Recipe for Success: Teaching Students Metacognitive and Self-Regulatory Learning Strategies

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Abstract

The decision to explicitly teach students learning strategies and skills and how to think reflectively about their learning process is framed theoretically by the literature on self-regulation, metacognition, and social-cognitive theory. Interventions for self-regulation and metacognitive strategies can optimize the student learning process and teaching metacognitive strategies in higher education is known to improve subject matter comprehension and course performance. This article offers a theoretical framework for explicitly teaching study strategies and skills, reviews literature on the efficacy of implementing study strategy and skills interventions,

and then provides a detailed example for teaching a self-regulatory time-management strategy with embedded metacognition.

Keywords: learning strategies, metacognition, time management, self-regulation, study skills

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Many college students struggle with studying effectively (Geller et al., 2018; Hartwig & Dunlosky, 2012; Morehead et al., 2015), yet this is not a new phenomenon. Courses offering instruction to enhance college students' study behaviors have been documented for more than 125 years, with such courses proliferating in the 1920s and beyond (McKeachie, 1988). Student success-type courses, as they have come to be known, continue to be offered in various forms (e.g., study skills, first-year seminars, learning-to-learn, learning frameworks) to facilitate students' autonomy in college, strengthen their strategic learning processes, and increase their grades, retention, and graduation rates (Hodges et al., 2019; Tuckman & Kennedy, 2018; Weinstein & Acee, 2018). Additionally, many educators are now helping students strengthen their study skills by embedding learning strategy instruction within discipline-specific courses to promote students' autonomy and success.

Sellers et al. (2015) described autonomous learners as "independently competent in a wide variety of academic tasks, able to actively achieve goals based on values, and skilled in self-reflection" (p. 23). These students are "aware of their learning strengths and weaknesses" (p. 23) and "use effective learning strategies and adopt those strategies to new situations" (p. 24). Similarly, Weinstein and Acee (2018) defined strategic learners as goal-directed and autonomous, "who have the skill, will, and self-regulation needed to survive and thrive in different postsecondary educational contexts" (p. 230). Weinstein and Acee see these components as malleable intraindividual factors under a learner's direct control and amenable to change through educational intervention.

The purpose of this article is to promote teaching students how to think reflectively about their learning process using metacognitive and self-regulatory strategies. After reviewing the theoretical underpinning and relevant literature, we offer by example a strategy to help students hone their overall study, metacognitive, and time management strategies and skills.

Learning Strategies and Study Skills

The terms *learning strategies* (also called *study strategies*) and *study skills* are often conflated, but it is important to clarify the language as they are not the same. A learning strategy can be understood as a deliberate, goal-directed plan for accomplishing a learning task, and

we posit that it involves metacognitive awareness. Supporting the implementation of a learning strategy are learners' study skills—the "methods and techniques that aid effective learning" (Oxford English and Spanish Dictionary, n.d.-a). Drawing from the field of literacy, Afflerbach et al. (2008) posited that

> Reading strategies are deliberate, goal-directed attempts to control and modify the reader's efforts to decode text, understand words, and construct meanings of text. Reading skills are automatic actions that result in decoding and comprehension with speed, efficiency, and fluency and usually occur without awareness of the components or control involved. The reader's deliberate control, goal-directedness, and awareness define a strategic action. Control and working toward a goal characterize the strategic reader who selects a particular path to a reading goal (i.e., a specific means to a desired end). (p. 368)

Given this conceptualization, a student's combined use of study skills contributes to implementing an overall strategy. For example, a student may combine previewing a textbook chapter's bold print headings (skill), paraphrasing in the text margin (skill), and using the end-of-chapter questions to self-quiz (skill) as an overall strategy for comprehending the chapter content. In the absence of a holistic strategy, skills can be used in isolation, but teaching

students both strategies and skills is vital so that both might be more effective in achieving the students' goals.

