

WHAT MAKES A STUDY STRATEGY INTERVENTION IMPACTFUL? AN INTERVIEW-BASED STUDY

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Abstract

The purpose of the present study was to understand students' perceptions of the impact of a study strategy workshop intervention. For decades, researchers and higher education practitioners have used workshops as a method to buffer against the challenges that college students face. Prior research has supported the value of such interventions; however, the features that underlie effective workshop interventions are not fully understood. We conducted 20 semi-structured interviews to identify nuance and subjective details related to students' experiences with a study strategies workshop intervention in an undergraduate biology course. Based on thematic codebook analysis, findings pointed to three themes related to features that allowed the intervention to have an impact on students' study strategies: receptivity to workshop content, motivation and ability to change, and conditions for sustained change.

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Beyond students' formal curricular experiences, workshops are one of the most widespread and versatile forms of imparting knowledge and skills in college settings (Kuh et al., 2006; 2007; Matthew et al., 2016). In particular, teaching college students about study strategies in a workshop format is a popular intervention designed to support academic success (Toms, 2014). Although evaluating satisfaction and assessing learning outcomes are common practices in student affairs (Kasimatis & Massa, 2017; Suskie, 2009), there has been little research that explores students' perspectives on learning about study strategies in a workshop format. In the present study, we utilized thematic codebook analysis (Boyatzis, 1998; Braun et al., 2019; Fereday & Muir-Cochrane, 2006) to identify nuance and subjective details related to students' experiences with a study strategies workshop intervention. Based on in-depth interviews with 20 undergraduate biology students, our purpose was to inform future practice through a student-centered understanding of impactful features of an intervention.

Workshops as Interventions in Higher Education

Workshops are brief, group-based interventions that gather learners to receive instruction on discrete, practical topics (Wolters & Hoops, 2015). A popular form of educational intervention, workshops are inexpensive, flexible, and develop knowledge and skills concurrently (Boretz, 2012; Brooks-Harris & Stock-Ward, 1999). Reflecting the broad range of workshop topics on college campuses, scholar-practitioners have designed and evaluated workshops on topics such as mental health (Olson et al., 2016), diversity (Evans et al., 2004; Pascarella et al., 2014), and study strategies (Cook et al., 2013).

Kuh et al. (2006) noted that workshops focused on developing study strategies were relevant to students' academic transitions and college success. In a national survey, 82% of respondents

of university learning center administrators indicated that their institutions offered workshops or courses designed to teach study strategies (Toms, 2014). The prevalence of study strategy workshops highlights the importance that institutions place on developing students' effectiveness as learners in light of the academic demands that college presents.

Addressing Academic Challenges in College

The rigor and pace of coursework may surprise students as they transition into college (McCathy & Kuh, 2006; McGuire, 2015). The increased rigor of college coursework requires that students understand content at a deeper level than in high school, and many students are unprepared to do so (Gabriel, 2008; Venezia & Jaeger, 2013). Additionally, students experience increased independence when they enter college as they begin managing their responsibilities inside and outside of the classroom (Covington, 2007; Wolters & Hoops, 2015). This transition, too, can be difficult. While students' ability to manage time tends to be an important predictor of success in college (Credé & Phillips, 2011), developing effective time management strategies requires intention and planning.

For the past several decades, scholars have examined study strategy interventions as a method to buffer against and intervene in the challenges students face as they enter college (e.g., Hattie et al., 1996; Tuckman & Kennedy, 2011). Study strategy interventions that emphasize metacognition and self-regulated learning have steadily gained attention in recent years (Wolters & Hoops, 2015). Metacognition refers to students' awareness of, and control over, their thinking and comprehension (Dimmitt & McCormick, 2012). Self-regulated learning refers to students' active engagement in setting, monitoring, adapting, and reflecting on their learning goals and strategies (Panadero, 2017; Pintrich & Zusho, 2007). Metacognition and self-regulated learning theories share the core assumption that students can develop their abilities

to exert control over aspects of themselves and their environments to effectively engage in academics (Panadero, 2017; Pintrich & Zusho, 2007). As such, they align with the practical, growth-oriented nature of workshops (Brooks-Harris & Stock-Ward, 1999; Davidson et al., 2012).

Evaluating the Effectiveness of Study Strategy Workshops

Researchers have examined study strategy workshops in college, generally with an emphasis on describing methods and evaluating outcomes rather than exploring the features that support these outcomes (Boretz, 2012). In recent years, this research has reflected a growing trend of embedding workshops into a specific academic course (Cook et al., 2013; McGuire, 2015; Zhao et al., 2014). For example, researchers found that students in an introductory chemistry course who attended a 50-minute workshop on metacognition received a final grade that was a letter grade higher than those who did not attend (Cook et al., 2013). In a separate study in general chemistry, Zhao et al. (2014) found that students who attended a metacognition workshop reported increases in some effective strategies (e.g., trying to solve problems without first looking at resources) but decreases in others (e.g., reviewing course materials before or after class). Students' open-ended responses, collected over email and reported briefly as a secondary data source, revealed that students experienced positive changes that may not have been captured in closed-ended questions (Zhao et al., 2014).

In studies that have found mixed results of interventions, researchers have speculated that follow-up support might provide more sustained benefits (e.g., Davidson et al., 2012; Häfner & Stock, 2010). This direction for research aligns with what Wolters and Hoops (2015) identified as the main weakness of workshops: their one-shot approach may not provide the guidance and practice opportunities necessary for change. The literature provides compelling reasons to understand

why workshops are a prominent intervention for supporting students' success in college, yet existing research suggests that the impactful features of study strategy workshops have not been investigated fully. Students' open-ended responses have the potential to reveal further insights into how workshops serve as an effective learning intervention. The use of rigorous qualitative methods can add additional depth and nuance to what researchers and college student personnel alike understand about factors that contribute to the impact of workshops.

