Pamela F. Murphy

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Self-Regulated Learning in Media-Rich Learning Environments

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Self-regulated Learning and Engagement in Media-Rich Learning Environments

Rinat Levy Cohen

It has been wonderful to see this *Times Magazine's* special issue of the American Educational Research Association Studying and Self-Regulated Learning Special Interest Group come to fruition. This issue focuses on self-regulated learning (SRL) and engagement in media-rich learning environments (e.g., online courses and virtual reality). Below you will read about new ways our colleagues research SRL and engagement in these environments. I grouped the articles into three sections, as shown below.

We dedicate this issue to Pamela F. Murphy, an Associate Professor in the College of Arts and Sciences at the University of Arizona Global Campus. Pam is a frontiersperson in self-regulated learning in media-rich learning environments. She teaches online courses where she engages her students in acquiring competence associated with research methodologies and techniques used to collect data to answer research questions through quantitative or qualitative research. We celebrate Pam's fighting spirit despite challenging health conditions. She is constantly battling to reach her personal and professional dreams. Fully empowered with faith and self-regulatory skills, Pam is a self-regulated heroine we aspire to emulate. She perfectly exemplifies the triumph of faith and self-regulated learning over obstacles.

Advanced Learning Technologies for SRL and Engagement

Researchers and educational organizations have been developing technologies and software that foster student SRL skills and engagement in recent years. I am delighted to include a few new and exciting projects in the current issue. A common theme among these projects is that they all deploy groups of interdisciplinary professionals.

First, Azevedo and his team at the Laboratory for the Study of Metacognition and Advanced Learning Technologies (SMART Lab) apply multimodal learning analytics to foster students' SRL using human digital twins. He shares in his article below how he studies complex interactions between health professionals and intelligent learning systems by using interdisciplinary methods to measure cognitive, metacognitive, emotional, motivational, and social processes.

Tinianow and his group at the University of Arizona Global Campus recently received a grant to study the impact of virtual reality (VR) on learning in the college classroom. Tinianow and his colleagues suggest that VR is an inclusive learning methodology because it allows for diverse learning experiences. This group is exploring how VR impacts post-secondary students' engagement in learning.

Ostrow writes about the significance of engagement while learning online. She discusses a four-facet model Edmentum, an online learning platform, is applying to measure engagement on their website. Ostrow and her colleagues use this data and performance data to develop learning pathways for each student.

Promoting SRL & Engagement in Online Learning

Educators and learners are learning more about supporting learning in interactive learning environments as more research continues. The articles under this category discuss how to promote SRL and engagement online. Besharat Mann maintains that the transition to online learning, increased resources, and educational technologies may result in an increase in college students' cognitive load. She opines that promoting college students' SRL skills may remedy this situation and she describes external and personal factors that may impede students' SRL. Besharat Mann then recommends several strategies to overcome these challenges in interactive learning environments.

Ates-Akdeniz discusses her dissertation research that examined design students' SRL behaviors in an online learning environment. She maintains that low-achieving design studio students tend to avoid seeking help due to a fear of judgment. She maintains that including an open forum for students and teachers might foster design students' SRL skills and performance, especially amongst low-achieving students.

Research Methodologies for Assessing Help-Seeking Behaviors in the Classroom

The traditional research on student help-seeking used surveys to assess students' help intentions. Less work had been dedicated to actual help-seeking behavior. However, with the advancement of technology, more researchers are now assessing students' help-seeking behaviors. Minna Puustinen and Sabine Zorn reflect on a recent study they conducted.

They discuss applying a novel analysis method to understand students' help-seeking behavior in the classroom. In a video conference with the student, teacher, and researcher, they watched video segments during which the student asked for help. They found that allowing students to reflect on their help-seeking behavior in a virtual environment was perceived as less intimidating for the student.

Rinat Levy Cohen, PhD, graduated from Fordham Graduate School of Education. She is an educational researcher and the inaugural director of McLeod Innovation Center. She researches the impact of educational technologies on student achievement motivation and learning in formal and informal learning environments.

