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Times Magazine

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Self-Regulated Learning Science (2019-2020)

"Analyses of multimodal multichannel SRL process data can significantly augment advanced learning technologies by providing real-time, intelligent, adaptive, individualized scaffolding and feedback to address learners' self-regulatory needs."
Roger Azevedo & Dragan Gašević

"Studies that specifically test the effectiveness of instructional procedures for improving the writing of young African American males who experience difficulty learning to write are almost nonexistent."
Steve Graham, Karen R. Harris, & Keith Beard

"Classroom observations facilitated our efforts to create state space grids that show when and how teachers used emancipatory pedagogies to support students' learning."
DeLeon L. Gray

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February, 2020; Vol. 3, Issue 2

Editorial

Self-Regulated Learning Science: Publication Bias, Bias-Free Language, Falsifiability, and Replication

Héfer Bembenutty, Editor-in-Chief

The *Times Magazine* (*TM*) is a medium through which the Special Interest Group (SIG) Studying and Self-Regulated Learning (SSRL) of the American Educational Research Association (AERA) maintains communication with its members and friends. *TM* contains information on current events, innovative research, ground-breaking books, state-of-the-art pedagogy, and current trends on advanced learning technologies. It also shares research findings related to individual and group differences in this era of self-regulated learning science.

TM showcases outstanding contributions of its members and friends who are advancing the applications of self-regulated learning across diverse academic disciplines (e.g., science, mathematics, reading, writing). *TM* features interventions in physical education and sports contexts, interventions and the development of music expertise, and interventions in managing chronic disease. *TM* is a product of teamwork lead by the SIG's senior and junior chairs, their executive officers, and the editor-in-chief to make accessible empirical research to junior and senior scholars, graduate students, school teachers, and policymakers.

The current issue of the *TM* comprises research published during 2019-2020, some of which are in-press. A photo of Dr. Roger Azevedo is on the cover page representing all those scholars who are committed to the science and practice of self-regulated learning. The opinions and claims made by these researchers should not be necessarily construed as reflecting the official position of the AERA or our SIG SSRL. Readers are invited to judge the quality of the publications and engage in conversation directly with the authors.

In this era of self-regulated learning science, members and friends of our SIG are encouraged to ensure that our research and publications are rock solid and to:

- Avoid **publication bias** that could contaminate our research methodologies and findings. For instance, publication bias occurs when journals publish a meta-analysis that excludes research with non-significant findings. Authors who submit manuscripts containing only statistically significant results contribute to publication bias. With meta-analyses, we could avoid the ***file drawer*** problem (Hatcher, 2013; Rosenthal, 1979) by using the ***Rosenthal's fail-safe N*** tool to calculate the potential unpublished articles that could have zero effects.
- Design, conduct, and report research on self-regulation with **bias-free language** for age, disability, gender, racial and ethnic identity, sexual orientation, and socioeconomic status. The *Publication Manual of the American Psychological Association* offers general guidelines for reducing bias. Specifically, it recommends to 1) Describe at the Appropriate Level of Specificity (e.g., acknowledge relevant differences that do exist); 2) Be Sensitive to Labels (e.g., acknowledge people's humanity); and 3) Reduce Bias by Topic (e.g., age, disability, gender, racial and ethnic identity).
- Conduct **qualitative research** to obtain non-numerical data by observing and then interpreting with a naturalistic approach the meaning of the data. Qualitative research is needed in self-regulated learning science to assess attitudes, dispositions, beliefs, bias, interpersonal relations, and cultural tendencies. Research on emerging classroom technology using self-regulation principles as a guide for effective instruction (Moos, 2018) and on reasoning about real-time cognitive, affective, and metacognitive processes to foster self-regulation with advanced learning technologies (Azevedo, Taub, Mudrich, 2018) are enriched by qualitative research.
- Use scientific methods and hypotheses to test the **falsifiability** of our self-regulated theories and findings. In our discipline, myriad claims circulate and schoolteachers often accept them as reflecting substantiated evidence. Once those propositions and beliefs enter our school system and classrooms, they are challenging to eradicate because teachers believe that those propositions help them in their instruction, assessment, and classroom management. Engaging in **testability** of claims in self-regulation is the responsibility of all researchers. Meta-analysis is a tool that could be used to help check the falsifiability of some claims in self-regulated theories (Dent, 2013; Dent, & Koenka, 2016; Graham, & Harris, 2003; Graham, & Perin, 2007; Fong, Patall, Vasquez, & Stautberg, 2019).
- Engage in the **replication** of research on self-regulation. Replication of hypotheses and methods could solidify and advance our self-regulation theories and findings. The **replication crisis** could be stopped by engaging in collaboration, sharing data, and supporting scholars with limited resources to replicate previous findings. Replication helps to sustain the validity and reliability of our findings and methods. To illustrate, Michaelson and Munakata ("Same data set, different conclusions: Preschool delay of gratification predicts later behavioral outcomes in a preregistered study," *Psychological Science*, 2020) examined the same data set of Watts, Duncan, and Quan ("Revisiting the marshmallow test: A conceptual replication investigating links between early delay of gratification and later outcomes," *Psychological Science*, 2018) of research on delay of gratification. Contrary to Watts and his associates, Michaelson and Munakata found that preschool delay of gratification predicts behavioral outcomes in adolescence.

Much is known about self-regulated learning science and practices related to how children learn, develop, interact with hypermedia, and acquire reading, writing, and mathematics proficiencies. We have learned about the role of environmental and contextual factors in academic learning and sports performance. The publications included in this issue of the *TM* reflect how far we are in our scientific investigations, theories, and methodologies. Nevertheless, in this issue, Azevedo and his colleagues remind us of the challenges analyzing multimodal multichannel data related to self-regulated learning with advanced learning technologies. Graham, Harris, and Beard invite us to improve the writing of young African American males who experience difficulty learning to write. Gray and his associates encourage us to create emancipatory pedagogies supporting students' learning. Furthermore, Winne reminds us that we all can always improve.

It is perhaps a long shot, but it is imperative that we are vigilant in avoiding publication bias, maintaining bias-free language, conducting more qualitative research, assessing falsifiability, and seeking to replicate research in this era of self-regulated learning science.

SSRL SIG Times Magazine

February, 2020; Vol. 3, Issue 2

ANALYZING MULTIMODAL MULTICHANNEL DATA ABOUT SELF-REGULATED LEARNING WITH ADVANCED LEARNING TECHNOLOGIES: ISSUES AND CHALLENGES

Roger Azevedo (*University of Central Florida*) &
Dragan Gašević (*Monash University*)

Computers in Human Behavior (2019)
https://doi.org/10.1016/j.chb.2019.03.025

Analyzing multimodal multichannel data about self-regulated learning (SRL) obtained during the use of advanced learning technologies such as intelligent tutoring systems, serious games, hypermedia, and immersive virtual learning environments is key to understanding the interplay among cognitive, affective, metacognitive, and social processes and their impact on learning, problem solving, reasoning, and conceptual understanding in learners of all ages and contexts. In this special issue of *Computers in Human Behavior*, we report six studies conducted by interdisciplinary teams' use of various trace methodologies such as eye tracking, log-files, physiological data, facial expressions of emotions, screen recordings, concurrent think-alouds, and linguistic analyses of discourse. The research studies focus on how these data were analyzed using a combination of traditional statistical techniques as well as educational data-mining procedures to detect, measure, and infer cognitive, metacognitive, and social processes related to regulating the self and others across several tasks, domains, ages, and contexts. The results of these studies point to future work necessitating interdisciplinary researchers' collaboration to use theoretically based and empirically derived approaches to collecting, measuring, and modeling multimodal multichannel SRL data to extend our current models, frameworks, and theories by making them more predictive by elucidating the nature, complexity, and temporality of underlying processes. Lastly, analyses of multimodal multichannel SRL process data can significantly augment advanced learning technologies by providing real-time, intelligent, adaptive, individualized scaffolding and feedback to address learners' self-regulatory needs.

INTEGRATING METACOGNITIVE JUDGMENTS AND EYE MOVEMENTS USING SEQUENTIAL PATTERN MINING TO UNDERSTAND PROCESSES UNDERLYING MULTIMEDIA LEARNING

Nicholas V. Mudrick (*North Carolina State University*),
Roger Azevedo, & Michelle Taub (University of Central Florida)

Computers in Human Behavior (2019)
https://doi.org/10.1016/j.chb.2018.06.028

Metacomprehension is key to successful learning of complex topics when using multimedia materials. The goal of this study was to determine if eye-movement dyads could be: (1) identified by sequence mining techniques, and (2) aligned with self-reported metacognitive judgments during learning with multimedia materials that contain conceptual discrepancies designed to interfere with participants' metacomprehension. Thirty-two undergraduate students' metacognitive judgments were examined with RM-MANOVAs, and sequential pattern mining and differential sequence mining were conducted on their eye movements as they learned with complex multimedia materials. Additionally, we distinguished between event- (i.e., if participants looked at specific areas of the content) and duration-based (i.e., if participants looked at areas of interest [AOIs] for a medium or long amount of time) eye-movement dyads to assess if qualitative and quantitative differences existed in their eye-movement behaviors. For content with text and graph discrepancies, results indicated participants' metacognitive judgments were lower and less accurate, and more fixation dyads were found between the text and graph. Furthermore, specific dyads of different length (i.e., long fixations on the graph to medium fixations on the text) fixations may align with lowered and inaccurate metacognitive judgments for content with text and graph discrepancies. This study begins to address how to identify behavioral indices of metacomprehension processes during multimedia learning.

Paradigmatic Dimensions of Instrumentation and Analytic Methods in Research on Self-Regulated Learning

Philip H. Winne (*Simon Fraser University*)

***Computers in Human Behavior* (2019)**
https://doi.org/10.1016/j.chb.2019.03.026

Studies described in this special issue take bold steps in using diverse instrumentation to gather multidimensional data about self-regulated learning, and apply novel analytic methods to examine those data. I explore these advances from a perspective that foregrounds the role of a paradigm – coherent theoretical propositions and methodological properties – that underlie and contextualize the research. Several suggestions are offered for consideration about interpreting findings and designing future research.

