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January 2020 Volume 3, Issue 1

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SIG Senior Chair

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SIG Junior Chair

"The future potential for self-regulation researchers to contribute to the development of a scientifically based "best practice" computer curriculum is limitless."
Barry J. Zimmerman

Great 21st-Century Self-Regulated Learning Words That Impacted, Inspired, Exhorted, Defined, & Motivated Learning, Teaching, Performing, and Researching

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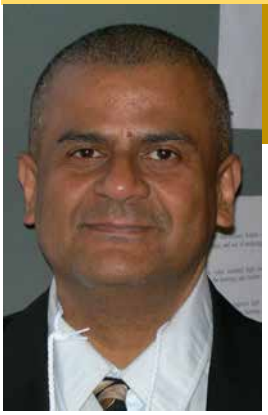
Editorial: Great 21st-Century Self-Regulated Learning Words

Dr. Héfer Bembenutty



Dr. Héfer Bembenutty is an associate professor in Educational Psychology at Queens College of The City University of New York in the Department of Secondary and Youth Services. His research focuses on the role academic delay of gratification, self-efficacy, and self-regulation on learning and performance. With his colleagues, he advances the *Cyclical Self-Regulated Learning Culturally Proactive Pedagogy Model*.

With jubilance, our Studying and Self-Regulated Learning (SSRL) Special Interest Group (SIG) of the American Educational Research Association (AERA) has entered the last year of the second decade of the 21st-century. Our SIG has a lot to celebrate. We have transcended boundaries. Our annual meetings have been of tremendous success with great attendance, multiple awards, phenomenal keynote speakers, and significant contributions by junior and senior scholars and graduate students. Our SIG continues to be committed to diversity, equity, inclusion, and social justice with a focus on self-regulated learning science and technology. Our SIG is committed to its members and their betterment.

The different volumes and issues of our Times Magazine provide scientific information that educators, researchers, practitioners, and policymakers can use to make this world a better place for all. The present issue of our Times Magazine continues that tradition.

The present issue of our Times Magazine focuses on ***Great 21st-Century Self-Regulated Learning Words*** that impacted, inspired, exhorted, defined, advanced, and motivated learning, teaching, and researching. The inspiration for this particular issue came to light when I bought the book *Great Speeches That Changed the World* (Andrews, Strasen, & Taylor, 2019). The book showcases speeches that inspired, exhorted, and energized others. It contains speeches and essays from influential leaders from around the world (e.g., Dr. Martin Luther Kings, Jr's *I Have a Dream*, Nelson Mandela's *Freedom For All*).

In this particular issue, we selected a few exemplary scientific words delivered by members and friends of our SIG since the year 2000. The authors needed to be single authors or both authors needed to be stellar contributors (e.g., Karen Harris & Steven Graham). Given limited space is the only reason why other transformational words from tremendous authors were not included, it should not be construed as a judgment of the quality of others. Barry J. Zimmerman was selected for the cover page since he is one of the founder members of our SIG.

Make no mistake: Each word included in this special issue is simultaneously humbling and powerful, and holds the potential to inspire research, community service, and new teaching approaches. It is our hope that this special issue will stimulate the educational community to work to benefit learners from historically underserved, marginalized, and minoritized communities, music and sport learners, health care patients, and more.

We hope that the inspiring words of these authors increase your comprehension of studying and self-regulated learning research and that you can join these highly motivated scholars in their quests for advancing research with diverse learners with powerful technological tools. Our path forward must include critical and practical applications that continue impacting and motivating learning, teaching, and researching.

The present issue of our Times Magazine focuses on *Great 21st-Century Self-Regulated Learning Words* that impacted, inspired, exhorted, defined, and motivated learning, teaching, and researching.

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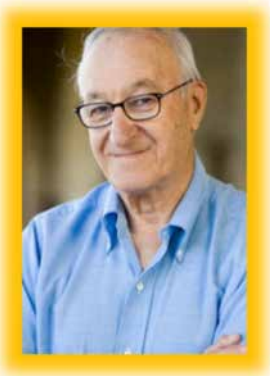
Great SRL Words
Albert Bandura & Barry J. Zimmerman



Dr. Albert Bandura is a **Canadian-American psychologist** who is the **David Starr Jordan Professor Emeritus of Social Science in Psychology at Stanford University. Bandura has been responsible for contributions to the field of education and to several fields of psychology, including social cognitive theory, therapy, and personality psychology.**

Perceived self-efficacy occupies a pivotal role in the causal structure of social cognitive theory because efficacy beliefs affect adaptation and change not only in their own right, but through their impact on other determinants (Bandura 1997, Maddux 1995; Schwarzer 1992). Such beliefs influence whether people think pessimistically or optimistically and in ways that are self-enhancing or self-hindering. Efficacy beliefs play a central role in the self-regulation of motivation through goal challenges and outcome expectations. It is partly on the basis of efficacy beliefs that people choose what challenges to undertake, how much effort to expend in the endeavor, how long to persevere in the face of obstacles and failures, and whether failures are motivating or demoralizing. The likelihood that people will act on the outcomes they expect prospective performances to produce depends on their beliefs about whether or not they can produce those performances. A strong sense of coping efficacy reduces vulnerability to stress and depression in taxing situations and strengthens resiliency to adversity. (Bandura, 2001).

Dr. Barry J. Zimmerman **is a Professor Emeritus at the City University of New York, and a Distinguished Professor of Educational Psychology. He has written scholarly publications on learning and motivation, many describing his research and theories on self-regulated learning. In 2011, Zimmerman was awarded the E. L. Thorndike Career Achievement award by the American Psychological Association's Division of Educational Psychology.**

To address the issue of causal relations between SRL processes and key motivational beliefs, and learning outcomes, I (Zimmerman, 2000) proposed a cyclical model of SRL based on social cognitive theory. According to this model, a student's learning processes and accompanying motivational beliefs fall into three self-regulatory phases: forethought, performance, and self-reflection... Forethought phase processes are used in preparation for efforts to learn and are intended to enhance that learning. Performance phase processes are employed during efforts to learn and are intended to facilitate self-control and self-monitoring of one's performance. Self-reflection phase processes occur after efforts to learn and are intended to optimize a person's reactions to his or her outcomes. These self-reflections, in turn, influence forethought processes and beliefs regarding subsequent efforts to learn-thus, completing a self-regulatory cycle. The cyclical properties of this model are designed to explain the results of repeated efforts to learn, such as when learning a new language. (Zimmerman, 2013).

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Great SRL Words: Bracha Kramarski, Tova Michalsky, & Darolyn A. Glaggs

Future researchers would do well to expand empirical scrutiny of the multidimensional dual-role training model. In the studies presented here, the model was assessed for preservice teachers in university classrooms in the science domain (i.e., TPCK) and inservice teachers in authentic school classrooms in the mathematics domain (i.e., problem solving), focusing on metacognition in the self-regulation cycle oriented to planning, monitoring, and evaluation phases. Furthermore, transfer ability was tested only on an SRT-oriented lesson design... Future studies should extend study of the model to other academic domains and self-regulation aspects like motivation and affect… The multidimensional training model offers a blended, practical, web-based means, within class activities, to stimulate dual-role considerations in teachers at all stages of their career, through a user-friendly set of self-questioning prompts embedded in classroom scenario analysis and lesson design, aiming to arouse trainees' awareness about *what*, *how*, and why self -regulation happens and *by whom*: by teachers (i.e., SRL or SRT) or by students (i.e., SRL). The model offers workable guidelines for enhancing professional training by fostering the acquisition, activation, and application of teachers' SRL/SRT as *agents* to promote students' SRL... This clear operational program may be widely applied in diverse professional settings, from the university classroom to mentoring sessions in the field, thereby inserting the concept of self-regulation as an integral part of teachers' critical reflective discourse… (Kramarski, 2018)

Dr. Bracha Kramarski is an Associate Professor of Education, Department of Education, University of Bar Ilan at Ramat—Gan, Israel. Her research focuses on investigation of meta-cognition in learning and self-regulated.

Research should investigate the scheme's sensitivity to all of the SRL subcomponents including the cognitive, metacognitive, and motivational strategies for direct SRL teaching and the cooperation, constructivism, situatedness, and self-direction principles for indirect arrangement of SRL-promoting learning environments. Such analysis will provide more detailed data about teachers' ability to design SRL-infused instruction for students' learning (e.g., Kramarski & Michalsky, 2010; Michalsky & Schechter, 2013; Michalsky, 2012). Additional discriminant validation of the scheme is also recommended by administering the scheme along with other tests on diverse teacher samples and other subject matters… Active management of motivational processes is an essential but less investigated component of teaching SRL (Wolters, 2003; Zimmerman, 2008). It is insufficient to possess and regulate the ''skill'' – one must also possess and regulate the ''will'' (Schraw & Brooks, 2001). Motivationally well-regulated learners reveal good self-efficacy in their ability to learn, and they report intrinsic interest in the tasks at hand… Students with higher meta-motivational knowledge may regulate their motivation more productively, spend more time on task, develop higher self-efficacy for learning tasks, and experience fewer situations where they refrain from beginning a task, provide inadequate effort, or disengage before a task is complete. All this may increase their learning processes and academic achievements. In addition, the current study opens a window to investigating the correlation between teachers' frequency of teaching different SRL component strategies (cognitive, metacognitive, and motivational) and these strategies' links to their students' achievements. (Michalsky, 2014)

Dr. Tova Michalsky is a Senior Lecturer, Head of the Teacher Education Program and Head of the Learning and Teaching Sciences Program investigating preservice teachers' professional growth in self-regulated learning environments..