Human Digital Twins at The Laboratory for the Study of Metacognition and Advanced Learning Technologies

Roger Azevedo

Roger Azevedo is a Professor in the School of Modeling Simulation and Training at the University of Central Florida. He is also an affiliated faculty in the Departments of Computer Science and Internal Medicine at the University of Central Florida and the lead scientist for the Learning Sciences Faculty Cluster Initiative. He received his PhD in Educational Psychology from McGill University and completed his postdoctoral training in Cognitive Psychology at Carnegie Mellon University. His main research area includes examining the role of cognitive, metacognitive, affective, and motivational self-regulatory processes during learning with advanced learning technologies (e.g., intelligent tutoring systems, hypermedia, multimedia, simulations, serious games, immersive virtual learning environments). More specifically, his overarching research goal is to understand the complex interactions between humans and intelligent learning systems by using interdisciplinary methods to measure cognitive, metacognitive, emotional, motivational, and social processes and their impact on learning, performance, and transfer.
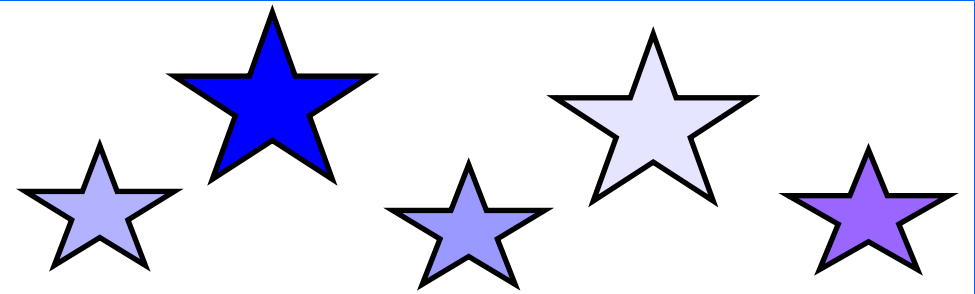
"There are some lessons learned and open challenges for interdisciplinary researchers. First, SRL takes time to develop and needs to be acquired, internalized, and practiced over time with the assistance of human and artificial agents to enhance learning and transfer. Therefore, future intelligent systems may need to scaffold learning and should encourage students to interact with such systems for a longer period of time. Second, adaptive (intelligent) scaffolding is key to supporting students' SRL with learning technologies, but this can only be achieved once we understand how CAMM processes dynamically and temporally unfold and how they relate, contribute, and impact real-time learning processes (Hadwin, 2021). To do so, it is critical that system features become more seamless in their interactions with students (e.g., hold a conversation using NLP) and use stealthier assessment (gaze-behavior analysis, etc.) to adapt itself to the needs of each individual student."

Azevedo R., Bouchet F, Duffy M,. Harley J., Taub M., Trevors G., Cloude E., Dever D., Wiedbusch M., Wortha F,, & Cerezo R. (2022). Lessons Learned and Future Directions of MetaTutor: Leveraging Multichannel Data to Scaffold Self-Regulated Learning With an Intelligent Tutoring System. Front Psychol. https://doi.org/10.3389/fpsyg.2022.813632. PMID: 35774935; PMCID: PMC9239319.

Human Digital Twins at The Laboratory for the Study of Metacognition and Advanced Learning Technologies

Roger Azevedo

The Laboratory for the Study of Metacognition and Advanced Learning Technologies (SMART Lab) is directed by Roger Azevedo. The SMART Lab's current research extends traditional methods of studying and fostering self-regulated learning. Azevedo's team and interdisciplinary collaborators are currently focusing on human digital twins to facilitate learners' development of self-regulated learning using multimodal data in blended learning and interactive simulations.

Human digital twins (HDTs) are symbolic digital replicas of (real) humans that can serve as a novel research platform to represent, model, and simulate how learners with varying self-regulated learning knowledge and skills behave, operate, and learn in blended learning interactive simulations while solving problems related to societal challenges (e.g., STEM learning, health disparities).