Conclusion

The studies published here are state of the art. Individually and collectively, they advance research on SRL and factors that moderate. Not only are new findings presented but, perhaps more importantly, new and scientifically exciting approaches were published that others can adopt and adapt to push research further.

Notwithstanding these advantages these projects lend to future research, every new instrument and every advanced method for analyzing data arises within the perimeter of a paradigm. Consequently, both findings and methods are bounded. Dedication to noting one's paradigm's relatively well-marked perimeter is a hallmark of sound and responsible science. Where all can always improve is seeking to discover and explicitly relay tacit features of paradigms. There, I believe, lie seeds we should nurture. Like A Square, Abbott's (1952) main character in his social satire *Flatland*, we might more regularly strive to consider the dimensionality of our science.

SSRL SIG Times Magazine

February, 2020; Vol. 3, Issue 2

Effects of peer-led training on academic self-efficacy, study strategies, and academic performance for first-year university students with and without reading difficulties

Bradley W. Bergey (*Queens College*), Rauno K. Parrila (*Macquarie University*), Annie Laroche, & S. Hélène Deacon (*Dalhousie University*)

Contemporary Educational Psychology (2019)

https://doi.org/10.1016/j.cedpsych.2018.11.001

We examined how participation in peer-led study strategies training for first-year university students was associated with changes in academic self-efficacy and self-reported study strategies as well as with use of support services, academic achievement, and persistence. We examined potential differences for students with (n = 297) and without (n = 677) a history of reading difficulties, since reading difficulty is an indicator of academic vulnerability. Results from a randomized control trial revealed positive effects of the intervention on academic self-efficacy and several aspects of study strategies for both groups of participants. There were no training effects on first-year academic performance or second-year retention for either group. Suggestions of differences in effects across groups emerged in two ways. For participants with a history of reading difficulty, training appeared to increase use of the accessibility center in the subsequent semester and for participants with no history of reading difficulty, training appeared to increase use of other support services. The study suggests the peer-led study strategies program holds promise as a cost-effective approach to supporting the study strategy development of university students with and without reading difficulties.

Highlights

- We examined effects of a proactive peer-led study skills training program.
- Training had positive effects on academic self-efficacy and some study skills.
- Training was associated with increased use of additional support services.
- Trainees did not differ from controls in academic performance or retention.
- Some differences emerged for students with a history of reading difficulties.

A Latent Profile Analysis of Undergraduates' Achievement Motivations and Metacognitive Behaviors, and Their Relations to Achievement in Science

Wonjoon Hong (*University of Nevada, Las Vegas*), Matthew L. Bernacki (*University of North Carolina, Chapel Hill*), & Harsha N. Perera (*University of Nevada, Las Vegas*)

Journal of Educational Psychology (2020)

https://doi.org/10.1037/edu0000445

Achievement motivation theories propose that student motivation is composed of multiple factors. Models of self-regulated learning adopt this assumption and further articulate that multiple metacognitive processes—planning, monitoring learning, and self-evaluation—are essential to guide progress toward a learning goal. Learners' motivations are theorized to influence these metacognitive processes, which in turn influence learning outcomes. Latent profile analyses (LPA) enable a person-centered approach and capture multiple dimensions of motivation as they co -occur when learners engage in a task. This study documents the emergent motivation profiles of 1326 undergraduate biology students comprising efficacy beliefs, achievement goals, and perceptions of the value and costs of an anatomy and physiology course. Traces obtained from the learning management system provide data on students' use of tools designed to support metacognitive processes including planning, monitoring learning, and self-evaluation. Latent profiles document the emergence of motivation, and metacognition profiles and a 3-step process reveals how student demographics predict motivation profile membership, and how the motivation profiles are related to metacognition profiles. Four motivation profiles (High Cost, Moderately Motivated, High Goals and Values, Mastery-Driven) and 3 metacognitive learning profiles (Infrequent Metacognitive Processing; Planning and Self-Evaluation; Monitoring via Self-Assessment) emerged. Demographic information was found to predict motivation profile membership. Members of Mastery-Driven and High Cost groups were less likely to use tools that support metacognitive processing. Learners in High Goals and Values and Mastery-Driven groups outperformed those in other groups, and learners in Planning and Self-evaluation and Monitoring performance outperformed those with little metacognitive activity.

Educational Impact and Implications Statement

Learners' motivations influence the way they engage in learning, including their use of metacognitive processes such as planning, monitoring their understanding, and evaluating their performance. When survey data on students' motivation (goals, efficacy, values, and costs) were modeled as profiles, different groups of students were found to report High Cost, Moderate Motivation, High Goals and Values, and Mastery-Driven motivations to learn. When regrouped by their digital metacognitive behaviors (use of tools to plan, monitor, and evaluate), these same students demonstrated either low metacognitive activity, use of planning and self-evaluation tools, or monitoring of their quiz performance. Learners in High Goals and Values and Mastery-Driven groups outperformed those in other groups, and learners in Planning and Self-evaluation and Monitoring groups outperformed those with little metacognitive activity. Instructors might design courses and tasks to promote positive motivations and scaffolding metacognition by supplying tools and resources to plan, self-assess, monitor, and evaluate. These choices may particularly benefit learners from underrepresented minority groups—and sometimes men—who are more likely to be members of the lower-achieving motivation and metacognition profiles.

SSRL SIG Times Magazine

February, 2020; Vol. 3, Issue 2

PREDICTIVE STUDENT MODELING IN EDUCATIONAL GAMES WITH MULTI-TASK LEARNING

Michael Geden, Andrew Emerson, John E. Rowe (*North Carolina State University*), Roger Azevedo (*University of Central Florida*), & James C. Lester (*North Carolina State University*).

Thirty-Fourth Advancement in Artificial Intelligence Conference on Artificial Intelligence (2020)
https://aaai.org/Conferences/AAAI-20/

Modeling student knowledge is critical in adaptive learning environments. Predictive student modeling enables formative assessment of student knowledge and skills, and it drives personalized support to create learning experiences that are both effective and engaging. Traditional approaches to predictive student modeling utilize features extracted from students' interaction trace data to predict student test performance, aggregating student test performance as a single output label. We reformulate predictive student modeling as a multi-task learning problem, modeling questions from student test data as distinct "tasks." We demonstrate the effectiveness of this approach by utilizing student data from a series of laboratory-based and classroom-based studies conducted in a game-based learning environment for microbiology education. Using sequential representations of student gameplay, results show that multi-task stacked LSTMs with residual connections significantly outperform baseline models that do not use the multi-task formulation. Additionally, the accuracy of predictive student models is improved as the number of tasks increases. These findings have significant implications for the design and development of predictive student models in adaptive learning environments.

RELEVANT EDUCATION IN A CHANGING WORLD: EXPANDING VALUE FOR THE MOTIVATION SCIENCES

Jeffrey Albrecht & Stuart A. Karabenick (*University of Michigan*)

Advances in Motivation and Achievement (2019)
https://doi.org/10.1108/S0749-742320190000020003

The idea that education should be made relevant to students is long-standing and pervasive in American society. Recently, motivation scientists have clarified important characteristics of students' relevance beliefs, ways to intervene, and individual characteristics moderating intervention effects. Yet, there has been little consideration of the role of situational constraints and sociocultural influences on students' relevance appraisal processes. We describe how societal changes and broader educational purposes affect the issues that students consider to be relevant to their educational experiences and the values they subsequently attribute to their studies. After differentiating components of relevance and highlighting ways in which particular components may be influenced by changing sociocultural milieus, we consider the implications of these processes for the development of subjective task value beliefs. Specifically, we show how the proposed model of relevance helps to parse out aspects of relevance appraisals that can be used to differentiate between components of subjective task value and argue that there is need to expand current models proposed in expectancy-value theory (EVT). Finally, we explore how recent global events may impact the social construction of educational relevance and constrain students' developing beliefs about the value of their educational opportunities and implications for future research and educators.

TEACHING PRACTICES AND STUDENT ENGAGEMENT IN EARLY ADOLESCENCE: A LONGITUDINAL STUDY USING THE CLASSROOM ASSESSMENT SCORING SYSTEM

Sarah E. McKellar, Kai S. Cortina, & Allison M. Ryan
(University of Michigan)

Teaching and Teacher Education (2020)
https://doi.org/10.1016/j.tate.2019.102936

Student engagement in schoolwork is crucial for positive academic adjustment, particularly during early adolescence. We investigated how observations of teaching practices predicted change in student behavioral and emotional engagement. In the fall, we examined teacher behavior in 54 fifth and sixth grade classrooms through external observers' reports of 11 dimensions of teachers' practices (Classroom Assessment Scoring System, CLASS). Students reported on their behavioral and emotional engagement in the fall and spring. We found *quality feedback* was the strongest predictor of behavioral engagement and *regard for student perspective* was the strongest emotional engagement. Our findings were more nuanced for what predicts behavioral engagement, as there is evidence that other teaching practices work in conjunction with *quality feedback* to predict behavioral engagement.