Theoretical Framework

The decision to explicitly teach students how to think about their learning process reflectively is framed theoretically by the literature on self-regulation, metacognition, and social-cognitive theory. Additionally, three types of knowledge (Schraw et al., 1994) form the conceptual glue for this theoretical framework. Broadly, declarative knowledge (skill) is the "what," procedural knowledge (skill) is the "how," and conditional knowledge (strategy) is the "when and why." For example, knowing the basic parts of a bicycle is declarative knowledge; knowing how to ride a bicycle is procedural knowledge; knowing when and why to switch gears while riding a bicycle is conditional knowledge. In the context of this article, these forms of knowledge respectively translate as a student's ability to describe a study skill (declarative), use the study skill (procedural), and determine the skill's usefulness in a particular situation (conditional). The understanding and application of learning strategies and skills are influenced by the dynamic interaction among personal, behavioral, and environmental factors of human development described in social cognitive theory (Bandura, 1991). Bandura contended that human behaviors, such as behaviors associated with learning, are motivated and controlled by self-influences. These influences

include self-monitoring the causes and effects of one's behavior, judging one's behavior regarding personal expectations and environmental situations, and evaluating affective self-reaction (Bandura, 1991; Zimmerman, 1994, 2000). Zimmerman (1995) added that learning socially requires both metacognition as well as regulative agency with social sources such as instructors and peers. More so, the *self*-regulatory aspect of learning contributes to learner self-reliance as a learner developmentally matures.

Academic self-regulation is the self-monitoring of thoughts, feelings, and actions related to learning success (Schunk, 1994; Zimmerman, 1989) occurring on both a global and real-time level (Weinstein et al., 2011). More specifically, global self-regulation involves selecting learning approaches, managing time (over weeks, months, and years), selecting help-seeking approaches, and managing motivation for learning. Real-time self-regulation involves managing high anxiety, utilizing metacognition, evaluating the efficacy of learning strategies, managing time (over the course of a task, hours, or days), focusing attention, and sustaining concentration. Self-regulation also includes a self-efficacy mechanism (Bandura, 1991) that plays a central role in the exercise of personal agency. A learner's sense of self-efficacy has a substantial impact on thought, affect, motivation, and action, empowering students to set and attain personal learning goals (Schunk, 1990). In other words, when a learner has high self-

efficacy—the belief in their ability to succeed in achieving an outcome or reaching a goal (Bandura, 1997)—they reflect confidence in the ability to self-regulate motivations and behaviors in the learning environment. As Zimmerman's (1995) work suggested, academic self-regulation functions with the aid of metacognition.

Metacognition (Flavell, 1976, 1979) is often defined as "thinking about our thinking." This reflective act refers to the cognitive processes that internally monitor, plan, assess, and judge one's performance and understanding (Brown, 1987; Flavell, 1979). Metacognition is a critical mechanism for guiding cognitive development (e.g., Piaget, 1976) as individuals develop conscious awareness and the capability to communicate their reasoning (Fox & Riconscente, 2008). Continuing with the bicycle example, metacognition extends beyond knowing the parts of a bicycle, how to ride it, and when and why to switch gears. Metacognitively, a rider may think to herself, "I've been focusing my thinking on when and why to switch gears, but instead, I should probably think more about mastering rider safety practices first." In this example of metacognitive monitoring, the rider is evaluating and re-prioritizing pieces of knowledge. In education, metacognition—the self-regulation of cognition—increases learners' ability to be responsible for their own learning as they make informed cognitive choices about what to learn and how to learn it.

Self-Regulation and Metacognition Interventions

Interventions for self-regulation and metacognitive strategies can optimize the student learning process (Halpern, 1998; Schraw et al., 1994). The time management aspect of self-regulation intervention generally occurs in three forms. First, intervention can directly address specific student behaviors after a time-management problem is identified. For example, Ozer et al. (2013) found that a series of five 90-minute structured sessions regarding patterns of procrastination, irrational thoughts, and productive thinking decreased participants' academic procrastination scores on a pre- and post-test measure. Second, intervention can directly address general or specific student behaviors before a time-management issue is noted. Scent and Boes (2014) reported that a group intervention program focusing on principles of acceptance and commitment resulted in gains in psychological flexibility. Most group setting intervention programs or courses have notable limitations, though. The time and cost required to organize and implement these programs may be impractical in budget-slim institutions and unappealing to students already committed to other coursework. Third, intervention can indirectly address student behaviors through the course and task design and delivery. For example, Perrin et al. (2011) found that students studied more consistently throughout the week when access to online study material was contingent upon completing the previous study

module. Students in the non-contingent access-group habitually crammed their studying into the time just before a for-credit weekly quiz. Students in the intervention group had improved quiz scores compared to pre-test scores. In this type of intervention, the instructor makes proactive decisions that indirectly nudge students to manage time without their active awareness.