Perceptions of institutional characteristics have the potential to greatly influence students' sense of belonging and racial academic achievement gaps. Factors such as campus racial climate can act as either pathways to persistence or barriers to retention, particularly for African American students… Though the interaction with sense of belonging and African American students was statistically significant, it is unclear what other factors outside of their perceptions of the campus racial climate contributed to their feelings of belonging. Extending this research to include interviews and focus groups with study participants may yield more insight on the antecedents to African American students' perceptions and sense of belonging. Student voices add another layer of understanding and clarification that would be beneficial in unpacking the results more. Continued research in this area is imperative and increased attention is necessary to expand previous models of student persistence and account for social inequities that may go beyond academic under-preparedness. Future studies should not just explore ways to help students feel a stronger sense of belonging by using coping strategies, but also explore ways to change the campus racial climate to be less hostile and more supportive. Further, future research should examine this path model at different types of higher education institutions such as small liberal arts colleges, Historically Black Colleges and Universities (HBCU's), and community colleges. The culture of different institutional types may introduce other variables that may be more pertinent for some populations than others. In addition, studying the path between campus racial climate and sense of belonging at different levels (e.g., student-student, student-faculty, student-staff, student-major department, and student-dorm) may be fruitful avenues to explore in an attempt to more holistically understand the impact and influence of these variables. (Flaggs, 2018)

Dr. Darolyn A. Flaggs is an Assistant Professor of Education at Kennesaw State University. Her research focuses on college students' perception of belonging, racial climate, and motivation.

AERA SIG Studying and Self-Regulated Learning

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Great SRL Words:
Pamela F. Murphy, Charles B. Hodges, Marie C. White, Avi Kaplan, & Maria K. DiBenedetto

For instructional designers, instructional technologists, and anyone considering offering math courses in an emporium, or similar, format the results of the present study are important. The courses should be designed to include elements which address the vicarious and affective/ physiological components of self-efficacy. Purposefully including these elements in the courses may enhance learner self-efficacy. Enhanced self-efficacy, in turn, should have a positive effect on achievement. Orientation activities could include testimonials from former students relating strategies for success, which would enhance the vicarious components of self-efficacy. Since students are free to work on the course at times of their choosing, then strategies could be suggested to students for doing their weekly studies at times when stress and anxiety can be minimized, thus assisting with the affective/ physiological components of self-efficacy. Helping students manage their time to avoid stress and anxiety may likely involve self-regulation techniques. Given the close relationship between self-efficacy and self-regulation, it should not be surprising that incorporating self-regulation training would be a benefit. (Hodges & Murphy, 2009)

Dr. Pamela F. Murphy teaches in the Psychology programs at Ashford University. She has an interest in student engagement in asynchronous online classes.

Dr. Charles B. Hodges is a Professor of Instructional Technology at Georgia Southern University.

Rather than accepting the evolved representations of cognitive modeling, educators should consider developing a defined and measurable construct of modeling that can be applied to peer modeling, teacher modeling, video modeling, and self-modeling. Measurement of modeling effectiveness and students' self-regulation should be incorporated into lesson planning with assessments of specific behavioral actions and responses targeted with outcome expectations for observational level goal attainment. In addition, more emphasis on training teachers how to prepare for observational learning segments would focus their attention on the organization of the task and the elements required to model the task... Making both the model and the observers fully aware of their functional roles and the behaviors that indicate proactive learning is critical to the success of learners in present-day classrooms. The topic of cognitive modeling and self-regulation should stimulate further discussion and generate empirical evidence that can support the validity and practicality for implementation in the 21st-century classroom. (White, 2017)

Dr. Marie C. White is Professor of Educational Psychology and Chair of Childhood and Adolescent Education at Nyack College.

An important conceptual conclusion of the current analysis is that metacognition, self-regulation, and self-regulated learning are not distinct concepts. Rather, they are subtypes of the same general abstract phenomenon of self-regulated action. Hence, self-regulation itself is not a unitary construct: there is no one set of cognitive, metacognitive, motivational, and behavioral strategies that constitutes the desirable mode of engagement in every setting and task. There are many types of self-regulated action that are more or less appropriate for different tasks, in different domains, in different sociocultural contexts, and for different students. Importantly, these types of self-regulated action are inseparable from the purpose of engagement in the task. The purpose of engagement constitutes a comprehensive psychological framework within which different self-aspects, objects of regulation, and strategies are integrated to form the type of self-regulated action relevant for engagement in the task. Therefore, purpose of engagement may guide researchers and practitioners in defining the type of self-regulation they wish to promote and in constructing educational environments and tasks that provide affordances for such purposes and self-regulated action. Unfortunately, currently, many students do not adopt learning as their main purpose of engagement in school. Despite its common use in the literature, it seems that types of "self-regulated achievement" are much more prevalent than types of "self-regulated learning." (Kaplan, 2008)

Dr. Avi Kaplan is Professor of Educational Psychology at *Temple* University.

Research on self-regulated learning has grown exponentially over the last several decades (Schunk & Greene, 2018; Zimmerman & Schunk, 2011) but there appears to be a lack of research showing its application to classrooms in meaningful ways (Anderman, 2011). Fortunately, many of us have had one or more excellent teachers who have enhanced our motivation, helped us stay on task, taught us how to keep track of our progress, and modeled how to attribute outcomes to controllable factors such as strategy use and effort. These teachers have modeled self-regulated learning processes and taught students how to be self-directed and to transfer these abilities to other situations. The processes of academic self-regulated learning provide learners with essential skills needed for life-long learning. Once students graduate from high school, they make a series of important decisions that impact their future. They are faced with career and college decisions, challenges that come from families and interpersonal relationships, health and family needs, and important philosophical questions about their own purposes in life. High school represents a period of time in which students are experiencing less structure in their academic environment, in addition to increases in coursework, homework, and responsibility (Zimmerman, 2002). It is critical at this time for educators to instill self-regulatory skills that will foster success in school and in life. (DiBenedetto, 2018)

Dr. Maria K. DiBenedetto is a Lecturer/Director of Assessment and Reporting - Bryan School of Business and Economics at UNCG.

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Great SRL Words: Claire Ellen Weinstein, Frank Pajares, & Wilbert (Bill) J. McKeachie

Originally, we believed that college readiness meant having the requisite prior content knowledge to do college-level work and therefore created remedial courses in all sorts of subject areas… The developmental education movement, particularly in math, reading and writing, is a very positive step towards increasing students' college readiness and a necessary one. However, it is not sufficient. So many policy reports are coming out now blasting developmental education and its effects on college student preparedness, but they are very misleading. As I said, developmental education is crucial for helping at-risk college students succeed, but there is another part missing that I think would greatly improve the outcomes of developmental education. That part is strategic and self-regulated learning instruction. We need to help students become more strategic learners through coursework, workshops, paired courses, and the introduction of teaching learning-to-learn into most, if not all, college courses, including other developmental education courses. We have opened up higher education to a wider range of students than any other country, particularly at the community college level. Along with this admirable change, however, we need to do more to help them succeed in college. It is not ethical to do anything else. (interviewed by Acee, 2009).

Dr. Claire Ellen Weinstein was a Professor Emeritus at the University of Texas at Austin who made significant contributions to the fields of strategic learning and college readiness, and self-regulated learning.

The "specifics" of what a teacher might do during any classroom activity to foster self-efficacy will depend on the student and the context of the situation. As you know, there are no recipes to teaching. As I said earlier, however, I think that the art of teaching consists of teachers keeping a dual focus on the importance of their students developing confidence and competence. During any 45-minute period, teachers can influence their students' self-efficacy in numerous ways, not the least of which are the modeling practices in which they engage, the verbal persuasions they provide, the type of feedback they offer, the manner in which they help their students interpret their own mastery, and the stress, anxiety, or serenity they bring to the classroom activity. Every action a teacher takes toward a student helps shape that student's competence and the beliefs that accompany that competence. (interviewed by Bembenutty, 2007).

"If I could use a metaphor, I think of self-efficacy and of self-regulation as kissing cousins. There certainly have a symbiotic relationship. Students regulate and manage their academic progress through the process of self-regulation, a metacognitive process that requires students to explore their own thought processes so as to understand and evaluate the results of their actions and to plan pathways to success."

(Pajares, 2007)

Dr. Frank Pajares was a professor at Emory University in Educational Psychology. He received many awards including Emory Williams Award for Distinguished Teaching and the Crystal Apple Award.

It is not just learning to learn; it is understanding the theory behind how students learn so that the teachers learn to teach more effectively. Teachers as well as preservice teachers need to learn self-regulation for the sake of their own learning and practice... I think every one needs to be a self-regulated learner. Essentially, everyone has some ability to set goals and figure out ways to achieve those goals and carry out appropriate actions, which is a form of self-regulation. Teachers and preservice teachers will always encounter problems in their classrooms and will need to think about these problems and establish strategies for coping with them. Teachers need to teach their students how to become self-regulated learners. This process is what we talked about in learning to learn. Our goal is to develop learners who will continue to learn once they leave the classroom. Thus, students need to learn to set realistic goals, understand how to achieve them, and develop a sense of self-regulation for their learning. In this way, they will most likely continue learning for the rest of their lives. (interviewed by Bembenutty, 2010).

Dr. Wilbert J. (Bill) McKeachie was an American psychologist. He served as president of the American Psychological Association, the American Psychological Foundation and the American Association of Higher Education.