Despite SRL being critical for task performance as learners dynamically monitor and regulate key cognitive, affective, metacognitive, motivational, and social processes, typical learners still cannot effectively self-regulate while solving complex and challenging problems. We argue that learners will accelerate their SRL skills and knowledge development by designing, modeling, and testing their HDTs in blended learning interactive simulations using various traditional methods (e.g., through direct verbal instruction of explicit metacognitive knowledge) in conjunction with the novel use of displaying, duplicating, merging and exchanging their multimodal multichannel data (e.g., eye movements, concurrent verbalizations, facial expressions of emotions, physiology, affective states) and therefore focusing on the human-HDT symbiotic relationship across tasks, domains, and over time.

Our team of interdisciplinary researchers is working on a new theoretically and empirically based methodological and analytical approach for modeling, simulating, and advancing self-regulatory processes underlying clinical decision-making in blended learning interactive simulation environments. The proposed approach highlights five cyclic and recursive phases:

1. The digital duplication, merging, and exchanging of health professionals' cognitive, affective, metacognitive, metacognitive, and social (CAMMS) self-regulatory knowledge and skills using sensor-based multimodal multichannel data with their HDTs.
2. The HDT's condition-flexible modeling and simulation of the professionals' CAMMS self-regulatory knowledge and skills.
3. The health professionals' scientific-reasoning-based learning approach to developing self-regulatory knowledge and skills by hypothesizing and testing their HDTs' learning and performance in blended learning interactive simulation environments.
4. The health professional's reflection on the processes of the HDTs and their self-regulatory and clinical decision-making skill development related to phases (1) to (3) with the assistance of their HDT and perhaps other more knowledgeable-expert health professionals' HDTs.
5. The health professional modifies the HDT's self-regulatory abilities and clinical decision-making expertise.

Our research on SRL and HDTs includes...

⇒ (1) synthesizing the biomedical literature on HDTs and how HDTs differ from other pedagogical agents used to advance self-regulation and clinical decision-making;

⇒ (2) articulating the theoretical bases for the use of HDTs as a modeling and simulation (research) platform that is aligned with contemporary models of SRL and other psychological sciences research on clinical decision-making;

⇒ (3) key role of exchanging sensor-based multimodal multichannel self-regulatory trace data between health professionals and HDTs during the different phases of representing, modeling, and simulating self-regulation for advancing healthcare professionals' clinical decision-making;

⇒ (4) role of HDTs as externally-regulating agents and their intelligent and adaptive behaviors in fostering health professionals' clinical decision-making based on the learners' self-regulatory needs; and

⇒ (5) the use of blended learning interactive simulation environments with embedded medical scenarios to exemplify the issues raised in points one to four, focusing on the symbiotic digital relationship between healthcare professionals and HDT. Lastly, our approach to examining SRL and HDT is applicable in addressing several societal challenges (e.g., STEM learning, health disparities, empathy training in the workforce).

Roger Azevedo, PhD, is a Professor in the School of Modeling Simulation and Training at the University of Central Florida. His main research area includes examining the role of cognitive, metacognitive, affective, and motivational self-regulatory processes during learning with advanced learning technologies.
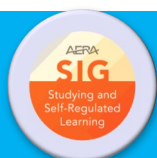
Synchronous Online Interactions as a Means to Deal With the Complexity of Student Help-Seeking
Minna Puustinen & Sabine Zorn

Very few studies have focused on student help- seeking in complex, real-world (online or face-to-face) conditions. We (Zorn & Puustinen, 2022) used video data to analyze help- seeking in French lower secondary students with autism spectrum disorder (ASD) and their teachers' subsequent help-giving in everyday classroom situations. A new help-seeking category emerged—baptized ambiguous help-seeking (i.e., help-seeking that cannot be coded unequivocally). Ambiguous help-seeking was always formulated through a statement (e.g., "I'm not going to be able to do this task.") instead of a question (e.g., "How should I do this task?").