THE MURKY DISTINCTION BETWEEN SELF-CONCEPT AND SELF-EFFICACY: BEWARE OF LURKING JINGLE-JANGLE FALLACIES

Herbert W. Marsh (*Australian Catholic University and Oxford University*), Reinhard Pekrun (*University of Munich*), Philip D. Parker (*Australian Catholic University*), Kou Murayama (*University of Reading*), et al

***Journal of Educational Psychology* (2020)**
https://doi.org/10.1037/edu0000281

This study extends the classic constructive dialogue/debate between the self-conc and self-efficacy researchers (Marsh, Roche, Pajares, and Miller, 1997) regarding the distinctions between these two constructs. The study is a substantive-methodological synergy, bringing together new substantive, theoretical and statistical models, and developing new tests of the classic jingle-jangle fallacy. We demonstrate that in a representative sample of 3,350 students from math classes in 43 German schools, generalized math self-efficacy and math outcome expectancies were indistinguishable from math self-concept, but were distinct from test-related and functional measures of self-efficacy. This is consistent with the jingle-jangle fallacies that are proposed. On the basis of pre-test -variables, we demonstrate negative frame-of-reference effects in social (big-fish-little-pond effect) and dimensional (internal/external frame-of-reference effect) comparisons for three self-concept-like constructs in each of the first four years of secondary school. In contrast, none of the frame-of-reference effects were significantly negative for either of the two self-efficacy-like constructs in any of the four years of testing. After controlling for pre-test variables, each of the three self-concept-like constructs (math self-concept, outcome expectancy, and generalized math self-efficacy) in each of the four years of secondary school was more strongly related to post-test outcomes (school grades, test scores, future aspirations) than were the corresponding two self-efficacy-like factors. Extending discussion by Marsh et al. (1997) we clarify distinctions between self-efficacy and self-concept; the role of evaluation, worthiness, and outcome expectancy in self-efficacy measures; and complications in generalized and global measures of self-efficacy.

Educational Impact and Implications Statement

Positive self-beliefs are a central construct in educational psychology, and self-concept and self-efficacy are the most widely-used and theoretically important representations of positive self-beliefs. In Educational Psychology, much effort has been expended in trying to distinguish between self-concept and self-efficacy. Nevertheless, in practice and theory the distinction remains murky. We critique previous conceptual attempts to distinguish the two constructs—arguing against some distinctions that have been offered in the past, and offering some new theoretical distinctions and new empirical approaches to testing support for these distinctions.

IMPACT ON MATHEMATICS SELF-BELIEFS FROM A MASTERY-BASED MATHEMATICS SOFTWARE

Teomara (Teya) Rutherford (*University of Delaware*), Allison S. Liu (*North Carolina State University*), Arena S. Lam (*WestEd's Health & Justice Program*), & Katerina Schenke (*University of California, Los Angeles*)

Journal of Research on Technology in Education (2020)
https://doi.org/10.1080/15391523.2019.1689210

Self-beliefs are important determinants of student choice and success (Wigfield & Eccles, 2000) and are informed by student educational experiences, such as prior success with a task (Bandura, 1986). The potential for Computer-Based Interventions as self-belief-supporting learning environments is examined in this study, focusing on the mathematics software, Spatial Temporal (ST) Math. ST Math includes elements theorized to support student self-beliefs, including informative feedback and a self-pacing structure. Using a randomized control trial, we find that students who play ST Math have higher mathematics self-beliefs than their control counterparts, and that ST Math operates through self-beliefs to positively influence achievement. ST Math's impact on student self-beliefs is strongest for those students who had lower mathematics achievement scores.

SSRL SIG Times Magazine

February, 2020; Vol. 3, Issue 2

Social, Dimensional, and Temporal Comparisons by Students and Parents: An Investigation of the 2I/E Model at the Transition From Elementary to Junior High School

Fabian Wolff, (*Kiel University*), Allan Wigfield, (*University of Maryland*), Jens Möller, (Kiel University), Anna-Lena Dicke (*University of California, Irvine*), & Jacquelynne Sue Eccles, (*University of California, Irvine, and Australian Catholic University*)

Journal of Educational Psychology (2020)
https://doi.org/10.1037/edu0000440

The present research examined the joint effects of social, dimensional, and temporal comparisons on students' academic self-concepts and parents' beliefs about their children's competencies during students' transition phase from elementary school to junior high school. To this end, we tested the newly developed 2I/E model using longitudinal data including 2,417 students between Grades 6 and 7 and 1,846 parents. We found strong social comparison effects and moderate dimensional and temporal comparison effects on students' self-concepts. In line with our assumption that students should be particularly sensitive to changes in their achievements during phases of school transition, the temporal comparison effects were stronger than in any prior study of the 2I/E model. Parents' ratings of their children's competencies were also predicted by social, dimensional, and temporal comparisons. However, whereas the social comparison effects on students' and parents' ratings were equally strong, the dimensional and temporal comparison effects were stronger on students' ratings. We finally tested how social, dimensional, and temporal comparisons affected changes in students' self-concepts and parents' competence beliefs over 1 year. Although the effects of all 3 comparisons were still significant, we found drastic changes in their strengths, with the strongest effects on changes in competence beliefs occurring for temporal comparisons. Overall, our study provides a variety of new insights into the impact of comparison processes on the formation of competence beliefs. In particular, it emphasizes the role of temporal comparisons. Theoretical and practical implications are discussed.

Educational Impact and Implications Statement

Individuals use different kinds of comparative information in forming their beliefs about their competencies: Social comparisons involve comparing one's performance with that of others, temporal comparisons are comparing one's current performance to previous performance, and dimensional comparisons are comparing one's performance in different subject areas. The present study investigated how these comparison processes influenced students' beliefs about their own competencies and their parents' beliefs about their children's competencies across a major transition occurring in most U.S. schools—the elementary to junior high school transition. Results showed that students and their parents used all 3 kinds of comparative information, but in general students used temporal and dimensional comparisons more than did parents. Moreover, the influence of temporal comparisons on students' competence beliefs was stronger than in prior studies examining these effects during periods where no school transition took place. The study's findings have implications for teachers' understanding of students' development of their competence beliefs and the kinds of messages they can give to both their students and their students' parents to enhance students' beliefs in their competencies at the time of transition.

The Individual STEM Student in Context: Idiographic Methods for Understanding Self-Knowledge and Intraindividual Patterns of Self-Efficacy Appraisal

Daniel Cervone, Lara Mercurio, & Carmen Lilley
University of Illinois at Chicago

Journal of Educational Psychology (2020)
https://doi.org/10.1037/edu0000454

This study aimed to identify elements of personal knowledge that were hypothesized to underlie within-person, across-context variations in students' appraisals of self-efficacy for coping with challenges encountered in Science, Technology, Engineering, and Mathematics (STEM) education. Freshman in a college of engineering completed assessments of (a) 4 elements of personal knowledge regarding themselves and their educational resources; (b) their subjective beliefs about links between these 4 personal and social qualities and each of 32 specific educational challenges; and (c) perceived self-efficacy for successfully handling each of the 32 challenges. Individual students' self-efficacy appraisals commonly varied substantially within-person, across contexts. This variability was predictable. Students displayed relatively high (low) self-efficacy within subsets of situations they subjectively linked to positively (negatively) valenced knowledge that they possessed, a finding consistent with the knowledge-and-appraisal model of personality architecture that guided the research. Additional analyses demonstrated that students with similar overall academic self-efficacy scores may display markedly different profiles of self-efficacy appraisal across context. Students' narrative accounts enriched understanding of these profile patterns.

Educational Impact and Implications Statement

This study introduces novel methods for assessing the beliefs of individual STEM students and the specific social contexts in which these beliefs come into play. Findings show that our assessments predict both consistency and variability in student's confidence in their ability to handle challenges encountered in STEM education. Because our assessment methods provide richer, more nuanced information about individual students than the assessments commonly found in the scientific literature, they may be of particular value to school counselors and advisors who need to understand idiosyncrasies in the beliefs and social experiences of the individual student.

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Mobile Technology, Learning, and Achievement: Advances in Understanding and Measuring the Role of Mobile Technology in Education

Matthew L. Bernacki, *UNC-CH*,
Jeffrey A. Greene, *UNC-CH,* & Helen Crompton, *ODU*

Contemporary Educational Psychology (2020)
https://doi.org/10.1016/j.cedpsych.2019.101827

Studying *mobile learning* – the use of personal electronic devices to engage in learning across multiple contexts via connections to media, educators, peers, experts, and the larger world – is a relatively new academic enterprise. In this special issue, we interrogated the promise and unexamined expectations of mobile learning, the theories and ideas developing around it, and the devices that afford it. The articles introduce mobile and wearable technologies as key components of empirical research and demonstrate ways that learning conducted with such devices (1) affects the process and products of learning via interactions with other psychological constructs; (2) affords new opportunities to directly influence learning process or outcomes; and (3) provides opportunities to collect previously unobtainable data that improve understanding and modeling of the learning process. In this introduction, we overview the emergence of mobile learning theory and its contemporary conceptualization. Then we highlight ways that mobile technologies can be used to enhance learning processes and an understanding of them. All special issue contributors conceptualize and align their work with both psychological theories of learning and instruction as well as emerging theories of mobile learning. The commentary authors appraise mobile learning research critically and analytically, and recommend ways mobile learning theory might build upon research methodology and knowledge grounded empirically in psychological and sociocultural theories of learning. Overall, we believe this special issue achieved our goal to produce a balanced consideration that highlights the advancements in learning and learning theory mobile devices might afford, and to temper any premature enthusiasm about these potential benefits.

Motivated Information Seeking and Graph Comprehension Among College Students

Stephen J. Aguilar & Clare Baek (USC)

Proceedings of the 9th International Conference on Learning Analytics & Knowledge (2019)
https://doi.org/10.1145/3303772.3303805

Learning Analytics Dashboards (LADs) are predicated on the notion that access to more academic information can help students regulate their academic behaviors, but what is the association between information seeking preferences and help-seeking practices among college students? If given access to more information, what might college students do with it? We investigated these questions in a series of two studies. Study 1 validates a measure of information-seeking preferences---the Motivated Information-Seeking Questionnaire (MISQ)----using a college student sample drawn from across the country (n = 551). In a second study, we used the MISQ to measure college students' (n = 210) performance-avoid (i.e., avoiding seeming incompetent in relation to one's peers) and performance-approach (i.e., wishing to outperform one's peers) information seeking preferences, their help-seeking behaviors, and their ability to comprehend line graphs and bar graphs---two common graphs types for LADs.