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Great SRL Words: Aubrey Whitehead, John L. Nietfeld, & Krista R. Muis

By directing their own goal-specific behavior (e.g., effort to earn higher math grades) and self-regulatory behaviors (e.g., persevering through difficult tasks) at school, SCCT (Social cognitive career theory) offers that learners actively engage in behaviors which lead toward their career goal... Billions of dollars of Federal funding have been allocated for STEM education research to address the employment gap. To reduce the burden to taxpayers, educational efforts must be introduced to help interested students achieve STEM degrees. Increasing the number of STEM college graduates will show benefits for the nation across all aspects of humanity; with current and future implications... Students believe on their motivation to earn a STEM degree was borne from inside themselves. However, those closest to students whose opinion they respect and trust influence their career decision-making process. Whether STEM influence from mothers, friends, and high school STEM teachers is subtle or obvious, these recommendations and suggestions encourage students to follow a path toward STEM careers. As Bandura (1997) stated, the higher a student's level of motivational factors (such as self-efficacy and subject interest), "the better they prepare themselves educationally for different occupational careers, and the greater their staying power in the chosen pursuits" (p. 161)... Different FFE (Family, Friends, and Educators) subgroups have greater or lesser influence at certain points in student's educational and career journey. Overt influence of parents during early childhood may make way for friends during adolescence, and then teachers and college prep counselors during high school. It is difficult to track what experiences, conversations, or suggestions from those closest to students will initiate and sustain a willingness to pursue a STEM major and career. Student perception of who, when, and how these groups nurtured this idea must be better understood to help support their STEM degree attainment and career path. (Whitehead, 2019)

Dr. Aubrey Whitehead
is a Perry-Williams Postdoctoral Fellow in Psychology at The College of Wooster. His research interests are STEM education, social group, and self-regulated learning.

Using Digital Games to Promote Self-Regulated Learning

The unique qualities of games also increase the opportunity to promote SRL skills as outcomes. Consider games that require evidence of accurate monitoring, the use of multiple strategies, or indicators of growth mindset to earn badges, gain points, or unlock hidden game features. Digital games can be created to leverage the engagement that these features support and produce SRL variables as outcomes. The opportunity to study SRL variables as outcomes of digital games is currently wide open. Can playing digital games improve conditional knowledge and therefore learners' ability to understand when and why to apply strategies outside of the game? Can digital games help improve the domain-specific or general monitoring skills of learners? Can digital games, if played over many sessions, impact learners' mindsets or increase mastery approach goal orientations? Can games teach learners adaptive help-seeking skills that transfer outside of the game context? These are just a sample of questions that could have profound implications for digital games in practice.

Research in digital games related to SRL has yet to gain a strong foothold in the literature but appears to be at a tipping point. Numerous game-based studies framed by SRL theory and even more SRL studies from computer-based learning environments and intelligent tutoring systems are paving the way for the study of SRL in digital games. Current research shows great promise for SRL to impact learning in digital games; however, a more integrated approach to incorporating and targeting all facets of self-regulation is needed. SRL skills can have a significant impact for learning in games and can also be important products of games. (Nietfeld, 2018)

Dr. John L. Nietfeld is a professor of Educational Psychology, North Carolina State University. His research focuses on self-regulated learning and metacognition.

I suggest that researchers measure relations between epistemic beliefs and self-regulated learning in the context of actual learning. To examine why epistemic beliefs are related to self-regulated learning, as Muis et al. (2006) recommend, domain-specific epistemic beliefs should be measured, and facets of self-regulated learning can be captured using interview, observation, and think aloud protocols. To explore whether epistemic beliefs are activated during Phase 1 of self-regulated learning, learners can be given a specific task and, prior to engaging in that task, questions can be asked that tap into learners' definitions of the task (Jamieson-Noel, 2005). Then, to assess whether epistemic beliefs influence the standards students set for learning, various measures can be used to evaluate students' comprehension standards, epistemological standards, or other standards across various types of goals that students set. Once goals are produced, a think aloud protocol can be used to observe the types of cognitive and metacognitive strategies students use to engage in the task. Using this methodology, one can assess the mechanisms by which epistemic beliefs influence self-regulated learning and, subsequently, achievement. Coupled with sophisticated analytic techniques, the research proposed here may provide a richer and more in-depth analysis of the role that epistemic beliefs play in self-regulated learning. Moreover, to examine how self-regulated learning may play a role in the development of epistemic beliefs, as Shadish, Cook, and Campbell (2002) argued, randomized experiments are needed that allow researchers to examine cause-and-effect relationships and to describe the consequences attributable to varying a treatment. (Muis, 2007)

Dr. Krista R. Muis is an associate professor, Department of Educational and Counselling Psychology. Her research interests are in the areas of epistemic cognition, emotion, self-regulated learning, and conceptual change.

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Great SRL Words: Karen R. Harris & Steve Graham

Dr. Karen R. Harris and Dr. Steve Graham are the Mary Emily Warner Professor of Education, Arizona State University.

Self-Regulated Strategy Development (SRSD) Stages of Instruction* (Harris & Graham, 2009, 2017)

1. Develop and Activate Knowledge Needed for Writing and Self-Regulation

- read and discuss works in the genre being addressed (persuasive essays, reports, etc.), to develop declarative, procedural, and conditional knowledge (e.g., *What is an opinion?, What does it mean to persuade?, Why is it important to think about your readers? What are the parts of a persuasive essay, are they all here?; How do you think the author came up with this idea, what would you do?; What might the author have done to organize the ideas?; What might the author done when he/she got tired or frustrated?,* and so on), appreciation of characteristics of effective writing (e.g., *How did the writer grab your interest?*), and other knowledge and understandings targeted for instruction. Continue development through the Model It stage as needed until all key knowledge and understandings are clear.
- explore and discuss students' current beliefs, attitudes, and feelings/ emotions about writing/when they write. Discuss what helps them, what gets in their way, and how.
- **discuss and explore both writing and self-regulation strategies to be learned (we typically begin development of self-regulation, introducing goal setting and the goals we will be working on)**

2. Discuss It – Discourse is Critical!

- **further discuss students' current writing and self-regulation abilities, their attitudes and beliefs about writing, what they are saying to themselves as they write, and how these factors might help or hinder them as writers; emphasize role of both effort and powerful strategies in becoming a better writer (begin development of attributions to knowing the "tricks" of writing and to effort in order to strengthen motivation and self-efficacy for writing)**
- graph number of genre specific essay elements and other goals targeted included in pretest or prior essays; this assists with goal setting and tracking progress in writing (graphing prior writing can be skipped if students are likely to react negatively)
- **further discuss writing and self-regulation strategies to be learned: purpose, benefits, how and when they can be used or might be inappropriate (this assists with generalization as well as initial learning)**
- introduce graphic organizer for the writing genre and task being addressed
- analyze good, grade appropriate model papers (we often have to write these essays ourselves or collect them from peers, as text found in the classroom is typically above many or most students' writing levels)
- take notes from these papers on a graphic organizer to assist students in learning to make notes (we find that many students need practice and support in learning to make notes rather than writing full sentences on graphic organizers)
- with the teacher, analyze poor essay(s), make notes for a better essay on a graphic organizer, and write this essay collaboratively
- establish students' commitment to learn strategies and act as collaborative partners; further establish role of student effort and strategy use in becoming an effective writer
- give students copies of the appropriate mnemonic chart and graphic organizer when appropriate in Stages 1 and 2 for their writing files (these are used throughout stages 3-5 as supports for memory and performance and are gradually faded; see following stages)

3. Model It

- **teacher modeling and/or interactive, collaborative modeling of writing and self-regulation strategies, including self-statements, goal-setting, self-assessment, and self-reinforcement; teacher refers to the mnemonic chart and graphic organizer during the writing process (it is not necessary for teachers to model alone while students watch and listen, many teachers prefer interactive, collaborative modeling while maintaining control of the writing process and modeled elements)**
- **peers may act as models if appropriate, in small groups or for the class; teachers have videotaped former/current students modeling and explaining their use of the writing and self-regulation strategies and used these videos in SRSD instruction as helpful**
- analyze and discuss strategies and model's performance; make changes as needed; discuss how students will use or modify aspects of the model's performance
- **students develop and record personal self-statements to assist them throughout the writing process and use of the writing and self-regulation statements (these are now kept in students' writing files and used as another support through Stage 5)**
- model self-assessment and self-recording through graphing of collaboratively written compositions
- **promote student development of self-regulation and writing strategies across other tasks and situations; discuss use in other settings (continue generalization support)**

4. Memorize It

- although begun in earlier stages, require and confirm memorization of strategies, meaning and importance of each step in each strategy, mnemonic(s), and self-instructions as appropriate
- continue to confirm and support memorization in following stages, make sure students have memorized the mnemonics, what they mean, and the importance of each step before Independent Performance (as one student told us, "Of course you can't use it if you can't remember it!")