We suggested that ambiguous statements might "actually not correspond to soliciting help from the helper but reflect another previous step of the help-seeking process, namely determining whether there is a problem and whether help is needed" (Zorn & Puustinen, 2022, p. 9); in addition, "given that students' reflections were expressed out loud, teachers could have interpreted them as requests for help and provided help" (p. 9). This interpretation potentially leads us to challenge seminal work in this field. In her pioneering paper, Nelson-Le Gall (1981) distinguished two verbal means to solicit help: directly asking questions and making statements. Could it be, after all, that making statements does not correspond to soliciting help?

Within this context, the question arises as to what methodology could be applied to verify whether students intend to seek help when formulating statements in everyday learning situations. We have experimented with a cross-view method during the analysis by parents and professionals of video-recorded data on students with profound intellectual and multiple disabilities (PIMD; Atlan et al., 2020). Initially, because of the Covid-19 pandemic restrictions, we needed to transpose this method to online situations (Atlan et al., 2022), and we were pleasantly surprised by the outcome.

Based on this experience, we consider that the best method for verifying students' statement-related intentions would be crossing the student's, the teacher's, and the video-recording researcher's views of the situation during an online interview shortly after the video recordings. During the interview conducted by the researcher, the student and the teacher would be invited and encouraged to express their viewpoints on the unfolding of the student statement-making episodes and exchange with each other and with the researcher to result in increased mutual understanding.

It seems to us that an online environment, allowing synchronous interactions between the student, the teacher, and the researcher, would be particularly appropriate for this investigation, especially from the student's viewpoint. A face-to-face interview with two adults (the teacher and the researcher) may be intimidating for students: they may not feel at ease recalling classroom situations in which they seem to encounter difficulties. The advantage of computer-mediated situations is that they seem to lower the threshold for student participation because of increased psychological distance and thus decreased perceived threat (cf., for example, Keefer & Karabenick, 1998; see also Puustinen & Rouet, 2009).

In sum, we firmly believe that understanding the different aspects of student help-seeking in complex, real-world settings is necessary for the effective implementation and promotion of self-regulated help-seeking behaviors. We would be delighted to have comments on these ideas from other researchers.

1 An online environment is especially recommended for students with ASD who experience difficulties in interacting with others (cf. Gillespie-Lynch et al., 2014), but we believe that it is more suitable than a face-to-face situation for all the students.

Upon request, references are available by contacting Minna Puustinen (minna.puustinen@inshea.fr).

Minna Puustinen, PhD, is a professor of educational sciences at INSHEA, France. Her research focuses on student help seeking in natural (i.e., every day) face-to-face and online learning situations. She co-edited "Advances in help-seeking research and applications: The role of emerging technologies" with Stuart A. Karabenick (2013, Information Age Publishing).

Sabine Zorn, PhD, is an associate professor of educational sciences at INSHEA. She works on inclusive education issues by analyzing video-recorded data on help-seeking/help-giving interactions in the classroom.

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Transforming Learning with Virtual Reality: A Faculty-Led Exploration
Dan E. Tinianow

I n 2022, the University of Arizona Global Campus' University Fellows Program offered a grant that allowed a dozen faculty members to purchase Meta Quest 2 virtual reality (VR) headsets. During the year, we explored VR together, with an eye toward its potential in higher education. More recently, the University Fellows Program funded this project for a second year and expanded the group by six. The group includes primarily faculty but also information technology and faculty support staff. In the project's second year, the focus shifts from general exploration to specific proposals for how we might integrate VR into our curriculum at a course and assignment level.

Over the last year, the group has experienced this technology's potential to increase student motivation and engagement. VR provides an immersive and interactive experience that can transport students to different worlds and scenarios, allowing them to explore and learn in ways that were not possible before.

Although the second year of this project is still in the starting stages, the first-year group was impressed with VR, especially its ability to connect people. After the initial novelty wore off, meeting in VR felt more and more like meeting in person, or at least much closer to this than our typical Zoom-based meetings. As a distributed campus, this means a lot. As we got more comfortable with the technology and explored specific VR applications, the potential of this technology for interacting with students and greatly expanding what online instruction can offer them became evident.