Results point to a negative relationship between graph comprehension and help-seeking strategies, such as attending office hours, emailing one's professor for help, or visiting a study center---even after controlling for academic performance and demographic characteristics. This suggests that students more capable of readings graphs might not seek help when needed. Further results suggest a positive relationship between performance-approach information-seeking preferences, and how often students compare themselves to their peers.

This study contributes to our understanding of the motivational implications of academic data visualizations in academic settings, and increases our knowledge of the way students interpret visualizations. It uncovers tensions between what students want to see, versus what it might be more motivationally appropriate for them to see. Importantly, the MISQ and graph comprehension measure can be used in future studies to better understand the role of students' information seeking tendencies with regard to their interpretation of various kinds of feedback present in LADs.

MOTIVATION AND SOCIAL COGNITIVE THEORY

Dale H. Schunk, & Maria K. DiBenedetto
The University of North Carolina at Greensboro

Contemporary Educational Psychology (2020)
https://doi.org/10.1016/j.cedpsych.2019.101832

This article discusses motivation from the perspective of Bandura's social cognitive theory. Motivation refers to processes that instigate and sustain goal-directed activities. Motivational processes are personal/internal influences that lead to outcomes such as choice, effort, persistence, achievement, and environmental regulation. Motivation has been a prominent feature of social cognitive theory from the early modeling research to the current conception involving agency. The conceptual framework of reciprocal interactions is discussed, after which research is summarized on behavioral, environmental, and personal influences on motivation. Key internal motivational processes are goals and self-evaluations of progress, self-efficacy, social comparisons, values, outcome expectations, attributions, and self-regulation. Critical issues confronting the theory include diversity and culture, methodology, and long-term effects of interventions. The article concludes with additional recommendations for future research on contexts, conceptual clarity, and technology.

CURRICULUM AND INSTRUCTION AT INCLUSIVE STEM HIGH SCHOOLS

Erin E. Peters-Burton (*George Mason University*), Ann House (*SRI International*), Vanessa Peters (*Digital Promise*), & Julie Remold (*SRI International*)

School Science and Mathematics (2019)
https://j-stem.net/index.php/jstem/article/view/45

In recent years, prominent organizations have released large-scale policy reports on the state of science, technology, engineering, and mathematics (STEM) education in the United States, with particular emphasis on curricula and instructional practices. The purpose of this paper was to examine the curriculum and instruction occurring at high performing STEM-focused high schools that have no academic conditions for student admission. This study conducted a cross-case analysis across eight case studies of contextually different but well-regarded inclusive STEM high school. Common themes that emerged included different hierarchical levels of design and implementation (classroom-level, cross-cutting school level, school-wide) as well as responsive design of curriculum and instruction. Unique contextual differences are discussed as well as implications for replication of inclusive STEM school design.

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PREDICTING MID-LIFE CAPITAL FORMATION WITH PRE-SCHOOL DELAY OF GRATIFICATION AND LIFE-COURSE MEASURES OF SELF-REGULATION

Daniel J. Benjamin (*University of Southern California*) et al

***Journal of Economic Behavior & Organization* (2019)**

https://doi.org/10.1016/j.jebo.2019.08.016

How well do pre-school delay of gratification and life-course measures of self-regulation predict mid-life capital formation? We surveyed 113 participants of the 1967–1973 Bing pre-school studies on delay of gratification when they were in their late 40's. They reported 11 mid-life capital formation outcomes, including net worth, permanent income, absence of high-interest debt, forward-looking behaviors, and educational attainment. To address multiple hypothesis testing and our small sample, we pre-registered an analysis plan of well–powered tests. As predicted, a newly constructed and pre-registered measure derived from preschool delay of gratification does not predict the 11 capital formation variables (i.e., the sign-adjusted average correlation was 0.02). A pre-registered composite self-regulation index, combining preschool delay of gratification with survey measures of self-regulation collected at ages 17, 27, and 37, does predict 10 of the 11 capital formation variables in the expected direction, with an average correlation of 0.19. The inclusion of the preschool delay of gratification measure in this composite index does not affect the index's predictive power. We tested several hypothesized reasons that preschool delay of gratification does not have predictive power for our mid-life capital formation variables.

TOWARDS CONVERGENCE OF MOBILE AND PSYCHOLOGICAL THEORIES OF LEARNING

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Contemporary Educational Psychology (2020)

https://doi.org/10.1016/j.cedpsych.2019.101828

This special issue was designed to promote an integration of mobile and psychological theories of learning by inviting empirical research that draws upon both theoretical approaches to guide investigation into learning involving mobile devices. Five empirical articles illustrated how mobile devices afford resources to learners and how new channels of data afford researchers new insight into learning processes. Authors of two invited commentaries note the challenges involved in researching mobile learning, which unfolds across multiple contexts and can involve novel tools, multiple learners, and instructors and experts. These authors propose a taxonomy that can organize research that investigates interactions amongst learners, instructors, experts, and tools across one or more physical contexts, as well as a research agenda that would empirically test and refine assumptions made by mobile learning theorists. In this commentary, the editorial team proposes that mobile and psychological theories may be improved through convergence. Theories of mobile learning can be advanced by adopting practices previously employed to refine psychological theories of learning, whereas conducting research using mobile devices (and the data they provide) can further refine psychological theories of learning. We illustrate these positions with examples, and consider how instruction must be designed and how learners must be prepared in order to benefit from learning using mobile technology.

Games as Playful Learning: Implications of Developmental Theory for Game-Based Learning

Bruce D. Homer, Charles Raffaele, & Hamadi Henderson

City University of New York

***Handbook of Game-Based Learning* (2020)**

https://mitpress.mit.edu/books/handbook-game-based-learning

In the field of developmental psychology, there have been a number of attempts to create operational definitions of play. Krasnor and Pepler (1980) propose four criteria for identifying play: *flexibility, positive affect, nonliterality,* and *intrinsic motivation*. They suggest that "pure play" involves all these factors, with playlike behaviors involving some but not all the factors. Others point out that not all forms of play are flexible, and at least some involve negative affect (Smith, 2009). In their study of what defines play, Smith and Vollstedt (1985) include the four criteria of Krasnor and Pepler as well as an additional one, "dominated by means rather than ends" (from Rubin, Fein, & Vanderberg, 1983). Smith and Vollstedt found that nonexpert raters viewing videos of nursery school children's behaviors had high agreement concerning which behaviors were play but had less agreement about which of the five factors were involved. Smith and Vollstedt conclude that there is no single defining feature of play, but the more of the criteria are involved in a behavior, the more certain it is play. This is also the approach to understanding play—and playful learning—we take in the current chapter.

Implications

Based on the preceding review, the following key principles of playful learning emerge:

- *Playful learning is intrinsically motivating*. Although the motivation for play may be for fun and pleasure, other motivations, including challenge and self-actualization, are also essential.
- *Playful learning depends on a break from reality*. For learning to be playful, there must be opportunity for exploration and graceful failure with minimal real-world consequences, as in the "magic circle" of games.
- *Playful learning requires a polytheoretical approach*. Not only is playful learning compatible with multiple learning theories, but effective games for learning will often embrace concepts from multiple theories in order to enhance learning and playfulness.
- *New technologies provide new opportunities for playful learning.* Although the fundamentals of play are consistent, the affordances of new technologies provide new opportunities for game-based learning.
- *Playful learning requires an integration of play and learning.* In effective games for learning, game mechanics and learning mechanics match, meaning in-game activities are both fun and support learning.

By applying the concept of playful learning, we can realize educational experiences in digital games that may go beyond even what was envisioned by Vygotsky and Piaget in supporting the cognitive development and learning of children.

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FAMILY-SUPPORT GOALS DRIVE ENGAGEMENT AND ACHIEVEMENT IN A COLLECTIVIST CONTEXT: INTEGRATING ETIC AND EMIC APPROACHES IN GOAL RESEARCH


Ronnel B. King

Ronnel B. King & Dennis M. McInerney
The Education University of Hong Kong

***Contemporary Educational Psychology* (2019)**
https://doi.org/10.1016/j.cedpsych.2019.04.003

Much of the goal research in educational psychology has focused on top-down etic approaches with little emphasis on the use of bottom-up emic methods to uncover culturally-relevant phenomena. The aim of this study was to combine etic and emic approaches and to explore how goals derived from both approaches drive engagement and achievement. Study 1 was a qualitative study which aimed to examine the different types of goals that students spontaneously generated in school contexts. Wanting to help the family (which we labeled as family-support goal) was one of the most commonly-endorsed goals indicating its psychological salience for Filipino students. Study 2, a cross-sectional study, demonstrated that family-support goals were distinct from achievement goals. Study 3, a prospective longitudinal study, found that family-support goals positively predicted subsequent engagement and achievement. Study 4 replicated the results of Study 3 on a different sample of students after taking into account several relevant covariates (e.g., parental relatedness, relational self-construal, social desirability) thus ruling out the possibility of third variable confounds. Taken together, family-support goals were more salient predictors of optimal learning-related outcomes followed by mastery-approach goals. Results of the current study highlight the importance of taking culture into account in examining student motivation.

Highlights

- **Etic and emic approaches were combined to investigate student motivation in a collectivist context.**
- **Family-support goals were the most important predictor of engagement and achievement.**
- **Mastery-approach goals were positively associated with engagement and achievement.**
- **Performance-approach, performance-avoidance, and mastery-avoidance goals were not significant predictors.**

RELATIONS AMONG TEACHERS' SELF-EFFICACY BELIEFS, ENGAGEMENT, AND WORK SATISFACTION: A SOCIAL COGNITIVE VIEW

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***Contemporary Educational Psychology* (2019)**
https://doi.org/10.1016/j.cedpsych.2019.02.003

Although recent research has examined the links between (a) teacher self-efficacy and teacher engagement and (b) teacher engagement and job satisfaction, comparatively little is known about the longitudinal interplay among teachers' self-efficacy beliefs, work engagement, and job satisfaction. Using short-term longitudinal data from almost 600 teachers, we redress this gap in the literature by examining a social cognitive reciprocal-effects model linking teachers' self-efficacy beliefs, engagement, and satisfaction directly and indirectly. Results of fully-latent simultaneous equations analyses, establishing requisite levels of longitudinal measurement invariance, showed that teacher self-efficacy and work engagement were reciprocally linked over time. Teacher work engagement and job satisfaction were also found to be reciprocally linked over time. In addition, reciprocal indirect relations were obtained, such that (a) initial teacher self-efficacy predicted later work satisfaction via engagement and (b) initial work satisfaction predicted later teacher self-efficacy via engagement. Notably, the directional and reverse directional pathways constituting these reciprocal relations were found to be equal, suggesting that these constructs are mutually reinforcing in the motivational process shaping teachers' capability beliefs, engagement, and satisfaction at work. Notably, all predictive effects were observed while accounting for prior variance in outcomes as well as the predictive effects of other substantive variables. The present findings contribute to understandings of the motivational processes underlying teachers' development of their capability self-beliefs, engagement, and satisfaction at work.