5. Support It

- **teachers and students use writing and self-regulation strategies collaboratively as needed to meet all of the goals identified for composing in this genre while using the visual supports in students' writing folders (the mnemonic strategy chart, graphic organizer, personal self-statements sheets, and targeted words lists such as linking words or "million dollar words"/effective vocabulary**
- challenging initial goals for genre elements and characteristics of writing established collaboratively with students and individualized as needed; criterion levels increased gradually until final goals met
- peers can collaborate in planning, composing, and revising/editing as appropriate; peer support strategies may need to be taught
- graphic organizer replaced with student creating mnemonic based organizer on scratch paper (this makes use of the strategy "portable" and not reliant on the physical graphic organizer)
- prompts, guidance, and collaboration faded individually until the student can compose successfully alone
- **self-regulation components (goal setting, self-instructions, self-monitoring and self-reinforcement) are all being used by this stage; additional forms of self-regulation, such as managing the writing environment, use of imagery, and so on may be introduced**
- **discuss plans for maintenance, continue support of generalization**

6. Independent Performance

- **students able to use writing and self-regulation strategies independently; teachers monitor and support/enhance as needed**
- **fading of overt self-regulation may begin (graphing may be discontinued, self-statements sheets may not be out during writing, and so on)**
- **plans for maintenance and generalization continue to be discussed and implemented**

** Aspects of affect, cognition, and behavior are addressed in each stage; a "stage" of instruction is not equivalent to a single lesson; Stages 1 and 2 are often combined in instruction; a stage or combination of stages may take several lessons to complete; Stages 3 and 5 typically take the most time in instruction; instruction is often recursive across stages; students should progress across stages as they meet criteria for doing so.*

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Great SRL Words: Monique Boekaerts, Jacquelynne S. Eccles, & Lyn Corno

Engagement refers to a student's active involvement and participation in school-based activities, more concretely it entails students' reactions to and interactions with the learning material as it is embedded in the physical, instructional and social environment. The learning tasks, the learning environment, and the instructions put the students' cognitive, conative and behavioral systems at work. All these systems contribute in some way or other to the quality of the students' reactions to and interactions with the learning tasks and their contexts. But does involvement of these different systems imply that the whole of psychology should be incorporated into a theory of engagement? Certainly not. We need to identify the crucial elements of the engagement process and separate them from the peripheral aspects that have been introduced into the engagement literature over the years. I fully realize that all these aspects of psychological functioning (affect, interest, motivation, volition, and self-regulation) are implicated in engagement, but they are not the core of student engagement... the definition of student engagement is presently too broad and too conflated with related constructs. (Boekaerts, 2016).

Dr. Monique Boekaerts is a Belgian educationalist. She was a professor of pedagogy at the Radboud University Nijmegen and Leiden University.

Drawing upon person–environment fit theory, Eccles and Midgley (1989) proposed that the motivational and behavioral declines evident during early adolescence could result from the fact that junior high schools are not providing appropriate educational and social environments for early adolescents. According to person–environment fit theory, behavior, motivation, and mental health are influenced by the fit between the characteristics individuals bring to their social environments and the characteristics of these social environments. Individuals are not likely to do very well, or be very motivated, if they are in social environments that do not meet their psychological needs. If the academic and social environments in the typical junior high or middle school do not fit with the psychological needs of adolescents, then person–environment fit theory predicts a decline in motivation, interest, performance, and behavior as adolescents move into and through this environment. (Eccles, 2008).

Dr. Jacquelynne S. Eccles is an American educational psychologist. She is the Distinguished Professor of Education at the University of California, Irvine and formerly the McKeachie/Pintrich Distinguished University Professor of Psychology and Education at the University of Michigan.

We defined self-regulated learning as the highest form of cognitive engagement... Because motivation denotes commitment (goal setting) and volition denotes follow through (protecting goals), a full explication of goal pursuits in education requires accounting for both motivation and volition. Although I understand the need for theoretical parsimony, I have been puzzled by the resistance that reintroducing volition as a key construct in education has encountered among some in our educational psychology circles. But in recent years, I have seen a softening; the resistance existed primarily among motivation researchers who believed they were able to capture all that was needed about purposive striving by expanding the definition of motivational processes to include planning, implementation, and reflection… The function of conation that Snow urged me to study many years ago is an umbrella that covers both motivation and volition. (interviewed by Bembenutty, 2009).

> "I have to believe that some of my early thinking on the topic of self-regulated learning, and certainly the continued work on volition, came about when I moved my organization skills from what psychologists call the episodic (personal experience) to the semantic (theoretic principle) level." Corno, 2009

Dr. Lyn Corno is an adjunct professor of education and psychology at Teachers College, Columbia University. Her research interests are in conceptualizing self-regulated learning, homework, theory of volition, and self-regulation.

Great SRL Words: Akane Zusho

Integrative Model of Student Learning

Dr. Akane Zusho is a Full Professor of Educational Psychology in the Graduate School of Education at Fordham. University.

Like Fig 1, Fig. 2 generally outlines the antecedents and outcomes of learning. Specifically, it seeks to explain important cognitive outcomes of learning, such as deep understanding of content material and academic achievement, as well as behavioral outcomes such as academic risk-taking and indices of behavioral engagement such as effort, choice, and persistence. Thus, unlike most models of student engagement, this model of student learning differentiates motivation and cognition from behavior. It also focuses more on academic outcomes, rather than the social outcomes outlined in some models of student engagement (e.g., satisfaction, well-being, and personal growth). Although models of SRL are increasingly recognizing the social bases of learning, there is at present little to no empirical research to suggest that they are linked to such outcomes. Thus, for now, this model is limited to explaining academic outcomes. That said, an important area of future research would be to explore how these mostly academic variables ultimately can explain social outcomes, as well as more distal academic outcomes such as lifelong learning.

In terms of antecedents, in line with Pintrich's model of SRL, at the heart of the model is the interaction between motivation and cognition, specifically: a) motivational constructs related to competence (e.g., self-efficacy), meaningfulness (e.g., value, achievement goals, interest), autonomy, and belonging, and; b) use of cognitive strategies (e.g., elaboration, rehearsal, organization) and strategies related to regulation (planning, monitoring, control, and evaluation) of cognition, motivation, behavior, and context. I assume that these motivational and cognitive processes are influenced by both personal (depicted on the top side of the model) and contextual (depicted on the bottom side of the model) factors, which in line with Kahu's (Kahu 2013) model can be broken up into more proximal and distal factors. Rather than depict this interaction linearly (as we did in Fig. 1), the updated model takes a more situated, ecological approach, by depicting how motivational and regulatory processes are situated in both the person and in context at varying levels of influence. The model also recognizes that this interaction between the antecedent and outcome variables are embedded in a particular sociopolitical context.

In terms of more proximal influences, I consider contextual factors such as academic tasks, which can vary in content, level of difficulty, structure (i.e., extent to which the task is defined or open-ended), and the extent to which it supports students' use of SRL (with or without the use of technology). Similarly, instructional methods can vary; for example, in terms of how much an instructor supports students' autonomy, or engages in collaborative or group learning. On the more personal end, research consistently demonstrates the impact of prior knowledge on subsequent learning. For example, Alexander's(1997, 2004) model of domain learning (MDL) specifies an interaction between knowledge (both subject matter and topical knowledge) and depth of strategic processing (see also Dinsmore, this issue). Similarly, there is evidence to suggest (as highlighted by the work on patterns of learning and epistemic beliefs) that students' beliefs about learning can be important moderators of the relationship between motivation, cognition, and learning outcomes (Hofer and Pintrich 1997; Muis and Franco 2009; Muisetal.2015). The arrow between these more immediate personal and contextual factors also recognizes that these factors do not work in isolation but can interact with each other in important ways. Indeed, Kahu (2013) notes the important interrelationship between students and teachers; specifically, she suggests that engagement largely depends on what teachers and students do together.

As for distal influences, I consider personal characteristics such as age, ethnicity, personality (e.g., Big 5) as well as "lifeload" (or "the sum of all of the pressures a student has in her life", Kahu 2013, p. 767) and contextual factors related to curriculum, and degree of institutional support. Although I believe that these factors certainly play a role in the learning process, I assume that they exert their influence primarily through the proximal factors listed above. In addition, in line with Pintrich and Zusho (2007), this model also largely assumes motivational and regulatory processes to mediate the relationship between these personal and contextual factors and learning outcomes. (Zusho, 2017)

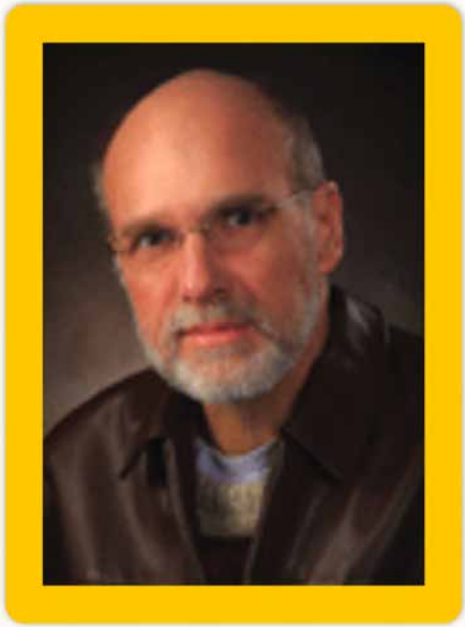
Great SRL Words: Paul R. Pintrich & George Michael Pressley

Dr. Paul R. Pintrich was an educational psychologist who made significant contributions to the fields of motivation, epistemological beliefs, and self-regulated learning. He was a professor of education and psychology at the University of Michigan.