Teaching metacognitive strategies in higher education is known to improve subject matter comprehension and course performance. Amzil (2014) implemented a five-session explicit-instruction intervention with college students that focused on metacognitive processes for reading by combining reflective dialogue, modeling, and group practice. On a posttest, the experimental group outperformed the control group in both reading comprehension and metacognitive awareness. Maftoon and Alamdari (2020) employed a 10-week set of metacognitive strategy lessons with undergraduate students learning English as a foreign language (EFL) that focused on planning, monitoring, and evaluating. Participants showed a significant difference in posttest listening comprehension improvement compared to the EFL students who did not participate in the intervention lessons. The benefits of teaching metacognitive strategies also apply across disciplines. For example, a case study of metacognitive strategy instruction in an undergraduate chemistry course revealed increases in student academic confidence, self-concept, and academic enjoyment in both chemistry and math

(Zhao et al., 2014). Additionally, survey findings from a Cook et al. (2013) study revealed that first-year science major students changed their academic behavior as a result of attending a 50-minute lecture on metacognitive learning strategies. Students who know about strategies for learning are more likely to use them when faced with a variety of learning tasks (Pintrich, 2002).

Self-regulation, including metacognition, is not an all-or-nothing occurrence but refers to the degree that students are motivationally, metacognitively, and behaviorally active in their learning (Zimmerman, 1986) as evidenced by choice and control (Zimmerman, 1994). However, students cannot self-regulate unless they have options available for their learning, and they must self-manage critical dimensions of that learning (Zimmerman, 1994). The use of self-regulative strategies implies that students can attain a host of learning tools based on forms of knowledge and selected strategies that are best suited for their learning task. By doing this, students can control factors that influence their learning and focus on mastering the learning task.

The unfortunate reality is that many students lack sufficient variety of research-based learning and study strategies and skills, in part because explicit instruction of such strategies and skills is not given time and attention in the classroom. Although students may acquire self-regulatory and metacognitive knowledge and skills through experience and age, Pintrich (2002) noted that both explicit

and implicit instruction are still critical because too many students do not exhibit these skills in college.

The lack of knowledge about metacognitive learning strategies is particularly evident in students from minoritized groups, lower income households, or under-resourced schools. These students are less likely to have been explicitly taught research-based learning strategies than their peers from higher resourced schools and are less likely to have had the opportunity to take challenging courses that require metacognitive skill use. McGuire (2021) referred to closing the gap between awareness and use of metacognition between students from different backgrounds as reaching metacognitive equity. When this gap is closed, underprepared students will be equipped to perform as well as students from backgrounds where this information is more likely to have been acquired through experience or by interacting with mentors who pass on these skills to their mentees. Haak et al. (2011) demonstrated that providing students with highly structured introductory biology course emphasizing practice, reflection, and frequent assessment of knowledge improved the performance of all students but had a disproportionate benefit for disadvantaged students. Given the benefits of self-regulation and metacognition intervention with potential to increase student achievement across disciplines, the remainder of this article offers an example of

teaching a self-regulatory time-management strategy infused with metacognition and supported by a set of transferable study skills.