Highlights

- **We tested a reciprocal effects model of teacher self-efficacy, engagement and satisfaction.**
- **Analyses were conducted using fully-latent simultaneous equations models.**
- **Self-efficacy and engagement were reciprocally linked over time.**
- **Engagement and satisfaction were reciprocally linked over time.**
- **Self-efficacy and satisfaction were reciprocally linked indirectly via engagement.**

ENGAGING BLACK AND LATINX STUDENTS THROUGH COMMUNAL LEARNING OPPORTUNITIES: A RELEVANCE INTERVENTION FOR MIDDLE SCHOOLERS IN STEM ELECTIVE CLASSROOMS


DeLeon L. Gray

DeLeon L. Gray (*Michigan State University*), Tamika L. McElveen (*North Carolina State University*), Briana P. Green (*Michigan State University*). & Lauren H. Bryant (*Virginia Polytechnic Institute and State University*)

***Contemporary Educational Psychology* (2020)**
https://doi.org/10.1016/j.cedpsych.2019.101833

With the aim of bridging research in educational psychology and teacher education, we designed a research-practice partnership to unpack the concept of relevance from a race-reimaged perspective. Specifically, we employed a mixed-methods sequential explanatory research design to examine associations between the communal learning opportunities afforded to Black and Latinx students, and their engagement patterns during STEM activities. Within a nine-week instructional unit we provided students six opportunities to rate their scholastic activities. High levels of behavioral engagement were sustained over the course of the instructional unit. On weeks when students rated the activities as higher in communal affordances, they also reported more behavioral engagement. Classroom observations facilitated our efforts to create state space grids that show when and how teachers used emancipatory pedagogies to support students' learning. We used these state space grids, along with teacher interviews and student focus groups, to develop contextualized illustrations of two teachers of color as they successfully provided communal forms of motivational support over the span of six observations per teacher. These strategies differed based on three key factors: where the lesson was placed within the larger instructional unit, the way teachers interpreted and responded to their students' engagement patterns, and how the demands of the larger school environment impacted classroom dynamics.

Highlights

- **A research-practice partnership sustained Black and Latinx students' engagement.**
- **The partnership was intentional about culturalizing STEM curriculum and instruction.**
- **Students were more engaged when learning opportunities were communal in nature.**
- **This investigation employed observations, surveys, focus groups, and interviews.**

SSRL SIG Times Magazine

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PERSONAL AND COLLECTIVE PERCEPTIONS OF SOCIAL SUPPORT: IMPLICATIONS FOR CLASSROOM ENGAGEMENT IN EARLY ADOLESCENCE

Jessica E. Kilday, & Allison M. Ryan
(*University of Michigan*)

Contemporary Educational Psychology (2019)
https://doi.org/10.1016/j.cedpsych.2019.03.006

The present study uses multilevel modeling to understand early adolescents' individual and class-level perceptions of social support in relation to their behavioral and emotional engagement in math and science. To capture individual relationships, we examined students' self-perceptions of classroom social satisfaction, best friend quality, and teacher-student relatedness. Between classrooms, we considered collective perceptions of peer and teacher support. Participants were 761 fifth (n = 412) and sixth grade (n = 349) students nested within 44 classrooms who were 52% female and ethnically diverse. Results indicated that both peer and teacher relationships are important for early adolescents' behavioral engagement, but teachers play a primary role in shaping emotional engagement toward subject-area content. Moreover, both individual and classroom-level indicators of perceived support explained variation in children's engagement outcomes, highlighting the complex nature of classroom social relationships that necessitate teachers' consideration.

Highlights

- Individual and class-level relationships explain unique variation in engagement.
- Best friend quality is related to engagement, whereas social satisfaction is not.
- Relationships with teachers are more strongly associated with emotional engagement.
- Average peer support is associated with behavioral, but not emotional engagement.

DIGITAL DISTRACTION IN THE CLASSROOM: EXPLORING INSTRUCTOR PERCEPTIONS AND REACTIONS

Abraham E. Flanigan (*Georgia Southern University*), & Wayne A. Babchuk (*University of Nebraska-Lincoln*)

***Teaching in Higher Education* (2020)**
https://doi.org/10.1080/13562517.2020.1724937

We examined college instructors' perceptions of student use of mobile technology for off-task purposes during class. Previous research demonstrated that digital distraction hinders student learning, yet little is known about instructor views and reactions to this behavior. Phenomenological interviews with 11 college instructors revealed that student digital distraction has a profound influence on their pedagogical decision-making, relationships with students, and professional satisfaction. These instructors regularly encounter student digital distraction during class and have well-defined views on the deleterious influence digital distraction has on the integrity of the classroom learning environment. However, instructors were divided in their perceived responsibility to curb this behavior. Most rely on proactive prevention strategies rather than reactive strategies out of concern for negatively impacting student-instructor rapport. Moreover, these instructors experience frustration stemming from student digital distraction. Findings indicate that student digital distraction influences pedagogical decision-making and threatens the quality of student-instructor rapport.

Conclusion

The learning and achievement consequences of student digital distraction have been widely documented (Heflin, Shewmaker, and Nguyen 2017; Kates, Wu, and Coryn 2018), but less is known about how instructors perceive and react to student digital distraction in college classrooms. The present study addressed this literature gap and uncovered that student digital distraction has pronounced effects on the decision-making and professional satisfaction of college instructors. The notable rift among our participants regarding their perceived responsibility to curb off-task device use in their classrooms suggests that university faculty might be a long way off from adopting a uniform approach towards addressing student digital distraction. Given that participants view students' chronic off-task device use as an impediment to student -instructor rapport, we implore college faculty to adopt a proactive approach towards curbing student digital distraction to protect the integrity of the learning environment and to prevent student-instructor relationships from being eroded in

CULTURALLY INCLUSIVE AND RESPONSIVE CURRICULAR LEARNING ENVIRONMENTS (CIRCLES): AN EXPLORATORY SEQUENTIAL MIXED-METHODS APPROACH

Revathy Kumar (*University of Toledo*), Stuart A.Karabenick (*University of Michigan*), Jeffery H.Warnkw (*Walsh University*), **&** Susan Hany (University of Toledo), & Nancy Seay (*Simmons College of Kentucky*)

Contemporary Educational Psychology (2019)
https://doi.org/10.1016/j.cedpsych.2018.10.005

Cultural inclusion, cross-cultural openness, and positive intergroup relationships are essential considerations as schools are becoming increasingly multicultural because of shifting demographic patterns in the U.S. We explored Arab/Arab-American (ArA) Chaldean (Chal), African American (AfA) and European American (EuA), student perspectives on Culturally Inclusive and Responsive Curricular Learning Environments (CIRCLEs) through the theoretical lenses of culturally relevant/sustaining pedagogy, social identity and social categorization theories, and the intergroup contact hypothesis utilizing an exploratory sequential mixed-method research design. In Phase 1 we conducted focus group interviews (N = 57) in 12 culturally diverse middle schools with 114 ArA, 41 Chal, 48 AfA, and 100 EuA students. Students discussed their school experiences focusing on interactions with teachers and peers, the curriculum, and school policies. Phase 1 informed the development of the CIRCLE measure in Phase 2. Multi-group confirmatory factor analysis (CFA) of CIRCLE items supported the generalizability of a hierarchical first and second order structure of the measure (CIRCLE) and its subscales across ArA (977), Chal (244), AfA (270), and EuA (1423) student groups. Analyses of the interviews and CFA results indicate that cultural self-other awareness and openness to different ways of thinking and being among teachers and students, through sensitively designed culturally inclusive curricula and school policies and programs responsive to student diversity is an educational imperative.

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EXPANDING THE NOMOLOGICAL NETWORK OF WORK AVOIDANCE: ANTECEDENTS AND CONSEQUENCES ACROSS CONTEXTS

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The Journal of Experimental Education (2019)
https://doi.org/10.1080/00220973.2019.1635564

Work avoidance, or the goal to reduce effort in an achievement context, is related to disengagement and may offer insight into disengaged students and employees. To shed light on this issue, we investigated the antecedents of work avoidance in academic and work contexts to distinguish it from mastery, performance-approach, and performance-avoidance goals. Two samples of employed college students (N = 207, N = 233) completed questionnaires about their jobs and in one sample about their introductory psychology class. Across both contexts, proposed antecedents of alienation, low need for achievement, and perceiving one's competence needs as not being met predicted work avoidance. Work avoidance also accounted for additional variance when combined with achievement goals to predict citizenship behaviors, perceiving work/classwork as meaningless and wanting to leave/quit.