It is not clear how students learn or develop these different strategies and tactics in general or how the strategies bind with or become associated with different goals. Research has shown that mastery-approach goals are associated with reports of self-regulated learning (Pintrich, 2000d), but it is not clear how and why this relation develops. It may be that there are some general costs associated with the use of various self-regulatory strategies in terms of extra time (e.g., self-testing and rereading text to repair lack of understanding takes more time than just reading a text once), but that a focus on learning makes these costs seem worthwhile or that time or other costs are not perceived in quite the same manner under a mastery-goal orientation. However, it is also possible that it may just be an issue of the accessibility and knowledge of certain types of strategies, with some students knowing more strategies than others and having more flexibility in associating different goals with these strategies (the issues of equifinality and multifinality, as noted previously). It is clear we need more developmental and microgenetic research on these issues, and at this point in the development of the field, simple one-shot correlational studies with self-report instruments will probably not provide us with much more knowledge gain. (Pintrich, 2003).

Dr. George Michael Pressley was an American educational psychologist. He received the E. L. Thorndike Award in 2004. He was born on April 25, 1951, in Sewickley, Pennsylvania. He graduated from Northwestern University in 1973 and received his Ph.D. from University of Minnesota in 1977.

What is specifically metacognitive about skilled, self-regulated reading? Recall that metacognition is knowledge about thinking, and metacognition about reading is specifically knowledge about reading and how reading is accomplished. Skilled readers know how to get meaning from text. At the letter and word levels, they know how to decode words and are very cognizant of the need to attend carefully to the individual letters and letter combinations in words that are not immediately recognizable, that sounding out words and blending the sounds is how to recognize unfamiliar words. The metacognitively sophisticated reader also knows to ask questions while reading, construct images of ideas being conveyed in text, and summarize what is being read. The metacognitively sophisticated reader knows that good reading involves being alert to the possibility that some parts of text are confusing. He or she knows to react to confusion with fix-up strategies, such as rereading. The metacognitively sophisticated reader knows comprehension strategies, knows to use them, and often does use them. (Pressley, 2002).



Great SRL Words
Anastasia Kitsantas & Mimi Bong

Dr. Anastasia Kitsantas is professor of Educational Psychology in the College of Education and Human Development at George Mason University. Her research interests focus on the role of self-regulation on learning and performance across diverse areas of functioning, including academics, athletics, and health.

Research shows that learning technologies can help students develop self-regulatory skills that in turn will sustain their learning efforts to accomplish their goals. However, it should be noted that the instructor also plays a critical role in self-regulation development. The degree to which students actively engage in self-regulation partially depends on the actions of the teacher and the classroom environment (Urdan & Turner, 2005). Focusing prematurely on outcomes and/or not offering students the opportunity to use different learning technologies to accomplish a goal could have detrimental consequences on students' motivational beliefs. Therefore, it is important for instructors to not only design environments that allow students to develop self-regulation, but also design lessons where students are provided with choice which in turn will encourage and motivate students to be proactive learners. For example, a research methods professor who instructs students to choose from a list of approved topics regarding writing a literature review for their final projects and offers a variety of learning technologies to assist them in organizing their research supports student autonomy (Deci & Ryan, 1985) and influences the amount of motivation, interest, and effort a student devotes to the task (Zimmerman, 2008)… Current research offers a number of guidelines for educators on how to use learning technologies to support student self-regulation. In summary, using LMS (Learning Management Systems) tools and other learning technologies, instructors can teach students how to set process-oriented goals to complete long-term projects. Using tools such as the calendar feature, instructors can trigger student strategic planning on how to accomplish these goals by providing specific deadlines and due dates to students. Virtual worlds where instructors plan all activities ahead prior to implementation and train students to navigate the virtual world and its basic functions can be used to model strategies (e.g., organizational, rehearsal, visualization, etc.) to help students work on course projects. Students can also be prompted to keep track and reflect on their progress via task aligned checklists, journals, and rubrics. (Kitsantas, 2013)

"Research evidence shows that self-regulated learning processes such as goal-setting, self-monitoring, and self-evaluation can be supported by using experience and resource sharing tools (e.g., blogs and wikis) whereas communication tools can enhance help-seeking behaviors." (Kitsantas, 2013)

Dr. Mimi Bong is Professor of Educational Psychology and the Associate Director of the Brain and Motivation Research Institute (bMRI) of Korea University and studies motivation of adolescents in school settings.

How much value students attach to the subject matter and their preferences toward task mastery and challenge in the subject were, in contrast, more distinct across domains. In particular, high school students demonstrated mastery goals that were clearly differentiated between subjects. This extreme domain specificity of mastery goal orientation contradicts the view that achievement goal orientations originate from stable personal dispositions (Duda & Nicholls, 1992; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997). Rather, results indicate that importance, usefulness, and intrinsic interest students perceive in the school subject may play a more meaningful role in guiding students to the mastery goal adoption. As expected, high school students' task-value perceptions were clearly differentiated across diverse subjects, presumably reflecting their relatively imminent concern with future college majors. Not only did mastery goal orientation show a similar pattern of cross-domain associations to that of task value, relationships between these two constructs became much stronger among the high school students than among the middle school students. One of the unanswered questions in the achievement goal research is where the goals come from (Urdan & Maehr, 1995). Although covariation does not imply causation, these results point to the need to investigate whether the mastery and performance goals are differentially affected by different sources. Differences in the cross-domain associations in turn determined the suitability of hypothesized hierarchical representations for each motivation construct...Therefore, assessing general academic value or general mastery orientations without referring to specific school subjects and tasks may be highly inappropriate at least for late adolescents. In general, high school students demonstrated more differentiated motivational beliefs than did middle school students...The results merely indicate that some motivational constructs appear to be more hierarchically structured than the others and that the nature of this hierarchy differs between different constructs and age groups. Perhaps the most pressing need for future research in this area involves uncovering the psychological grounds that create such a hierarchy and its change thereafter. There are many viable explanations of why students' academic motivation begins to differ across diverse subject areas as they grow older. However, whereas some of these mechanisms may be relevant to most academic motivation constructs, others seem pertinent mainly to a subset of these constructs. More research is needed on the social-cognitive processes underlying the differentiation of each motivation construct and on the differences in students' behavioral intentions before and after such differentiation. (Bong, 2001)

Great SRL Words
Peggy P. Chen & Sarah M. Bonner

The Framework: CA:SRL (Classroom Assessment:Self-Regulated Learning)

CA:SRL blends the core aspects of SRL with activities that are part of CA practice. As a subfield in the domain of measurement, CA comprises a wide variety of activities that teachers perform in order to obtain, analyze, interpret, and use information about student learning. As with other educational assessment, characteristics of the activities associated with CA relate to the validity of the inferences about learning that are drawn from the information, and the validity and fairness of information use. Drawing high-quality inferences requires attention to the assessment purpose, the content domain, the assessment tasks themselves, the evidence they produce, and the psychological processes that ground the student performance and teacher interpretation about that performance. In classrooms, teachers have great leeway in assessment content, methods, and interpretations. Considering teachers, therefore, as assessment-developers, we suggest that teachers' assessment activities should be guided by principles like those set forth in the Standards for Educational and Psychological Testing (AERA et al., 2014; hereafter, Standards), although necessarily adapted for classroom contexts (Bonner, 2017). The CA:SRL framework provides guidance for developing assessments so that they will be aligned to the assessment purpose and also support student self-regulation.

CA:SRL has four stages: (1) pre-assessment, (2) the cycle of learning, doing, and assessing, (3) formal assessment, and (4) summarizing assessment evidence (Figure 2). Each stage represents a necessary part of CA, from precise identification of the content domain for instruction and assessment, to the gathering of multiple sources of evidence in instructionally sensitive ways, to formal assessment of performance, to summation of multiple strands of evidence. In each stage, students and teachers engage in distinct SRL processes as they interact over assessment tasks. As shown in Figure 2, arrows between the stages illustrate the processes wherein teachers and students draw inferences from evidence, provide and receive feedback based on those inferences, and use those inferences to guide behaviour in the next stage. The model is cyclical, when summarization and reflection on a set of evidence from a cycle of assessment on a set of related instructional objectives have been performed, planning for new instruction and assessment gives rise to new pre-assessment and forethought.

Stage 1 of the CA:SRL framework comprises pre-assessment and SRL forethought. Assessment development begins with planning: articulation of the intended purpose, construct identification and delineation (AERA et al., 2014; Haladyna & Downing, 2011; Messick, 1994). In a classroom context, teachers begin to plan assessment with their content-domain standards, but must then narrow the domain to a scope that is appropriate for the particular social context in which they teach… **Stage 2** is the cycle of instruction and assessment for learning, which connects to the SRL performance phase. Stage 2 emphasizes interactivity in performance between teachers, students, and peers, relatively informal assessment techniques, and multiple iterations. In Stage 2 CA, teachers purposefully design and conduct assessment activities in order to examine the effects of instruction… In this stage (**Stage 3**), students are formally assessed at a point of instructional closure – after the last of a series of lessons that are unified by the standards they address, for instance. The CA:SRL framework defines a place for formal assessment in CA not just because of classroom exigencies, such as the need to manage the logistics of learning and instruction by separating instruction into units and academic terms… This stage (**Stage 4**) refers to summarizing performance of student learning, which we map onto self-reflection in Zimmerman's SRL model. At this time, teachers and their students have gathered evidence of learning and have engaged in instruction and assessment cycles, likely multiple times. Students have performed on a formal assessment, and teachers pause between instructional units or time periods. Teachers and students now do two things: summarize and evaluate. (Chen & Bonner, 2019)

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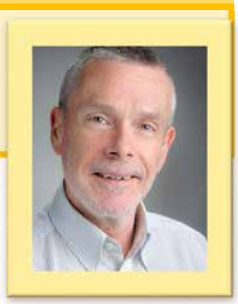
Great SRL Words
Philip H. Winne & Dale H. Schunk

Dr. Philp H. Winne is a professor of educational psychology at Simon Fraser University. Winne has made significant contributions to research on self-regulated learning. He is the principal investigator of the *Learning Kit Project*, which has developed educational software, now called nStudy, founded on principles of self-regulated learning.