The Recipe Approach

Recipes require particular ingredients combined in particular ways to produce a particular dish. However, recipes can be personalized and still create the same dish. The intent of a personalized study recipe is to direct students to (a) consider their own general awareness of their thinking and learning, (b) think about what they already know and do not know about the material to be learned, (c) select appropriate learning strategies to implement during learning, (d) plan, organize, and self-regulate their learning process, and (e) self-assess their understanding of the material once they have engaged in learning the material. This article's recipe was adapted from one used by coauthor Rosianna Gray, a biology professor, titled "Grandma's Recipe for Accountable Learning and Time Management" (Gray, 2020), which is an endearing nostalgic label used to provide a sense of comfort for students. However, the title and recipe can be easily adapted and used for a general student success course, or as it was conceived, as a learning strategy recipe embedded within a discipline-specific course. Additionally, this strategy may be useful for instructors to introduce to students during individual meetings or for learning support educators to integrate into academic support programs such as tutoring, Supplemental Instruction, and academic coaching. Teaching

students about metacognitive and self-regulatory strategies should come early in the semester, certainly within the first few class meetings or support sessions, followed up by periodic review of the strategies to encourage students' use.

General Considerations for Instructors

Within the first week, instructors should provide instruction on metacognition and self-regulation, including definitions and examples. McGuire (2015) offered a flexible and comprehensive framework for delivering such instruction. For classes with traditional-aged students, instructors might also emphasize the gap between academic demands on high school students and those on college students and have students reflect on their own experience with learning academic content. Doing so with open-ended questions is a powerful strategy that can help students understand their level of commitment to their personal learning goals and provide them with the insight of using metacognition to increase their learning. The instructor should also emphasize the learner's role in honing their learning skills by introducing immediate-use strategies such as using a weekly planner/semester planner (calendar) or creating a comprehensive notebook organizational system and then model the skills needed to implement the strategy effectively. Students who do not enact self-regulation and metacognitive strategies may experience disappointment after receiving their first exam score, leading to considerations of

dropping the course, changing their majors, or even leaving school (Cook & McGuire, 2017). The class meeting following the first exam is a strategic opportunity for the instructor to review self-regulation and metacognition and for students to reconsider the benefits.

Instructors could also consider administering a learning strategies assessment (during class or as an out-of-class assignment) such as the *Learning and Study Strategies Inventory (LASSI)* (Weinstein et al., 2016) or the *Motivated Strategies for Learning Questionnaire (MSLQ)* (Printrich & de Groot, 1990) to provide students with awareness about their current use of learning and study strategies and skills. Many of these types of assessments can provide both students and instructors with diagnostic measures to help identify areas in which students can benefit most from educational interventions, and many can be used as a pre/post achievement measure.

Student Time Management Recipe for Exam Preparation

As with any recipe, there are ingredients and procedures. For this example, the ingredients include the course syllabus, the course calendar (which may already be included in the syllabus), course textbooks and/or assigned readings, a blank calendar template (paper), and a digital calendar (such as Google or Outlook).

The Recipe

The recipe steps for exam preparation are (a) count the number of available study days, (b) identify the chapters, sections, or pages

covered on the exam, (c) rank the chapters (or sections) by difficulty, (d) assign chapters or sections to each day, and (e) list specific study strategies and skills for each day. Each of the steps listed is a skill supporting the overall strategy of time-management that accomplishes the goal of test preparation. A quick look at the five steps reveals that time-management, metacognition, and self-regulation are all rolled into one recipe.

Count the Number of Available Study Days. This means that students are to read the course syllabus and the course calendar to identify the dates of all exams (and/or any other tasks/projects which require reading). In Gray's experience, many students report that they do not look at their course syllabus or calendar until something goes wrong. Therefore, she suggests that instructors consider investing several minutes of class time teaching students about the differences between a course syllabus and calendar and how to read them because knowing these differences build agency for students who feel underprepared or overwhelmed. Checking the calendar is a self-regulatory step because students are initiating the process of looking ahead and increasing their awareness of due dates. In this example, on the first day of class (August 23), a student uses the course calendar to identify September 24 as the first exam date. Figure 1 is a visual representation for determining the number of reading/study days until the identified exam.