WORK AVOIDANCE IS DISTINCT FROM THE ACHIEVEMENT GOALS

Through confirmatory factor analysis we demonstrated that work avoidance is distinct from the achievement goals in both the academic and the work contexts. We further explored the antecedents of work avoidance (i.e., alienation, low need for achievement, competence needs not being met), finding support for antecedents previously proposed (Archer, 1994; Nicholls, 1989) but never tested. Our analyses also demonstrated that the antecedents of the achievement goals did not predict work avoidance, with the exception of need for achievement which was a positive predictor of the approach achievement goals but a negative predictor of work avoidance. The analysis of the potential antecedent variables clearly distinguished work avoidance from the achievement goals and was replicated across contexts in Study 2. In addition, the fact that the achievement goals were strongly related to contingent self-worth but work avoidance was not further suggests that individuals adopting these different types of goals are likely to react differently in achievement settings. We would expect that poor performance would not impact the self-esteem of work-avoidant students or employees, consistent with them being disengaged and not really caring how well they perform. In contrast, those endorsing any of the achievement goals would be likely to feel badly when their performance was poor...

THE EFFECTS OF A SELF-REGULATED LEARNING TEACHING UNIT ON STUDENTS' PERFORMANCE CALIBRATION, GOAL ATTAINMENT, AND ATTRIBUTIONS IN PHYSICAL EDUCATION

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The Journal of Experimental Education (2020)
https://doi.org/10.1080/00220973.2020.1724852

This study examined the effects of a self-regulated learning teaching unit on students' performance calibration, goal attainment, and attributions in physical education. Participants were 101 fifth- and sixth-grade students who were randomly assigned to an experimental (57 students) and a control group (44 students). Calibration indexes were calculated based on students' estimated and actual performance in a basketball shooting test. The intervention included four sessions based on Zimmerman's four-level model of self-regulated learning. Experimental group students estimated more accurately their performance after the intervention compared to control group students while associations between calibration, goal attainment, and attributions were found. Results are discussed with reference to calibration and self-regulated learning in physical education. Practical implications and directions for future research are also provided.

CONTRIBUTIONS AND PRACTICAL IMPLICATIONS OF THE STUDY

This study was implemented in authentic physical education settings involving students in a sequence of four sessions including all key components of the four-level training model of self-regulated learning (Kitsantas, Kolovelonis, Gorozidis, & Kosmidou, 2018; Zimmerman, 2000). Moreover, students came from typical schools and were taught sport skills usually taught in the physical education curriculum increasing thus the external validity of this study and the practicability of the results. On the other hand, the fact that the intervention was implemented by an experienced experimenter with a master's degree in physical education increased the internal validity of the study probably at the slight expense of the ecological validity of the results. Furthermore, following recent calibration research (Gonida & Leondari, 2011; Gutierrez & Schraw, 2015; Kolovelonis & Goudas, 2018) the measurement and analysis processes considered the nature of calibration indexes (i.e., bias and accuracy) (Griffin et al., 2013) therefore strengthening the validity of the results...

BRIEF RESEARCH REPORT: SENSE OF BELONGING AND ACADEMIC HELP-SEEKING AS SELF-REGULATED LEARNING

Sungjun Won, Lauren C. Hensley, & Christopher A. Wolters
(*The Ohio State University*)

The Journal of Experimental Education (2019)
https://doi.org/10.1080/00220973.2019.1703095

Academic help-seeking is a self-regulatory strategy that can have an important influence on students' learning and achievement. The primary goal of the present study was to investigate whether college students' sense of belonging could be used to understand their academic help-seeking. In addition, two aspects of motivation, self-efficacy for self-regulated learning and utility value, were examined as predictors of adaptive and expedient help-seeking strategies within an integrative model. College students (N = 307) completed two online self-report surveys that assessed sense of belonging, motivation, and help-seeking. Results of structural equation modeling showed that sense of belonging significantly predicted reported use of adaptive help-seeking strategies, even when accounting for students' motivation. Self-efficacy for self-regulated learning also positively predicted adaptive help-seeking strategies, whereas utility value negatively predicted expedient help-seeking strategies. Findings support the conclusion that college students' perceptions of their social contexts inform if and how they seek help with their learning.

DISCUSSION

Our findings advance the understanding of college students' help-seeking within a model of self-regulated learning in several ways. First and foremost, our results indicate that the extent to which students feel that they belong and are accepted and respected within their social context is positively associated with their reported use of adaptive help-seeking strategies. Second, our findings corroborate the importance of self-efficacy for self-regulated learning in students' adaptive help-seeking. Third, findings provide initial empirical evidence indicating that college students' utility value is negatively associated with their expedient help-seeking. In the remainder of this section, we elaborate on the theoretical and practical implications of these findings, discuss some limitations, and identify paths for additional research...

IMPLICATIONS

Several practical implications stem from the results of the present study. First, if instructors and educators want students to make use of resources and services to support their learning (i.e., engage in adaptive help-seeking), it may help to build a social environment that cultivates a high sense of belonging. A recent meta-analysis indicated that instructors' support is the most powerful factor in achieving this goal (Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018). More generally, instructional practices that encourage mutual respect, caring, fairness, and autonomy can help students feel acknowledged and valued. In addition, emerging evidence indicates that even a brief narrative-based intervention about the transient nature of belonging concerns can enhance sense of belonging (Walton & Cohen, 2011)...

SSRL SIG Times Magazine
February, 2020; Vol. 3, Issue 2

HOW EFFECTIVE IS PEER INTERACTION IN FACILITATING LEARNING? A META-ANALYSIS

Harriet R. Tenenbaum, Naomi E. Winstone (*University of Surrey*), Patrick J. Leman (*King's College London*), & Rachel E. Avery (*University of Surrey*)

Journal of Educational Psychology **(2019)**
https://doi.org/10.1037/edu0000436

Decades of research indicate that peer interaction, where individuals discuss or work on a task collaboratively, may be beneficial for children's and adolescents' learning. Yet, we do not know which features of interaction may be related to learning from peer interaction. This meta-analysis examined results from 62 articles with 71 studies into peer interaction, involving a total of 7,103 participants aged 4 to 18 years. Peer interaction was effective in promoting learning in comparison with other types of learning conditions, Hedges' g = 0.40, 95% confidence interval [CI: 0.27, 0.54], $p < .0001$, across different gender and age groups. In contrast, however, peer interaction was not more effective than child–adult dyadic interaction. Moderator analyses also indicated that peer interaction is more effective when children are specifically instructed to reach consensus than when they are not. Findings extend theoretical considerations by teasing apart the processes through which children learn from peer interactions and offer practical implications for the effective use of peer interaction techniques in the classroom.

Educational Impact and Implications Statement

We conducted a meta-analysis (statistical review of findings from previous research) of 71 studies to investigate whether children and adolescents learn from doing an educational task together in a group with other children and adolescents. We found that children and adolescents learned more when they completed a task with their peers compared with children and adolescents completing the same task alone or serving as a comparison group who were simply tested twice. Children and adolescents evidenced greater learning when they were asked to come to agreement than when they were not. The findings suggest that simple instructions for peer interaction in the classroom may increase learning.

THE ROLE OF CULTURAL VALUES IN TEACHER AND STUDENT SELF-EFFICACY: EVIDENCE FROM 16 NATIONS

Arielle Bonneville-Roussya (*Roehampton University*), Thérèse Bouffardb (*Université du Québec*), Olympia Palikaraa (*Roehampton University*), Carole Vezeau (Université du Québec)

https://doi.org/10.1016/j.cedpsych.2019.101798
Contemporary Educational Psychology **(2019)**

Data from a large study (PISA, 2015) involving more than 132,000 children and 22,000 of their teachers, in 16 nations, were used to investigate how teachers convey self-efficacy to students when they teach and whether this is culturally grounded. Using a multilevel data analysis framework, we aimed to: (1) test a path linking teacher and student self-efficacy; (2) examine teaching practices as mediators of the links between teachers and student self-efficacy; (3) evaluate the moderating roles of cultural values on those links. Results indicated that teacher and student self-efficacy were linked indirectly through the use of teaching practices, more strongly through inquiry-based practices. We found cross-cultural differences on the associations between student-perceived teaching practices and student self-efficacy that were moderated by two country-level cultural values: individualism and uncertainty avoidance. This study highlights that, although academic self-efficacy is considered universal, we found cultural differences in its sources and manifestations.

Highlights

- **We examine the link between teacher and student self-efficacy across 16 nations.**
- **The relationship between teacher and student self-efficacy is fully mediated by teaching practices.**
- **Cultural values moderate the role of teaching practices on student self-efficacy between nations.**
- **These results broaden our understanding of self-efficacy in a culturally-relevant manner.**

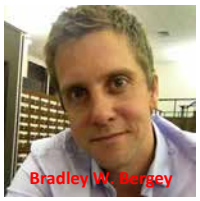
HONG KONG ACADEMICS' PERCEIVED WORK ENVIRONMENT AND JOB DISSATISFACTION: THE MEDIATING ROLE OF ACADEMIC SELF-EFFICACY

Li-fang Zhang (*The University of Hong Kong*), Mingchen Fu (*Nanjing Normal University*), & Dorothy Tao Li (*The University of Hong Kong*) *Journal of Educational Psychology* (2019)
https://doi.org/10.1037/edu0000437

Much research has been conducted to investigate the impact of work environment on academics' job satisfaction. However, little is known about what contributes to academics' job dissatisfaction. Job satisfaction and job dissatisfaction are two distinct entities because a lack of job satisfaction cannot be simply equated with job dissatisfaction. This research investigated the mediating role of academic self-efficacy in the relationship between perceived work environment and job dissatisfaction. Participants were 547 academics from the 8 University Grants Committee-funded higher educational institutions in Hong Kong. Results show that academics' perceptions of their work environment (including their perceptions of institutional expectations regarding research, university governance and management, and working conditions) statistically predicted job dissatisfaction both directly and indirectly through academic self-efficacy in research and teaching, irrespective of age, gender, academic rank, institutional ranking, and primary academic discipline. The findings enrich the literature concerning perceived work environment, academic self-efficacy, and job dissatisfaction. At the same time, they establish a meaningful link among the fields of psychology, higher education, and career development and have practical implications for academics and university senior managers and, most likely, for senior leaders in other occupations.