Research has shown that using VR in education can increase student engagement and motivation. According to a study by Kizilcec and colleagues (2017), students who used VR in a biology class reported higher motivation and interest than those who did not. Another study by Santos Garduño and colleagues (2021) found that using VR in a high school science class improved students' attitudes toward the subject and increased their motivation to learn.

The group has been exploring different VR applications and tools that may fit our curriculum well. We are looking at ways to use VR to create immersive learning experiences to help students better understand complex concepts and theories. For example, we are considering using VR to simulate face-to-face student (and student-instructor) interaction, recreate scientific experiments, and provide virtual field trips to places that may be difficult or impossible to visit in person. Of course, there are many other possibilities beyond this.

In addition to increasing motivation and engagement, VR can provide a more inclusive learning experience. For students with disabilities or limited mobility, VR can provide access to experiences that may have been previously inaccessible. It can also provide a more diverse range of learning experiences that cater to different learning styles and preferences.

As we move forward with our exploration of VR in education, we are committed to evaluating the effectiveness of this technology in enhancing student learning and engagement. When we provide students with VR experiences in the classroom (as of this writing, there has yet to be a date planned for implementation), we will look at data on student performance and feedback to determine where VR can have the most impact. Once we reach that point, we can use it to create meaningful and compelling learning experiences.

In conclusion, virtual reality has the potential to revolutionize higher education by providing immersive and interactive learning experiences that increase student motivation and engagement. Our faculty group is excited to explore the possibilities of this technology and hopes to one day integrate it into our curriculum in ways that can benefit our students. The group agrees that VR can provide more inclusive and diverse learning experiences to help students understand complex concepts and theories better.

Upon request, references are available by contacting Dan E. Tinianow (Dan.Tinianow@uagc.edu).

Dan E. Tinianow is a Professor and Faculty Lead for Oral and Interpersonal Communication in the Academic Enhancement Center of the College of Arts & Sciences at the University of Arizona Global Campus. He received a PhD in Mass Communication and a Master of Science in Television/Radio/Film from the Newhouse School of Public Communication at Syracuse University.

Dissertation Abstract

"Virtual reality is a nascent communication technology that is in the early stages of adoption. This dissertation defines and illustrates virtual reality, then proceeds to make an assessment of this impact in several key areas. Finally, it suggests a research agenda that enhances understanding, maximizes benefits and minimizes any drawbacks of this emerging technology. In defining and illustrating virtual reality, the works of a number of early virtual reality scholars and innovators are reviewed, as are a range of portrayals of virtual reality in existing mass media. Further, virtual reality and pseudo-virtual reality products are examined. In addition, a survey of those working closely with and greatly interested in virtual reality is presented. This survey, conducted on volunteers subscribing to the Usenet "Virtual Worlds" discussion group, provides a description of the view of and attitude toward virtual reality held by the respondents. This is followed by a systematic review of mass communication and other related theory, and an attempt to see what it implies about virtual reality, and vice versa. One major conclusion is that virtual reality may be a "massive" medium, related to, but distinct from, traditional mass media. Subsequently, specific discussion of economic and safety aspects of virtual reality is presented. The economic aspects primarily relate to level and rate of adoption of virtual reality and its economic support structure. The safety aspects focus on addiction and behavioral/attitudinal change, as well as physiological impact, such as decreased physical activity or repetitive motion injury, that will affect that way virtual reality is perceived, accepted and used. All of this leads into a research agenda that anticipates virtual reality joining the mix of media in society and attempts to provide an informed approach to understanding the role it will play. In examining virtual reality from a mass communication perspective, it is hoped that the author can provide a solid foundation for future inquiry as virtual reality becomes more widely available."

Tinianow, D. E. (1997). Virtual reality as a mass or massive medium. Dissertation Abstract, Syracuse University ProQuest Dissertations Publishing, 9820640.

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Bringing K-12 Learner Engagement Online:
A Cross-Functional Approach

Korinn S. Ostrow

Learner engagement is a complicated construct that is difficult to define and even more difficult to measure, yet most educators agree that keeping learners engaged is critical. They often use online resources to provide engaging educational opportunities for their students, hoping to promote lasting academic growth and instill self-regulation toward lifelong learning. As such, academics and industry professionals who develop these resources must consider the intricacies of learner engagement when attempting to optimize their products.