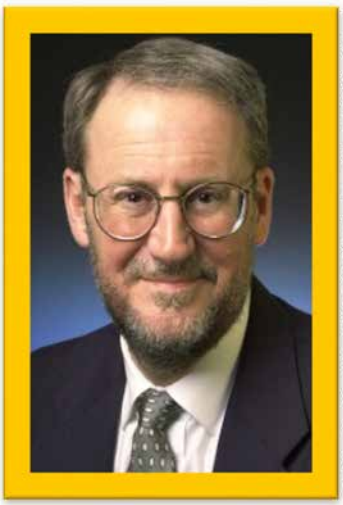


gStudy and Its Tools (Software That Has Evolved To nStudy)

Four principles underlie the design philosophy of gStudy (**software that has evolved to nStudy**). **First**, learners should have access to a wide variety of tools that afford them options for exercising agency as they go about their work to construct knowledge. **Second**, these tools should be appropriate for frequent use in diverse subject matters, across varied instructional contexts, and over a very long term (i.e., years). **Third**, to provide raw materials each learner needs to evaluate which methods for constructing knowledge really "work," abundant data should be collected about more than just the amount of knowledge that is constructed. Data that traces how learners go about constructing knowledge are essential for them (and researchers) to discriminate which study tactics and learning strategies work. **Fourth**, techniques for analyzing trace data in concert with other kinds of data, primarily data about achievement but also about time spent, should be available to learners (and researchers). Our research group's hypothesis is that, if all four principles can be realized, software systems like gStudy can help each learner to pull up his or her learning by its bootstraps because the software supports constant, intense, long-term, programmatic, learner-driven research on how to learn better. In other words, one of the aims is to help learners develop a personal program of design experiments that are progressively more and more effective. So, how might gStudy accomplish these goals? Learners use gStudy to engage with information in software-based learning kits. The information can be formatted as text, diagrams, photos, charts, tables, audio and video clips, and so forth—that is, the multimedia information formats found in libraries and on the Internet. Learning kits can be about almost any topic. As learners study in a learning kit, they can use gStudy's tools to create "information objects" and forge links between information objects. Kinds of information objects include notes, glossary entries, hierarchical (tree-structured) indexes, hierarchical labels applied to other information objects, entries in a table of contents, nodes and arcs and sets of nodes in concept maps, search queries, HTML documents, spreadsheet documents, documents that record chats learners generate in conversation with peers and with gStudy's software coach, and archives of Web sites. (Winne, 2006)

Dr. Dale H. Schunk is an educational psychologist, former Dean and current professor in the School of Education at the University of North Carolina at Greensboro. He has researched the effects of social and instructional variables on cognition, learning, self-regulation and motivation.

Bandura (1977) hypothesized that individuals acquire information about their self-efficacy from performance accomplishments, vicarious experiences, forms of social persuasion, and physiological indexes. Another key point of my research program is that, no matter the self-efficacy source, what is critical for self-efficacy and motivation is that students believe they are making progress in learning or are capable of making progress. Learners' perceptions of their learning progress or learning capabilities can be affected by numerous social, instructional, and other contextual variables… the effects of social, instructional, and contextual variables should be gauged not only on students' learning but also on their self-efficacy for learning. Some instructional variables that may improve learning may not have much effect on self-efficacy. For example, Bandura (1977) postulated that performance accomplishments are the most reliable source of self-efficacy information. Instructional conditions that provide much assistance to learners may help them learn but are unlikely to raise their self-efficacy much. Learners may simply attribute their enhanced performance to the assistance and doubt they can be successful on their own. In social cognitive theory, attributions are hypothesized to be key influences on self-efficacy. In subsequent research I expanded this model to include *self-regulation,* or learners' self-generated thoughts, behaviors, and affects that are systematically oriented toward their learning goals. This expansion fit nicely with my research focus, but it was through collaboration with Barry Zimmerman that I began to explore how self-efficacy and other motivational variables influenced various phases of self-regulation. Collaborations can be especially productive but it is essential to collaborate with persons with whom you work well. In my case the collaboration worked ideally even when we disagreed. We also became close personal friends. (Schunk, 2019)



Recommendations for Research on Metacognition, Self-Regulation, and Self-Regulated Learning

- Provide clear definitions
- Identify relevant theories
- Ensure that assessments clearly reflect processes
- Link processes with academic outcomes
- Conduct more educational developmental research
- Tie processes firmly with instructional methods

Great SRL Words
Allyson F. Hadwin & Deborah L. Butler

Dr. Allyson F. Hadwin is a professor of educational psychology in the Faculty of Education at the University of Victoria. She teaches graduate and undergraduate courses about learning, self-regulation, learning technologies, and research methods.

Winne and Hadwin (1998, 2008) model self-regulated learning as a dynamic and recursive process that unfolds over time and across tasks. We describe four global phases of self-regulated learning including: (a) constructing perceptions of the task at hand, (b) drawing on task perceptions, beliefs and experiences to define task specific goals or standards, (c) strategically enacting by applying self-selected tactics and approaches for engaging with the task at hand, and (d) engaging large scale adaptation by altering task perceptions, goals and strategies as needed within a task as well as carrying the regulatory knowledge and experiences forward to new tasks and situations. Underlying phases of SRL is a common cognitive architecture called COPES: conditions are the context for students' work in each phase of SRL comprised of: (a) external conditions or environmental factors (e.g., time, environmental cues, access to feedback), and (b) internal conditions or self factors (e.g., cognition, motivation, beliefs). Operations are what students do to create mental products in each phase of SRL including: searching, monitoring, assembling, rehearsing, and translating (SMART: Winne, 2001). Products are the cognitive, affective, or motivational results of each phase of SRL. Importantly, products in one phase of SRL become conditions for other phases. Evaluations are judgments students construct about products they create in each. Our view of regulation is that it is ubiquitous (Winne, 1995). Learners are active agents who regulate aspects of their learning on a regular basis both inside and outside of school. Learners regulate more skillfully or productively in some areas of their lives than in others, but all learners have an array of regulatory skills and strategies to draw upon. A critical feature of this model is that learners are agentic beings who strive toward goals and standards they self-define, even within the constraints of rigid rules and contextual restrictions. (Hadwin 2013)

"I argue that when self-regulated learning is viewed as a historically and contextually situated process, the landscape shifts to acknowledge the centrality of a wide variety of life challenges and experiences in affording opportunities for SRL to develop both inside and outside of school." (Hadwin, 2013)

Dr. Deborah L. Butler, University of British Columbia, Vancouver, Canada in the Education Department. She does research on collaboration and self-regulation in teachers' professional development.

Self-regulated learners engage recursively in a cycle of cognitive activities as they work through a given task (Butler & Winne, 1995; Zimmerman, 1994). To begin, self-regulated learners analyze task demands. When presented with a history report, for example, a self-regulated learner examines cues to determine what is required. The student might review notes from a teacher's verbal instructions or scrutinize assignment descriptions to extract information regarding the topic, expected procedures, required products, and/or marking criteria. As part of this process, the student would draw on his or her prior knowledge about what makes a good "report" (i.e., "metacognitive knowledge" about the task). For example, the student might recall that, in a report, teachers expect solid research, a clear and organized presentation, and/ or appropriate references. Task analysis is critical to effective self-regulation because it sets the context for further learning. Students base subsequent decisions (e.g., about strategies to use) on their perception of task demands… A challenge that confronts classroom teachers who wish to individualize instruction is that they need to divide their attention across many students at once. Thus, it is more difficult for them to assess individual needs and/or to provide oneon-one guidance of students' cognitive processing. But, as described above, teachers can (a) use procedural facilitators that guide cognitive processing to foster student success, coupled with interactive discussions that require students to make sense of learning processes, (b) engage students in interactive discussions about tasks, strategies, and monitoring, (c) require students to articulate and submit descriptions of emerging understandings as part of class assignments, (d) provide individualized feedback on task performance and students' learning processes, (e) require students to interpret feedback to provide direction for subsequent performance, and (f) vary instruction to include large-, small-, and one-on-one structures within which peers and teachers mediate students' cognitive processing. (Butler, 2002)

"To promote student self-regulation teachers must assist students to engage flexibly and adaptively in a cycle of cognitive activities (i.e., task analysis, strategy selection and use, and self-monitoring)." (Butler, 2002)

Great SRL Words
Roger Azevedo & Nancy E. Perry

Dr. Roger Azevedo is a Professor in the Department of Learning Sciences & Educational Research at the University of Central Florida. He is the Lead Scientist for UCF's Learning Sciences Faculty Cluster Initiative. His main research area includes examining the role of cognitive, metacognitive, affective, and motivational self-regulatory processes during learning with advanced learning technologies

Our research provides a valuable characterization of the complexity of self- and externally regulated learning processes in both laboratory studies and learner-centered science classrooms. We have begun to examine the dynamics of SRL processes--cognitive, motivational/affective, behavioral, and contextual--during the cyclical and iterative phases of planning, monitoring, control, and reflection during learning from hypermedia environments. One of the main methodological issues related to SRL that we address in our research is how students regulate their learning during a knowledge construction activity. We have developed trace methodologies of the type that are needed to capture the dynamic and adaptive nature of SRL during learning of complex and challenging science topics with hypermedia.