Figure 1

Determining the Total Number of Days Available for Reading and Study August 23 – September 24

S	M	T	W	Th	F	S
	Aug 23	24	25	26	27	28
	First class	Day 1	Day 2	Day 3	Day 4	Day 5
29	30	31	Sept 1	2	3	4
Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12
5	6	7	8	9	10	11
Day 13	Day 14	Day 15	Day 16	Day 17	Day 18	Day 19
12	13	14	15	16	17	18
Day 20	Day 21	Day 22	Day 23	Day 24	Day 25	Day 26
19	20	21	22	23	24	25
Day 27	Day 28	Day 29	mental rest	mental rest	Exam date	

When determining the total number of available days, Gray prefers for students to exclude the two days before the exam for the sake of mental rest and cognitive integration. That said, the premise of *spaced practice* (e.g., Kang, 2016) is the process of spreading out the practice of material over time which enhances memory, problem-solving, and transfer of learning to new contexts. The literature on spaced practice as an information retrieval strategy does not indicate a single, specific lag time between practice and test because it is context- and content-dependent. Further, spaced practice is a review strategy for reviewing previous content, but Gray's approach is generally used for all new material. This means that the duration of mental rest before an exam is not an exact number. Students' experience may lead to former habits of cramming as much studying as possible into the few hours and

days before an exam regardless of the exam performance outcome. The instructor should acknowledge this temptation and then encourage students to trust the process and remind students to practice good self-care habits such as getting enough sleep, eating well, engaging in physical activity, and connecting with loved ones.

Identify All Readings Covered on the Exam. Students must be sure they know which chapters or sections from the textbook will be tested, including any readings supplemental to the textbook. Students may choose to highlight the information on the syllabus or calendar or perhaps write the information on sticky notes or on a white board. In this example, the student notes from their course syllabus that content in textbook chapters 2 through 7 will be included on the first exam.

Rank the Chapters (or Sections) by Difficulty. This step engages students' metacognitive thinking by ranking the chapters or sections of course material according to perceived difficulty, consequently impacting the time required for completing the reading. In Gray's experience, it is by far the most intimidating and complex for students because they are unsure how to estimate the difficulty of material they have not yet learned. Students' backgrounds and academic skill sets are unique. Students must ask themselves questions about their current abilities and study methods and then answer honestly. Figure 2 offers examples of

questions useful as a think-aloud strategy that instructors can model for students regarding metacognitive processes.

Figure 2

Sample Think-aloud Prompts for Modeling Metacognitive Thinking

Self-Thought Question	Self-Thought Response
How long does it usually take me to read material and understand it?	I know it takes me longer to read history than science, but then again, I like science more than I like history, and I'm really good at science.
When I read, should I make flashcards, write in the margins of my textbook, make a concept map, create an outline of notes (etc.)?	Well, for my history class, it's better when I make an outline like a timeline and make a list of important names, but in science, it's better when I highlight in my book, try to draw my own pictures, and then make a concept map.
Have I seen this material before, or is it completely new to me?	I guess I need to check the table of contents and also skim the headings in the chapter. Oh, and I can look for words in bold or italics, and I can look at charts and figures. Maybe I should skim the chapter summary, too, to see if the material seems familiar. I think I'll also do a short self-check...I'll time myself reading and "taking notes" for 15 minutes and see how much material I get through. That can also help me decide how "hard" the reading is."

Developing a strategy for tackling a large project involving unfamiliar and challenging content is one of the biggest challenges any learner faces. Employing systematic processes such as this can provide a useful structure for creating a plan. Comprehensive

models of learning and especially reading comprehension employ multidimensional approaches, including recognizing sociocultural and disciplinary influences. That is, when students read, they not only must become aware of the social and cultural practices of each context within the discipline they are studying but also draw knowledge about the meaning of the text (activating schema) from their own prior knowledge and cultural upbringing, using their unique set of skills, understandings, and prior experiences (Holschuh, 2019). Sociocultural factors and experiences will play a role in students' metacognitive processes. Figure 3 shows how the student in this example might visualize the ranked reading material.