Various theoretical frameworks have operationalized learner engagement in ways that support the development of engaging educational environments and activities. One popular option splits learner engagement into behavioral, cognitive, emotional, and agentic dimensions (Fredricks, Blumenfeld, & Paris, 2004; Reeve & Tseng, 2011).

- The behavioral dimension is typically associated with time on task or rates of performance (e.g., session length, activities per session, items per hour), the amount of content a student has seen (e.g., items, skills, or modules completed), or their accuracy as either a predictor of an engagement or an outcome of having been productively engaged (e.g., item correctness, overall score).
- The cognitive dimension emphasizes a student's regulatory and metacognitive behaviors. It can be defined broadly (e.g., participation in extra-curricular activities, measures of student-teacher relationships) or by focusing on how a learning product supports metacognition (e.g., attempt counts, help-seeking behavior, report usage).
- The emotional dimension accounts for a student's feelings as they learn and includes their affect, sense of belonging, interest in and value of learning materials and outcomes.
- Finally, the agentic dimension targets a student's preferences, interests, and instances of autonomy associated with learning tasks or relationships within a learning ecosystem.

Edmentum is actively applying this four-facet model to explore the complexities of evidence-based learner engagement in Exact Path, one of its K-12 offerings that serve more than 5 million learners across more than 8,000 school districts in the United States. Exact Path uses a computer adaptive diagnostic assessment to pinpoint learning gaps and place students into a learning path or a self-paced skill progression tailored to educational standards. Students then follow a mastery learning-based trajectory that includes cycles of skill practice, assessment, and remediation. The diagnostic can be re-administered seasonally to track students' growth within national norms.

Edmentum is invested in enriching Exact Path with features that emphasize learner engagement and strengthen short- and long-term performance outcomes. In 2022, the industry leader brought together a cross-functional working group of learning designers, user experience researchers, learning engineers, research scientists, and consulting virtual academy educators to explore productive persistence among learners or a state of engaged focus that correlates with positive learning outcomes.

The group has identified a set of baseline metrics for measuring learner engagement over time and developed data pipelines and research dashboards to assess how those metrics change as Exact Path evolves. The group is actively exploring how these metrics align with learning outcomes like skill completion, growth, and achievement of grade-level proficiency. Teacher and administrator perspectives were considered during the development of these metrics.

The group is actively working to contextualize short- and long-term learning outcomes within demographic subgroups, hoping to improve equity for historically disadvantaged and underrepresented populations. The group has also developed a proof-of-concept AI-based sequence model that uses clickstream data to diagnose unproductive learning patterns, pinpointing opportunities for targeted intervention.

Upon request, references are available by contacting Korinn Ostrow (ksostrow@wpi.edu).

Korinn Ostrow earned her Ph.D. in Learning Sciences from Worcester Polytechnic Institute (2018). In her role as a Learning Engineer at Edmentum, she is focused on measuring and improving learner engagement through support for evidence-based iterative development of online learning environments.

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What Teaching Strategies Relate to Increasing Student Self-Regulation in Online Learning Environments?
Rachel Besharat Mann

Rachel Besharat Mann, PhD, is a Visiting Assistant Professor at Wesleyan University, specializing in media and digital literacy alongside literacy development amongst adolescents. Besharat Mann also researches the effects of social media environments on adolescent and young adult populations.

As educational technology expands and more resources are available for students, it remains that using technology in educational settings, particularly as a supplement to in-person learning, may help to increase self-regulation and motivation amongst a variety of student populations (Lin & Chen, 2017; Dabbagh & Kitsantas, 2012). However, it does remain that increased use of multiple online learning environments can increase cognitive load, requiring the need for strengthened self-regulation skills to ensure academic success (Lange & Costley, 2019; Broadbent & Poon, 2015). This can be particularly true for college students who transition to more independent learning environments.