SSRL SIG Times Magazine

February, 2020; Vol. 3, Issue 2



THE CONCEPTUALIZATION OF COSTS AND BARRIERS OF A TEACHING CAREER AMONG LATINO PRESERVICE TEACHERS

Bradley W. Bergey (*Queens College*), John Ranellucci (*Hunter College*), & Avi Kaplan (*Temple University*)

***Contemporary Educational Psychology* (2019)**
https://doi.org/10.1016/j.cedpsych.2019.101794

We investigated the perceived costs and barriers of a teaching career among Latino preservice teachers and how these men conceptualized costs relative to their race-ethnic identity, gender identity, and planned persistence in the profession from an expectancy-value perspective. We used a mixed-method approach that included a content analysis of open-ended survey responses to identify salient costs and barriers and non-metric multidimensional scaling (MDS) of participants' responses to quantitative scales to capture phenomenological meaning of perceived costs, collective identity constructs, and planned persistence in the profession. Participants identified a range of drawbacks and barriers of a teaching career including concerns about job demands, work conditions, teacher preparation demands, emotional costs, social status, and salary, among other concerns. The MDS map for the whole sample suggested race-ethnic and gender identity were closely associated with status, salary, and morale; maps also provided insight into phenomenological meanings of different types of costs and cost measures. MDS maps for individual students demonstrated substantial diversity in individual meanings that are lost in group-level analyses. Results are discussed with attention to theoretical and practical implications for understanding and supporting men of color entering the teaching profession.

A FRAMEWORK FOR CLASSROOM ASSESSMENT, LEARNING, AND SELF-REGULATION

Peggy P. Chen &
Sarah M. Bonner (Hunter College)

Assessment in Education: Principles, Policy & Practice (2019)
https://doi.org/10.1080/0969594X.2019.1619515

We present a conceptual framework that leverages synergies between classroom assessment (CA) practices and self-regulated learning (SRL) theory to support academic growth and instruction. We articulate the processes shared by CA and SRL, drawing on a model of SRL with three phases: forethought, performance, and self-reflection. We blend this SRL model with CA to create the CA:SRL framework in four stages: (1) pre-assessment, (2) the cycle of learning, doing, and assessing, (3) formal assessment, and (4) summarizing assessment evidence. We elucidate how SRL processes are involved at each stage and can be drawn on to support learning development and teacher understanding and co-regulation of learning. This framework is important in that it depicts how assessment and learning processes interact dynamically for both teachers and students in classrooms, and demonstrates that such interactions encompass the full breadth of purposes in CA, from planning through summation of evidence.

Examining the Role of Self-Regulated Learning Microanalysis in the Assessment of Learners' Regulation

D. Jake Follmer (*Salisbury University*) & Rayne A. Sperling (*Pennsylvania State University*)

***Journal of Experimental Education* (2019)**
https://doi.org/10.1080/00220973.2017.1409184

We examined the degree of convergence among self-regulated learning microanalysis, measures of metacognitive monitoring, and a self-regulated learning questionnaire during reading. Participants' reported strategy use during reading, as measured by self-regulated learning microanalysis, was significantly related to scores on a self-regulated learning questionnaire. Self-monitoring on the microanalytic protocol was significantly related to a measure of metacognitive monitoring as well as to participants' item-level confidence judgments. Participants who made strategy attributions for performance tended to have higher scores on the measure of reading comprehension. Strategic planning and strategy use during reading of the text also predicted comprehension. Implications and future directions for the study of self-regulated learning microanalysis are discussed.

TRANSLATION AND ADAPTATION OF THE LEARNING AND STUDY STRATEGIES INVENTORY - LASSI 3rd EDITION FOR USE IN BRAZIL: METHODOLOGICAL CONSIDERATION

Evely Boruchovitch, Natália Moraes Góes, Carolina Moreira Felicori (*Universidade Estadual de Campinas*), & Taylor W Acee (Texas State University)

***Educação em Análise* (2019)**
http://dx.doi.org/10.5433/1984-7939.2019v4n1p06

Self-regulation involves students´ awareness and control of their cognitive and metacognitive processes, as well as of their motivation, emotions, and behavior. Although the theme of self-regulated learning has attracted the interest of Brazilian researchers, the production of knowledge and its necessary application in the educational context is still incipient. The concern with developing and using more valid and reliable instruments for measurement of the variables associated to self-regulated learning in a more integrated way has also been a recent issue in Brazil. Thus, the present study is part of a larger interinstitutional cooperation research, funded by the National Council for Scientific and Technological Development (CNPq), which seeks to understand the cognitive, metacognitive, affective and motivational factors associated with academic success in university. Its objective is to report the methodological procedures related to the translation of the Learning and Study Strategies Inventory (LASSI), the version for college students (3rd edition) developed by Weinstein, Palmer and Acee (2016), as a first step for future validation studies for its use in the Brazilian context. The aim is to contribute to the advancement of knowledge on the measurement of psychological variables associated with learning and academic success in a more integrated, valid and reliable manner.

INTELLIGENT TECHNOLOGIES TO OPTIMIZE PERFORMANCE: AUGMENTING COGNITIVE CAPACITY AND SUPPORTING SELF-REGULATION OF CRITICAL THINKING SKILLS IN DECISION-MAKING

Anastasia Kitsantas (*George Mason University*), Amy L. Baylor (*National Science Foundation*), & Suzanne E. Hiller (Wingate University)

***Cognitive Systems Research* (2019)**
https://doi.org/10.1016/j.cogsys.2019.09.003

The purpose of the present paper is to (a) discuss how intelligent systems can augment cognitive capacity, and through self-regulation, assist learners to engage in critical thinking and (b) provide an example that highlights the information-rich context of the work environment and the role of self-regulation in working in partnership with technology to achieve peak performance. Self-regulation from a social cognitive perspective is conceptualized as a fluid, cyclical process whereby learners use externally provided or self-generated feedback to evaluate and adjust their learning strategies. With advances in technology, this paper attempts to illustrate how workers in jobs of the future will be supported in new ways to analyze data, make interpretations and draw inferences, evaluate situations, and make decisions within a work context before, during, and post-work. Educational implications will be discussed.

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AGENCY AND HIGH SCHOOL SCIENCE STUDENTS' MOTIVATION, ENGAGEMENT, AND CLASSROOM SUPPORT EXPERIENCES

Erika A. Patall (*University of Southern California*)
Keenan A. Pituch, Rebecca R. Steingut, Ariana C. Vasquez (*The University of Texas at Austin*)
Nicole Yates (University of Southern California). & Alana A. U. Kennedy (*University of Southern California*)

Journal of Applied Developmental Psychology (2019)
https://doi.org/10.1016/j.appdev.2019.01.004

Agentic engagement is a potential gateway to improving the classroom climate and adolescent students' motivation. The current investigation provided the first test of daily and short-term longitudinal relations between U.S. high school science students' agentic engagement during class and their psychological need satisfaction, other forms of engagement (behavioral, cognitive, emotional), and perceptions of teachers' autonomy relevant practices. Analyses were based on a six-week diary study with 208 urban and suburban U.S. high school students from 41 science classes. Multilevel modeling analyses suggested that agentic engagement predicted an increase in concurrent and longitudinal perceived teacher autonomy support, need satisfaction, and other forms of engagement. Mediational analyses supported theoretical depictions of agentic engagement as emerging out of an autonomy supportive context and dynamically shaping that context and students' motivational experiences over the course of an instructional unit. The implications and fit of the findings with theory are discussed.

Highlights

- First test of agentic engagement (AE) daily and short-term longitudinal relations.
- Diary study with 208 U.S. high school students in 41 science classes.
- AE predicted increased daily perceived teacher support and student motivation.
- AE predicted increased perceived support and motivation across instructional unit.
- Mediation illustrated AE's dynamic relationship with the context and motivation.


Erika A. Patall

EXAMINING CYCLICAL PHASE RELATIONS AND PREDICTIVE INFLUENCES OF SELF-REGULATED LEARNING PROCESSES ON MATHEMATICS TASK PERFORMANCE

Gregory L. Callan (*Utah State University*), & Timothy J. Cleary (*The State University of New Jersey*)

***Metacognition and Learning* (2019)**
https://doi.org/10.1007/s11409-019-09191-x

The current study used microanalytic interviews and behavioral traces to examine sequential phase relations among forethought, performance, and self-reflection processes, and to investigate the predictive influence of these processes on mathematics performance of 96 eighth grade students. Consistent with expectations, students' microanlaytic goals and strategic plans (i.e., forethought phase) correlated at a statistically significant level with students' strategy use (i.e., performance phase), which, in turn, correlated with their attributions following performance (i.e., self-reflection phase). Regression analysis revealed that goal-setting and planning each explained a unique and medium amount of the variance in performance phase strategy use. Further, as expected, the two forethought phase processes did not predict any self-reflection phase processes. Contrary to expectations, however, metacognitive-monitoring (i.e., performance phase) did not correlate with most SRL processes, and students' strategy use were not empirically linked with students' adaptive inferences (i.e., self-reflection phase).
In terms of predictive influences, students' strategic planning, strategy use, and metacognitive-monitoring correlated significantly and positively with mathematics performance, with strategy use and metacognitive-monitoring emerging as unique predictors of performance.


Gregory L. Callan

TEACHING WRITING TO YOUNG AFRICAN AMERICAN MALE STUDENTS USING EVIDENCE-BASED PRACTICES

Steve Graham, Karen R. Harris (*Arizona State University*), & Keith Beard (*Jefferson State Community College*)

***Reading & Writing Quarterly* (2019)**
https://doi.org/10.1080/10573569.2018.1535775

Studies that specifically test the effectiveness of instructional procedures for improving the writing of young African American males who experience difficulty learning to write are almost nonexistent. Although writing intervention studies include these children, researchers rarely disaggregate their data to determine whether the writing treatment enhanced the writing of this group of students. For this article, we reanalyzed the data from 5 true experiments conducted with mostly young African American students experiencing difficulty learning to write. Each of these studies taught 1 or more fundamental writing processes or skills using evidence-based writing practices validated in previous research. Our reanalysis of each of these studies focused only on students who were male, African American, and experiencing difficulties learning to write. We found that teaching fundamental writing processes and skills using evidence-based practices improved these children's writing performance, including their performance on skills directly taught as well as on other writing or reading skills not directly taught in some instances.