Figure 3

Example of Visualizing Ranked Readings with Metacognitive Notes

Chapter	*Thoughts*	*Difficulty*
Chapter 2 – General Chem	I was pretty good at measuring and cooking at home, but I don't know if that will help me with formulas and equations	2
Chapter 3 – Water Chem	I know a lot about beach salty water and drinking water, but this might be different.	4
Chapter 4 – Carbon Chem	I've heard of carbon before, that's it.	3
Chapter 5 – Macromolecules	Is this even a real word?	1 – HARDEST
Chapter 6 – Cell Structure and Function	SHOULD be the easiest, we did this in middle school and high school.	6 – EASIEST
Chapter 7 - Membranes	I remember something about this with cells, so it shouldn't be too bad, but the chapter is really long.	5

Note. These notes may be handwritten on paper or typed into a document.

Assign Chapters or Sections to Each Day. After ranking the sections of material according to difficulty, students decide how much reading and studying to do on each day accounting for difficulty. In this example, a basic division of 29 days across six chapters might result in allotting approximately 5 days per chapter, in the order they will be taught in class. However, students must consider allocating fewer than 5 days for chapters or sections they ranked as easier and more than 5 days for those they ranked as more difficult. The distinction between allotting and allocating is important because allocation includes purpose and intention beyond a basic division of time (Oxford English and Spanish Dictionary, n.d.-b). Given this distinction, allocation utilizes the metacognitive work done in the text difficulty ranking. It is also important to remind students to consider other demands on their time and energy: other course work; family, social, and job commitments; personal interest activities such as student organizations and hobbies; and personal health activities including exercise and sleep.

Completing this step reminds students that their time and energy are finite. Self-prioritizing time and energy helps develop students' metacognitive skills, will, and self-regulation (Weinstein et al., 2011). At times, the instructor may feel more like a coach offering encouragement than a content expert teaching about

macromolecules, but student struggle accompanied by instructor support will foster and reinforce learner self-reliance.

Ongoing Adjustment of Study-Day Allocation. When students begin to engage with course material, they often find that they must revise their initial estimates for the number of study days devoted to each chapter. Making ongoing adjustments to time allocation teaches students about the messy process of real-life time management. Although often used in an economic context, Gray uses the phrase "the sliding scale" to describe the ongoing adjustment of time allocation in which each chapter ultimately ends up receiving as many study days as its difficulty demands. Further, having students reflect on how they decided when and how to adjust the time develops students' metacognitive processes.

List Specific Study Strategies and Skills for Each Day. Gray requires students to use a blank calendar page or pages on which to handwrite specific study strategies and skills for each day such as active reading, concept mapping, flashcard making, etc., along with an estimated length of time. Writing by hand can result in deeper learning than typing (e.g., Mueller & Oppenheimer, 2014; Smoker et al., 2009), partly because notetaking by hand is generative and is immune to the pressing of a "dictation" key on an electronic device such as a laptop computer. Specific strategies or skills may also include utilizing digital resources such as the textbook publisher's online materials or webpages maintained by Supplemental

Instruction (SI) leaders. Consequently, this step in the recipe may take the most time and care because it requires students to evaluate their study options and make strategic selections that will be the most effective and efficient. Figure 4 shows three sample levels of detail from one calendar week: inadequate, acceptable, and optimal. The optimal entry includes the subtopics the student will

Figure 4
Examples of Inadequate, Adequate, and Optimal Detail for a Calendar Entry

Inadequate detail

SUN	MON	TUE	WED	THU	FRI	SAT
Ch. 2	Ch. 2	Ch. 2	Ch. 2	Ch. 2	Ch. 3	Ch. 3

Adequate detail

SUN	MON	TUE	WED	THU	FRI	SAT
elements & com-pounds, sub-atomic particle	isotopes,av atomic mass	P table, electron diagrams	all types of bonds	chemical rxns	Ch. 2 review	polar bonds, prop. of H_2O
flashcard	teaching	video	video	Make study guide	self-quiz	Flash-cards
30 min	30 min	45 min	45 min	45 min	45 min	30 min