In the recent article, "This is a weird time we're in": How a sudden change to remote education impacted college students' self-regulated learning, Laura Hensley, Ryan Iaconelli, and Christopher Wolters explored the impact of changing to online learning during the pandemic on self-regulated learning amongst college students. Using qualitative methods to capture student experience, the researchers determined four specific challenges perceived by students in online learning environments concerning self-regulated learning:

- feelings of disconnect and distraction
- problems with engagement associated with loss of independence and increased stress
- heavy academic burden and feelings of burn-out
- the encounters with instructors

Working extensively with undergraduate students, these themes resonate as we begin to emerge from the pandemic with increased reliance on online learning environments to account for COVID-19 exposures and diagnoses and an overall shift in pedagogical practices.

Analyzing the trends that emerged from the students' responses, Hensley and colleagues opened with the idea that the assumption many instructors make about the advanced level of students' digital skills is often misguided and can lead to poor self-regulation outcomes as students are left to navigate online environments without support. In turn, as students often understand this assumption about their generation, help-seeking behavior may be limited for fear of judgment and embarrassment. Understanding the dangers of this assumption is important.

The authors underscore their findings concerning instructor support's importance in enhancing self-regulated learning through scaffolding, including promoting goal-oriented behavior and peer interaction. These relationships and practices often promote help-seeking behavior, creating an environment of respect and learning.

Perhaps most notably, the researchers highlight the significance of external factors which compound self-regulated learning, particularly in online environments. Instructor support is paramount for success, but social and personal contexts can significantly influence individual self-regulation, changing the students' needs regarding instructor engagement and scaffolding. Though many outside events and interruptions are out of instructor control, there are strategies educators can employ to ensure the limitation of the negative effects self-regulation outside contexts can have on students.

As we hope the magnitude of the stress of the pandemic will ease and not be replicated in future events, the feelings that emerged for many—stress, isolation, anxiety, loss of control, and worry—are those that may occur for any student at any time and can have negative interactions with self-regulated learning, particularly with the autonomous nature of online learning environments and undergraduate settings. Thus, I offer a few strategies to combat these external and personal contexts that may aid students in online learning environments in terms of self-regulated learning behaviors and achievements:

- Setting clear goals early in the course: Though this seems obvious, "clear" may not look the same for every instructor or student. Posting a streamlined course schedule with precise due dates and learning targets can be incredibly beneficial for students to regulate their behavior to meet physical deadlines and academic requirements.
- Providing scaffolded instruction for digital practices: By posting tutorials, including individual instructor-created material, walking students through digital aspects of the course, including navigating platforms and assignment submission, can help to ease the anxiety of digital practices and encourage help-seeking behaviors regarding these types of issues. This can also alleviate the tendency of students to perceive failure in digital spaces as an academic failure, which Hensley and colleagues delineate.
- Creating rapport: When instructors create safe learning environments for students, self-regulation and achievement may increase. Instructors should strive to create this environment as much as possible in online spaces, including holding video conferences when appropriate, providing adequate time for students to schedule meetings, and providing feedback in a timely and constructive manner. Using platforms to allow students to interact with peers and instructors can help create efficient learning environments.

Learning in online spaces can often feel impersonal, depending on the course design. When instructors understand the contextual factors that may contribute to disruptions in self-regulation skills, particularly for college students who may not feel as comfortable seeking help, educators can seek to mitigate them when designing coursework and interacting with students.

Upon request, references are available by contacting Rachel Besharat Mann (remann@wesleyan.edu).

> **"Using technology in educational settings, particularly as a supplement to in-person learning, may help to increase self-regulation and motivation amongst a variety of student populations."**
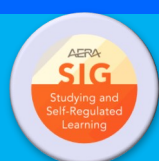
Help-seeking in a Design Studio Course
Aysun Ates-Akdeniz

We have realized the importance of learning strategies since the change of course delivery methods due to the pandemic. The pandemic significantly impacted design studio courses in higher education since they require three-dimensional models of ideas and interactive discussions. Although it has been possible to create a design studio environment for remote learning with the help of digital tools, design students still need to be engaged in a collaborative learning process. We believe that self-regulated learning (SRL) strategies can help design educators improve interactive design learning environments.