We have also begun to address some of the theoretical, methodological, and educational issues raised by several re-searchers… We use mixed methodology by combining experimental designs with a think-aloud method to produce both outcome measures and process data. Using think-aloud protocols has allowed us to map out how SRL processes influence qualitative shifts in students' mental models during learning with a hypermedia.

Our research has allowed us to examine the effectiveness of scaffolding methods in facilitating students' learning of complex and challenging science topics. By doing so, we have been able to reconceptualize the existing research on naturalistic human tutoring... by examining the role of scaffolding on SRL, while concurrently addressing fundamental... and contemporary criticisms of the role of scaffolds while learning with CBLEs... This is a critical issue that is beyond the scope of this article.

Last, our findings provide the empirical basis for the design of technology-based learning environments as metacognitive tools to foster students' learning of conceptually challenging science topics. However, these design decisions must also be based on the limitations and successes of current adaptive computer-based learning environments for well-structured tasks, current technological limitations in assessing learning of challenging and conceptually rich, ill-structured topics in hypermedia learning environments, and instructional decisions regarding "what, when, and how" to model certain key SRL processes in hypermedia environments. (Azevedo, 2005)

Dr. Nancy E. Perry is a Professor of Education, Dorothy Lam Chair in Special Education, Department of Educational and Counseling Psychology and Special Education, University of British Columbia, Canada.

Challenges for teaching SRL

Teaching toward SRL is not easy and teachers participating in my research experience several challenges in this regard. Many teachers struggle to design and implement complex tasks. In particular, they are challenged to meaningfully integrate skills and curricula and to connect students' learning to a larger project or learning agenda. As a consequence, their learning goals, processes, and products reflect surface as opposed to deep learning agendas, which limits opportunities for SRL... Teachers need to be supported in their efforts to promote self-regulation and SRL. My research involving preservice and inservice teachers (Perry, Hutchinson, & Thauberger, 2007; Perry, Walton, & Calder, 1999) indicates this may best be support from expert mentors). Toward this end, partnerships among researchers, teacher educators, and inservice professional development facilitators are needed to make the implementation of SRL promoting practices as widespread as research indicates they should be.

Challenges for studying SRL

Similarly, there are challenges researchers need to meet in order for knowledge about self-regulation and SRL to transform teaching and learning generally. Researchers need to continue studying children's regulation of learning in events/activities and as both an intra and interpersonal phenomena. This requires more studies in rather than about classrooms, collecting and analyzing group data and studying features of teaching and learning in concert (i.e. examining both opportunities and uptake). Also, more developmental (i.e. longitudinal) studies are needed to understand how children's regulation of learning develops over time and across contexts. Classroom research should be brought to scale. Widespread adoption of SRL promoting practices depends on demonstrating their utility and feasibility in large numbers of classrooms. Along these lines, research that links SRL promoting practices to general accounts of teaching effectiveness would sell their potential to transform teaching and learning in classrooms and schools. Finally, researchers need to expand their focus beyond classrooms to understand how school, district, and community influences afford and constrain opportunities for SRL in classrooms. (Perry, 2013)

"Choice is not synonymous with opportunities for SRL (i.e., all choices are not created equal). To support SRL, choices must require students to make meaningful decisions about learning and be accompanied by cognitive/metacognitive support and activity that prompts SRL (e.g., choosing a partner for a collaborative task on the basis of who will be most instrumental to learning). Without such support and activity, students may make poor choices that undermine productive regulation of learning." (Perry, 2013)

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Great SRL Words

Stuart A. Karabenick, Linda Bol, & Douglas J. Hacker

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What must be taken into consideration is that the designation "social" has long been defined in terms of the influence of another person that is real, imagined or implied (Allport, 1985; Cialdini & Goldstein, 2003). The absence of human interactivity when help is delivered via intelligent systems, therefore, may not mean the absence of social influence if an imagined or implied 'other' influences users of the system. An appropriate way to construe help seeking is to characterize it as a strategy that is especially susceptible to social influence, with the motivational consequences that implies. If that is the case, then the differences between ostensibly social-interactive help-seeking episodes (e.g., classroom questioning) and ICT systems is one of degree rather than kind (i.e., social versus non-social). Most obvious is the degree of privacy...To reiterate, there is much to be gained by an increased convergence of research in classroom and technology-based help seeking, including the facilitation of adaptive help seeking, the improvement of help provision, and a more complete understanding of the person and contextual influences on the help-seeking process. Understanding what is "social" in both contexts should accompany that effort given the rapid expansion of help delivery by artificial intelligent systems. (Karabenick, 2011)

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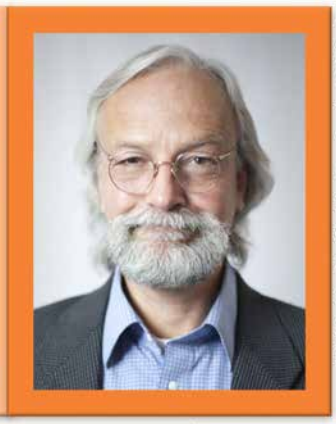
Calibration has been defined as the degree of fit between a person's judgment of performance and his or her actual performance (Keren,1991). As such, calibration reflects a metacognitive monitoring process that provides information about the status of one's knowledge or strategies at a cognitive level (Nelson, 1996). Based on this information, control at a metacognitive level can be exerted to regulate one's knowledge or strategies. Therefore, greater accuracy in a person's judgments of performance (i.e., being well calibrated) creates greater potential for self-regulation (Zimmerman and Moylan,2009)… Calibration research will be further advanced when we identify patterns of findings guided by sound theoretical models and based on precise descriptions of terms, measures, contexts, tasks, and populations. As we have argued previously (Hacker et al., 2008b), calibration has been measured in different ways but largely studied in more contrived contexts using college students. Granted, we must consider the trade -off between internal and external validity as we move into more naturalistic settings, such as classrooms and employ more authentic tasks. Various research methods with varying levels of control will better inform our questions overall. (Bol & Hacker, 2012)



"The broad research literature in educational psychology and the more specific literature on self-regulated learning reveal a growing interest in calibration that is well-warranted. For instance, students studying for a test need to be accurate in monitoring their knowledge acquisition and retention if they hope to successfully control further study. On one hand, students may develop a false sense of their mastery of studied material and overestimate how well they will perform. These students' positive biases could lead to premature termination of study and place them at risk for failure (Hacker et al., 2008a). On the other hand, students may underestimate how well they will perform. These negative biases also can be detrimental to academic performance because students may fail to disengage from studying and misallocate study time if they assume the material is not yet mastered. When students demonstrate strong biases in their calibration judgments, they may not take the remedial steps necessary to improve or evaluate their responses during or after an exam (Hacker et al.,2008b)."

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Great SRL Words

Jeffrey A. Greene, Daniel. C. Moos, & Christopher A. Wolters

The academic literature on self-regulation in education tends to fall into two camps, each of which addresses issues of critical importance to education and learning in the twenty-first century. In one camp, including but not limited to education, educational psychology, and learning sciences researchers, are those who study self-regulated learning (SRL), often defined as "the processes whereby learners personally activate and sustain cognitions, affects, and behaviors that are systematically oriented toward the attainment of personal goals" (p. 1). Self-regulated learners have both the "skill" and the "will" to learn. They possess skills to learn, such as effective learning strategies, and they know which of those strategies work for them in learning situations. They also have the will to learn, including positive motivation to get them started on a learning task and the volition to help them persist through to completing the task, even when it gets difficult. These skills and wills are powered by positive emotions, as well as positive interpretations of their emotions, whether they are positive or negative ones...

On the other hand, there is a second camp of scholars, often including but not limited to cognitive, developmental, and social psychologists, who study self-regulation in multiple contexts, including but not limited to formal and informal educational environments. For these scholars, self-regulation involves how people actively monitor, adjust, and maintain levels of cognitive, motivational, and emotional arousal in ways that fuel, rather than derail, their pursuit of goals, particularly in the face of challenges. From this perspective, self-regulation pervades all aspects of human functioning, such as when people pursue challenging goals such as losing weight, saving for retirement, or interacting in positive ways with teachers and peers in school. (Greene, 2017)

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Long gone are the days when technology was primarily used as productivity tools that embraced the notion of "tutor, tool, and tutee"...Hypermedia is considered an augmentation of hypertext and multimedia in the sense that this CBLE offers both interactivity and information presented in multiple formats. Future research should consider the relationship between navigation styles, intrinsic motivation, and extrinsic motivation. While the relationship between navigation styles and learning with hypermedia is an area that has been the focus of considerable research, the role of theoretically-grounded constructs of motivation in this relationship has received much less empirical attention. Considering the interaction between these variables will shed light on how these two motivation constructs affect learning outcomes, as demonstrated in this current study. Second, research from the field of Educational Psychology has given rise to various theoretical approaches to motivation... research should examine various motivation constructs when considering the complexities of the learning process... Motivation constructs related to Goals (i.e. mastery goal and performance goal), Interest (i.e. individual interest and situational interest), and Self-schema (i.e. attributions and self-efficacy) have also received considerable theoretical and empirical attention in the field. However, most of this research has not been conducted within the context of hypermedia learning... Given the documented individual differences in how students use hypermedia, examining other theoretically grounded constructs of motivation is a worthwhile direction for future research. Explaining individual differences through theoretically-grounded motivation constructs would be well advised. (Moos, 2010)

The present consideration of self-regulated learning and its relation to the 21st Century Competencies framework provides for three general conclusions as well as some implications for future research. **One conclusion** is that SRL encompasses many important skills, abilities and attitudes that substantially overlap with those viewed as core competencies for the 21st century. The level of conceptual similarity makes some of the core competencies appear nearly synonymous with dimensions of SRL. This conceptual congruity lends support to the critical importance of competencies such as self-direction, adaptability, flexibility, and collaboration...