Steve Graham

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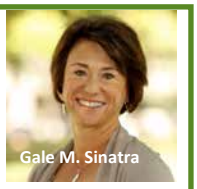
USING PERSUASIVE REFUTATION TEXTS TO PROMPT ATTITUDINAL AND CONCEPTUAL CHANGE

Ian Thacker, Gale M. Sinatra (*University of Southern California*), Krista R. Muis (*McGill University*), Robert W. Danielson (*Washington State University*), Reinhard Pekrun (*University of Munich and Australian Catholic University*), Philip H. Winne (*Simon Fraser University*), & Marianne Chevrier (McGill University)

Journal of Educational Psychology (2020)

https://doi.org/10.1037/edu0000434



Gale M. Sinatra

We investigated knowledge and attitudes before and after reading refutation texts augmented by different kinds of persuasive information and how emotions mediated the process of knowledge and attitude change. Undergraduates (N = 424) enrolled in 4 universities from 3 countries read a refutation text on genetically modified foods (GMFs) and were then randomly assigned to receive additional information about advantages of GMFs, disadvantages of GMFs, or both. After studying, students reading about advantages of GMFs had significantly more positive attitudes than students who read about disadvantages. There was also a significant reduction in misconceptions; participants in the positive-oriented text condition showed the largest learning gains, particularly those who held more positive initial attitudes. Epistemic emotions of curiosity, frustration, hope, and enjoyment mediated attitude change while confusion mediated relations between prereading attitudes and postreading knowledge. In addition, the direct relationship between prior attitudes and surprise was moderated by type of text. When reading about both advantages and disadvantages of GMFs, participants reported significantly less surprise when compared with those who read about either advantages or disadvantages of GMFs. To foster conceptual change when learning about complex topics, refutation texts may be paired with persuasive information that is aligned with accurate conceptions.

Educational Impact and Implications Statement

This study advances the idea that learning processes involve attitudes and emotions. We presented text to undergraduate students intended to correct misconceptions about genetically modified foods (GMFs) and paired it with information about the advantages of GMFs, the disadvantages, or both advantages and disadvantages. We found that participants who read text paired with information bout the advantages of GMFs had fewer misconceptions and more positive attitudes toward the topic compared with those who read about the disadvantages. We also found that some emotions (i.e., hope, enjoyment, confusion, and frustration) elicited through reading the text mediated relations between pre- and post-reading attitudes and knowledge, while others did not (i.e., surprise, boredom, hopelessness, anger, anxiety, and curiosity). These findings suggest that the greatest learning occurs when text is crafted to shift both knowledge and attitudes and it may be the case that refutation texts can be paired with persuasive information to do so.

YA'AT'EEH: RACE-REIMAGED BELONGINGNESS FACTORS, ACADEMIC OUTCOMES, AND GOAL PURSUITS AMONG INDIGENOUS COMMUNITY COLLEGE STUDENTS

Carlton J. Fong, Adam J. Alejandro, Megan R. Krou, John Segovia, & Karen Johnston-Ashton

Texas State University

Contemporary Educational Psychology (2019)

https://doi.org/10.1016/j.cedpsych.2019.101805

For decades, students' sense of belonging has been conceptualized through colonial perspectives, assuming students are to assimilate to educational institutions in order to belong. To challenge these perspectives, we race-reimaged belongingness factors in an investigation of Indigenous students (n = 887) from 156 U.S. community colleges in a secondary dataset. We first used measurement invariance testing to examine how Indigenous students interpret belongingness items differently from their non-Indigenous counterparts. Second, we used multilevel modeling to assess the role of Native-specific sense of belonging, operationalized through Indigenous ways of knowing and being, on GPA and goal pursuits. Our findings suggest that both traditional conceptualizations of belongingness factors (i.e., student relationships to teachers and peers) and Native-specific constructions of belongingness factors via relationships to community, family, and cultural identity were salient. Native-specific factors were more consistently associated with Indigenous students' outcomes. Implications for best practices to foster belongingness and future directions for race-reimaging research will be discussed.

Highlights

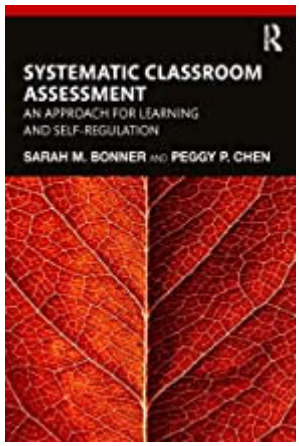
- **Belongingness factors were race-reimaged using Native theories and ways of knowing and being.**
- **Indigenous belonging integrates cultural identity, family, community, and self-empowerment.**
- **Belongingness factors were distinct for Indigenous students.**
- **Traditional and race-reimaged belongingness factors were positively associated with GPA and goal pursuits.**
- **Implications for fostering belonging for Indigenous students and future research are discussed.**

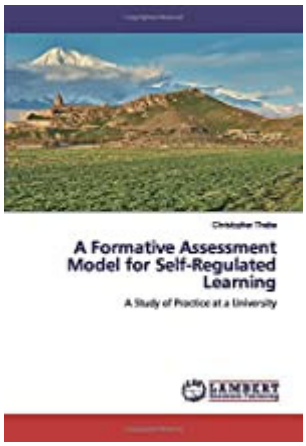
SSRL SIG Times Magazine

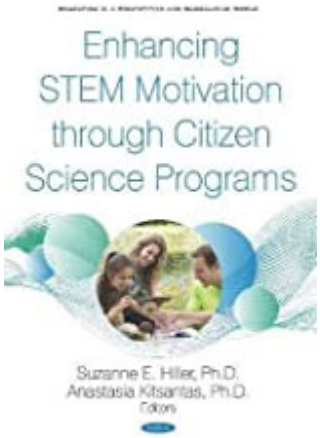
February, 2020; Vol. 3, Issue 2

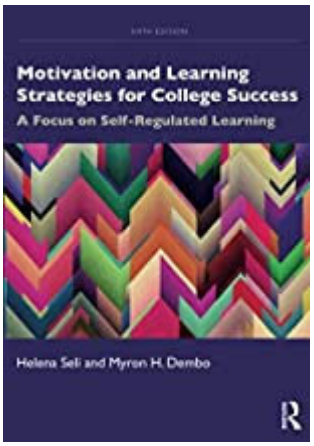
Some Books Published between 2019 and 2020

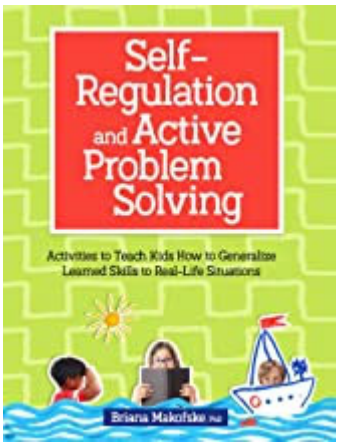
(The inclusion of these books here should not be construed as an endorsement of the books by our SIG SSRL or AERA. Members and friends of our SIG SSRL should exercise their own judgment of the books)

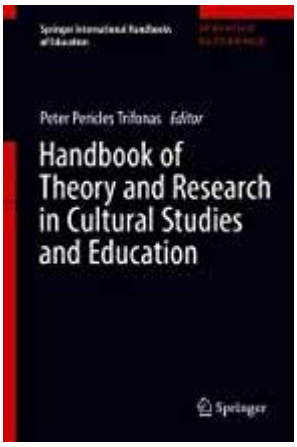


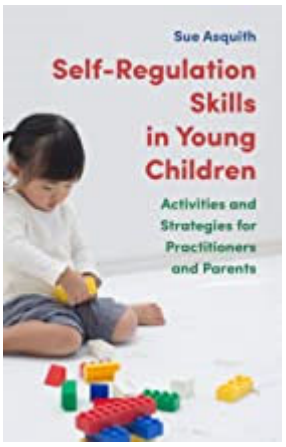


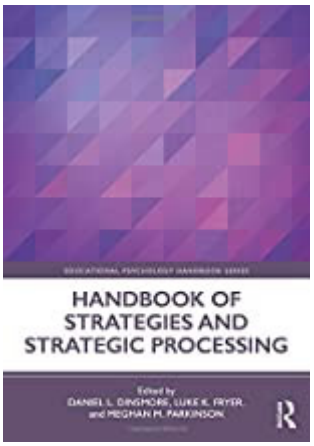


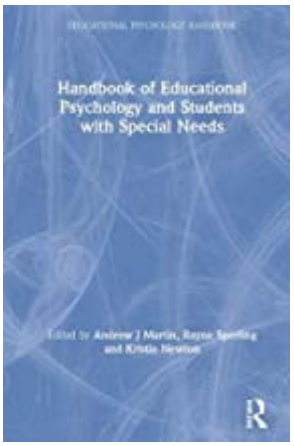


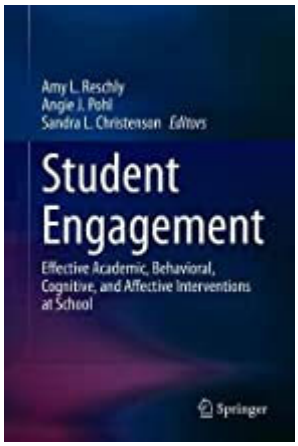


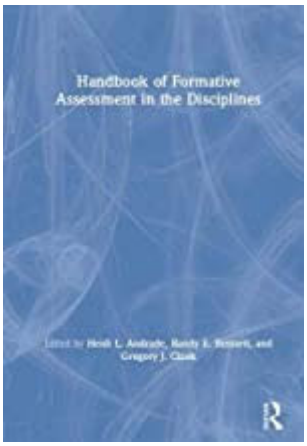












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