SRL stresses the importance of peers, parents, and instructors in learning (Zimmerman, 2000). Help-seeking as a behavioral strategy is the ability to reach out for help to overcome uncertainty and difficulties (Newman, 2008). The culture of a design studio has a combination of material representation, social collaboration, creativity, and tolerating uncertainty (Wang, 2010). However, the degree of uncertainties and ambiguities in design studio education can be frightening for some students.

As Sungur and Yerdelen (2011) explain, Turkey's competitive and exam-oriented education system begins in middle school, preventing students from seeking help. When Turkish design students encounter a studio that requires high social skills in critique sessions with judges where students present their projects to the instructors, guests, and peers, they must make their SRL visible and reflect on their previous learning strategies.

In our first study (see Ates-Akdeniz & Turan, 2022), which was the explorative phase of my dissertation study, we examined the differences in design students' strategy use with varying achievement levels. In line with the studies on help-seeking intentions, our findings highlighted that low-achieving design students were reluctant to seek help, whereas high achievers were eager to receive feedback from peers, upper-class peers, and instructors.

Reluctance to seek help may relate to a lack of awareness of the need for help (Greene & Azevedo, 2009), a lack of social competencies, or a fear of being criticized (Karabenick & Knapp, 1988). Additionally, students might be embarrassed to ask questions during a design studio course due to emotional unease. Critique sessions are a fundamental tool for reflective conversations in design studio education.

Yet, if critiques mostly point out weaknesses or mistakes, students may avoid attending the class or misinterpret the comments (Goldschmidt et al., 2010). Notably, underachievers tend to avoid communication in the design studio, which is expected to be open to collaboration. Additionally, the inaccessibility of instructors – described as "mystery-mastery syndrome" by Schon (1987) may prevent underachieving students from asking for help and decrease their self-confidence. Therefore, there is a need to improve the structure of critique sessions for low-achieving design students.

How can we encourage design students to seek help from others?

For the second phase of my dissertation, a self-regulation intervention for an industrial design studio (SRIIDS) was conducted within an online design studio course to encourage students to use SRL strategies and improve their design skills. The first phase's findings and Zimmerman's (2000) SRL model informed the framework.

During the intervention sessions, students were encouraged to reflect on their learning by sharing their studio experiences online. An integrated analysis of quantitative and qualitative data suggested that a forum for students to share their positive or negative studio experiences with instructors and peers increased their motivation and self-efficacy and enhanced instructor accessibility. Students were able to ask for help more easily. Further, pre-post judge grade comparison analysis indicated an increase in their design performance.

Our approach emphasizes "experience sharing" as a motivational strategy that establishes a basis for peer-to-peer and peer-to-instructor attachment through conversations about common difficulties and growth areas in an online learning environment. When students felt they were in a learning environment that encouraged sharing feelings and thoughts, they seemed more open to trusting their design approach and seeking help. Including an experience-sharing element in online design, studio courses may be an excellent way to promote SRL skills such as help-seeking.
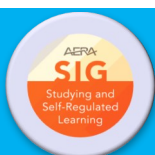
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Related Article
"The value of self-regulated learning skills for academic achievement has been shown in different domains. However, self-regulated learning skills in design studio education have rarely been studied directly. This study aimed to explore differences in self-regulated learning strategies and motivational factors between high and low achieving industrial design students in an industrial design studio course. We applied a convergent mixed methods design with self-report questionnaires and interviews to gain a comprehensive understanding of students' strategy use. The integrated analysis of quantitative data from 47 students and qualitative data from 16 students demonstrated differences between high and low achieving design students' self-regulated learning skills concerning the use of metacognitive, motivational and behavioral strategies. Together with the expanded integration of data analysis, these findings indicate that self-regulated learning examinations should be undertaken with caution in design studio contexts."

Ates Akdeniz, A. & Turan, G. (2022). Differences in self-regulated learning strategies among industrial design students: A convergent mixed-methods study. *A/Z ITU Journal of the Faculty of Architecture, 19* (2), 277-299. https://doi.org/10.5505/itujfa.2022.44522

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