Optimal detail

SUN	MON	TUE	WED	THU	FRI	SAT
p. 28	pp. 29–31	pp. 32–34	pp. 35–40	pp. 40–42		pp. 44–46
elements, compound subatomic particles	isotopes, half-life, avg atomic mass	periodic table, electron diagrams, orbitals	covalent bonds, ionic bonds, & H bonds	chemical rxns, reactants, products, equilibrium	Ch. 2 review	(Ch. 3) polar bonds, H bonds in H_2O, properties of H_2O
make flashcards and a graphic organizer	watch the video on Canvas, teach aloud to my roommate	make a concept map, color-code the vocab	watch the YouTube video	make an outline of the chapter from my notes	self-quiz, make a sticky note for gaps in mastery	make flashcards and a graphic organizer
Index cards		highlighters			HW and end-of-chapter questions	
30 min	30 min	45 min	45 min	60 min	45 min	30 min

study, the specific activities they will undertake, and the total time devoted to those activities. It is important to note that the total time may be done all at once or in smaller time segments separated by short or extended breaks. Students who struggle to develop details may benefit from a template such as in Figure 5.

Figure 5

Optimal Plan Template

	SUN	MON	TUE	WED	THU	FRI	SAT
Page #s							
Subtopics							
Strategy/Skill							
Resources & Materials							
Time needed							

Electronic Calendar Input

So far, students have identified required readings for the exam, ranked them by perceived difficulty, allocated calendar days, and estimated the time needed per day to complete specific self-selected study tasks. At this point, students should schedule these times into their preferred electronic calendar to visualize available time segments alongside other commitments such as attending other classes, going to work, or exercising. This step often leads to an adjustment of time for academic and personal needs, developing students' self-regulatory skills in prioritizing obligations and creating balance.

Coaching Students Through Time-Management Dilemmas

It is highly likely that students will offer reasons that they are unable or unwilling to use a skill or strategy such as the one in this article. It is also possible that students will ask about shortcuts in the process, pressing the instructor on the necessity and specificity

of each step. Here are four common student comments and some considerations for how the instructor might respond.

"I already study a lot." One common objection from students is that they lack time to study more than they are already doing. It may be beneficial to remind students that the concept of "studying" will need to be metacognitively self-evaluated. Students have not likely considered the extent to which their past efforts were efficient or effective. Having the students complete a formal self-assessment (such as the *LASSI* or *MSLQ* mentioned earlier) may help students broaden their understandings of variables that contribute to efficient and effective strategies. In the context of this article's recipe approach, the instructor may also compare trying this exam preparation strategy example to encountering a new and unfamiliar food, "Try it before saying, 'No, thank you.'"

"Is the paper calendar really necessary?" In addition to the advantages of hand-writing discussed in the previous section, in Gray's experience, a two-stage calendar process results in a more realistic schedule that students are more likely to follow. Students increase self-awareness of their available time and energy.

"I have a job." Being employed helps students to meet a variety of wants and needs. Sometimes work hours seem to consume students' time and energy to the detriment of academic success. If this is the case, they may wish to consider the following options: trimming their budget, cutting back on work hours, accessing

institutional resources for personal and academic supplies, and learning more about institutional financial aid options.

"I'm taking a lot of credit hours." It is possible that finding time to prepare for all classes adequately is difficult, even after students adjust other commitments such as work hours and social plans. If this happens, students may benefit from connecting with an academic advisor who can guide them through the advantages and disadvantages of maintaining or dropping a class.

Conclusions and Recommendations

Although no quantitative or qualitative investigations have been conducted to date to validate this specific recipe's use with students, informal feedback, according to Gray, has conveyed enthusiasm for the recipe because students can tailor aspects of the process to fit their own needs, strengths, and weaknesses. That noted, the literature would benefit from quantitative additional intervention studies on aspects of strategic learning that focus on self-regulatory and metacognitive processes across disciplines and student demographics (e.g., Amzil, 2014; Maftoon & Alamdari, 2020). Findings from intervention research may lend support to the anecdotal evidence that the time an instructor gives to explicit study strategy instruction is not just *spent on* students, but it is *invested in* students.

This systematic self-regulatory time-management approach with the embedded metacognition requires students to be accountable

for their learning. Doing this work can enable students to experience a decisive shift in mindset (e.g., Dweck, 2006) and understand that their academic performance is linked to their behavioral efforts. One way to facilitate this shift is to give students—especially underconfident, underprepared students—concrete tools they need, such as this one, to become more confident, independent learners.

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