A second conclusion is that SRL provides a viable theoretical basis for designing effective instructional interventions that, across diverse academic levels, populations of students and core content areas, can produce improvements in important academic outcomes. SRL is an effective framework for designing and implementing instruction that will improve students' learning, achievement and perhaps their longer term educational attainment. Again, one implication of this conclusion is that these same instructional models can be used to facilitate students' acquisition of the competencies within the 21st century framework...

A third general conclusion from this review is that empirical research that continues to foster a greater understanding of SRL and it relation to the 21CC framework would be useful. There are many fertile avenues for this research to take, including efforts that continue to establish the conceptual links between SRL and academic engagement and attainment for diverse groups of students across core content areas... (Wolters, 2010)

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Great SRL Words: Héfer Bembenutty, Heidi L. Andrade, & Timothy J. Cleary

The ability to delay gratification is the cornerstone of all academic achievement and education. It is by delaying gratification that learners can pursue long-term academic and career goals. In general, delay of gratification refers to an individual's ability to forgo immediate rewards for the sake of more valuable ones later (Mischel, 1996). Individuals who are able to delay gratification are known to have higher intelligence and higher academic achievement and to be more socially well adapted than individuals who succumb easily to immediate impulses and temptations. It is impossible to conceptualize a well-functioning society if its members are unable to prioritize between available rewards and those more important for which they will need to wait...In an academic content, however, academic delay of gratification refers to students' postponement of immediately available opportunities to satisfy impulses in favor of pursuing important academic rewards or goals that are temporally remote but ostensibly more valuable...Students and educators at the postsecondary education level would do well to give more attention to and integrate this self-regulatory phenomenon that is a central cornerstone of all academic achievement and performance. (Bembenutty, 2011)

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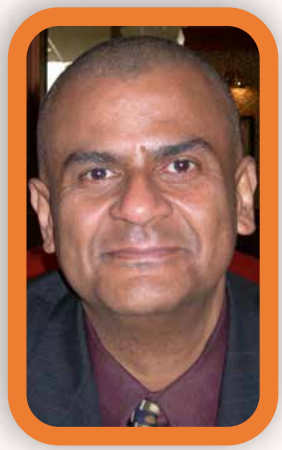

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Monitoring and self-assessing processes are practically synonymous with self-regulated learning (SRL), or at least central components of it such as goal-setting and monitoring, or metacognition. Research on SRL has clearly shown that self-generated feedback on one's approach to learning is associated with academic gains (Zimmerman and Schunk, 2011)… The association between self-assessment and learning has also been explained in terms of self-regulation... Self-regulated learning (SRL) occurs when learners set goals and then monitor and manage their thoughts, feelings, and actions to reach those goals. SRL is moderately to highly correlated with achievement (Zimmerman and Schunk, 2011). Research suggests that formative assessment is a potential influence on SRL… Conceptual and practical overlaps between the two fields are abundant. In fact, Brown and Harris (2014) recommend that student self-assessment no longer be treated as an assessment, but as an essential competence for self-regulation… Self-assessment is the act of monitoring one's processes and products in order to make adjustments that deepen learning and enhance performance. Although it can be summative, the evidence presented in this review strongly suggests that self-assessment is most beneficial, in terms of both achievement and self-regulated learning, when it is used formatively and supported by training. What is not yet clear is why and how self-assessment works. Those of you who like to investigate phenomena that are maddeningly difficult to measure will rejoice to hear that the cognitive and affective mechanisms of self-assessment are the next black box. Studies of the ways in which learners think and feel, the interactions between their thoughts and feelings and their context, and the implications for pedagogy will make major contributions to our field. (Andrade, 2019).

Although educators and school psychologists perceive issues of student motivation and self-regulation to be highly valuable and relevant to both student success and to their own work-related roles, they do not engage frequently in assessment, instructional, or intervention activities relative to these areas. This practice gap is particularly disconcerting because of the large number of students who exhibit motivation and strategic deficiencies in schools and because these deficits are often core characteristics in children and adolescents diagnosed with attention deficit hyperactivity disorder, learning disabilities, and emotional or behavioral disabilities.. Despite the wide array of motivation and self-regulation strategies and interventions available in the literature, steps need to be taken to ensure that school-based teachers and school psychologists have greater access to this knowledge base and more structured opportunities to practice using assessments and interventions targeting these processes. In a similar vein, training in motivation and self-regulation assessment methods should be a key focus in professional development and graduate training programs, particularly given that the current assessment tools recommended by self-regulation scholars differ from the measures commonly used in practice, such as self-report scales. Many self-regulation researchers have argued that self-report scales should be used with caution because they are typically decontextualized in nature and often rely on individuals' retrospective accounts of their behaviors (Winne and Perry, 2000; Zimmerman, 2008). As a result, these tools are not so effective at capturing the dynamic and fluid nature of self-regulation and motivation as are alternative assessment tools, such as microanalytic interviews, behavioral traces or observations, and think-aloud protocols (see Zimmerman, 2008, for a review of these assessment approaches). These alternative forms of assessment can be particularly effective in promoting intervention planning and development because they elicit direct information about students' regulatory processes, behaviors, and cognition as they occur in authentic, school-based contexts. (Cleary, 2011)

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Great SRL Words: Matthew L. Bernacki, Ellen L. Usher, & Taylor W. Acee

There has been rapid development of trace data tools that can inform students, teachers, and the technology itself about students' learning and achievement. During the software design process, technologies log user events for troubleshooting purposes. Educators can now get access to these existing traces of student actions with minimal effort and can use them to inform their instruction (i.e., "academic troubleshooting"). For instance, the example LMS data in this chapter come from logs kept by the university's information technology (IT) office. Such data already exist on campus and can be provided to instructors in summary or tabular form using software and systems IT departments already use... Likewise, trace data from cloud-hosted learning technologies can be obtained via application program interface (API) connections so educators can observe an individual's behaviors, or investigate whether groups or classes are behaving as anticipated in response to instruction… The SRL research toolkit is expanding both in terms of the raw data available that can be used to trace learning and the analytical methods that can make sense of such immense logs of detailed data. Enthusiasm for research with technologies that trace learning events is well warranted. Empirical studies can be conceptualized that test even the most complex of assumptions posed in SRL models. Given the diversity of assumptions across models and researchers' increasing ability to observe and model them, research in this area will continue to expand. However, researchers must temper their excitement with thoughtful consideration of the challenges posed by log data as a medium for validly representing SRL events. (Bernacki, 2018)

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Pursuing new avenues of research can help elucidate the role of personal capability beliefs in academic functioning and human development. As has been shown, the fact that capability beliefs serve as guides for behavior is well documented. Perhaps the field would be served by research that can clarify how and under what conditions learners come to form and alter their beliefs and how those beliefs change in magnitude and influence over time. Researchers have pointed to the need for additional investigations on the sources of capability beliefs such as self-efficacy (Usher & Pajares, 2008b). Most investigations have focused on experiences that build perceived competence (e.g., successful performances, positive evaluative messages, exposure to competent models). Investigating the experiences that undermine self-efficacy might provide a more complete picture of how some students become convinced of their inefficacy. Such investigations could include measures that reflect failure experiences (e.g., "I have performed poorly on mathematics tests") or could target learners who have been identified as at risk for academic failure… Intervention studies permit researchers to test the mechanisms by which capability beliefs change. Most intervention studies in education have been aimed at assessing the influence of instructional, programmatic, or curricular changes on specific learning objectives such as skill development and achievement. The effectiveness of innovative teaching approaches or novel curricula can be evaluated not only in terms of learning and behavioral outcomes but also in terms of changes in learners' perceived capabilities. The inclusion of perceived capability measures would enable researchers to view whether school-based changes have corresponding psychological effects (see Cleary, 2009). (Usher, 2015)

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While VR (Value-Reappraisal) had positive impacts on students' values and choice behaviors, it is unclear what specific mechanisms within the intervention contributed to student gains. Students were asked to use a variety of value-reappraisal strategies (e.g., brainstorming attainment, utility, and intrinsic reasons for learning course content, generating rationales, imagining experiencing benefits resulting from learning course content, and contrasting benefits with costs of task engagement) and these strategies could have differentially affected students' values. A systematic investigation into the effects of different value-reappraisal strategies on students' values, choice behaviors, motivation, and achievement is an important area for future work. Furthermore, the messages students received about the reasons learning statistics might be important for them could have contributed to changes in students' values. The main and interactive effects of persuasive messages and value reappraisal strategies also need to be examined in future studies. In addition, it is important that future research examine the VR intervention over longer periods of time (e.g., months and years) and on other outcome measures (e.g., students' intentions to continue learning statistics and students' course enrollment decisions). It is also important to investigate whether students can be taught to successfully use value-reappraisal strategies on their own and without continual guidance from an intervention… In future research on the VR intervention, we could try including either one general measure of task value or measuring specific components of the value construct. (Acee & Weinstein, 2010)

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