Present Study

We focus on understanding students' perceptions of a study strategy workshop intervention that included both initial instruction and follow-up assignments designed to reinforce content. The research question that guided our study was: What features enable a workshop intervention to facilitate changes in college students' study strategies?

Method

Intervention Description

This study is a part of a larger project focused on the development and evaluation of a workshop intervention aimed at improving the academic performance of undergraduate students enrolled in introductory biology (Hensley et al., 2021). The present study focuses on findings from semi-structured interviews with the purpose of understanding features that prompted change in students' study strategies.

The development of the intervention reflected a partnership between a student learning center and life sciences education center at a large, public university in the Midwest United States. The goal of the intervention was to teach students how to understand and utilize effective study strategies. With approval from the university's institutional review board, the intervention included workshops delivered in the individual laboratory

sections of introductory biology combined with follow-up assignments designed to reinforce the workshop content. Students in half of the laboratory sections experienced a one-hour workshop on metacognition, and the other half experienced a two-hour workshop that included the metacognition content plus time management content. The present study focuses on impactful features across both workshops.

As the biology instructor, the third author facilitated the metacognitive portion. The metacognition content was adapted from McGuire's (2015) work and provided students with an overview of the differences between studying to achieve a grade versus learning to deeply understand. It also introduced students to basic versus advanced levels of learning in Bloom's Taxonomy, as well as the importance of planning, monitoring, and evaluating learning strategies. Throughout the workshop, the instructor interwove personal examples from his own experience and examples of how students might use metacognitive strategies in their biology class.

As the learning center outreach specialist, the first author facilitated the time management portion. Based upon the scholarly literature on time management and procrastination (van Eerde & Klingsieck, 2018; Wolters & Brady, 2020), the facilitator covered specific strategies and tools students could use to manage their time (e.g., using a calendar effectively), overcome distractions (e.g., creating a distraction-free workspace), and reduce procrastination (e.g., breaking the task down to avoid feeling overwhelmed). The facilitator provided concrete examples for each strategy and paused between each major section to allow students to reflect on how to apply the content with one another.

The metacognition and time management workshop components were similar in terms of logistics and format. Both workshops provided opportunities for student reflection individually and with peers. Following the model of other study strategy interventions delivered within the context

of a specific course (Cook et al., 2013; McGuire, 2015; Zhao et al., 2014), the workshops took place the week after students had received their grade on the first biology exam (in this case, the sixth week of the Autumn 2019 semester). Immediately following the workshop, the instructor introduced a weekly extra credit assignment to facilitate students' implementation of workshop strategies. It consisted of a planning assignment, where students identified strategies they planned to use in the coming week, and a reflection assignment, where students reflected on the strategies they used.

Participants

We used purposeful sampling to identify participants who were currently enrolled university students who had taken part in the workshop intervention (Patton, 2002). Twenty students (14 female, 6 male) responded to a recruitment email and provided informed consent to participate in a semi-structured interview focused on the workshop intervention and their biology experiences. All interviewed students had participated in the metacognition workshop; of these 20 students, 12 also had participated in the time management workshop. In terms of racial/ethnic backgrounds, 12 students were White, four were Black or African American, two were Asian, one was Hispanic or Latinx, and one did not report this information. Students represented a range of academic levels, including three first-year students, 11 second-year students, four third-year students, and two fourth-year or higher students.

Data Collection and Analyses

The first author conducted interviews during a two-week period following the second biology exam. A general set of goals and questions guided each semi-structured interview, but the interviewer was free to ask follow-up questions or move between questions when appropriate (Seidman, 2006). All interviews were recorded and transcribed.

The first and second author analyzed the verbatim interview transcripts using Dedoose qualitative analysis software (2018). We selected thematic analysis to identify patterns across students' responses (Braun et al., 2019). Specifically, we utilized the codebook approach of thematic analysis to identify and organize meaningful textual excerpts relevant to the research question (Boyatzis, 1998; Fereday & Muir-Cochrane, 2006). We collaboratively developed a codebook based on discussion of in-depth notes taken while reading the transcripts and listening to the recorded interviews. The codebook included a list of codes along with descriptions, criteria for inclusion or exclusion, and examples. We presented the codebook to our co-authors in the life sciences education center to receive feedback, then reviewed, merged, and renamed codes to increase alignment with the content of the dataset. To establish inter-rater reliability, the first two authors applied the final set of codes to a subset of the interview data and conducted a coding consistency test in Dedoose, which yielded a Pooled Cohen's kappa of 0.88, reflecting excellent agreement across multiple codes (De Vries et al., 2008). The first author then applied the codes to the remainder of the dataset. The first and second author identified and developed the final themes through an iterative method of organizing, refining, and reporting on themes (Terry et al., 2017).

The fully coded dataset was reviewed to assess any differences based on intervention group (i.e., metacognition vs. metacognition plus time management). Although there were differences in the frequency of the appearance of codes, likely due to the additional content students in the latter group could comment upon, there were no notable differences in the features students described. Thus, our findings do not differentiate between students' intervention group and instead describe larger features relevant to the workshop intervention.

Findings

We identified three themes pertaining to features that allowed the intervention to have an impact on students' study strategies. One, students' perceptions of instructor caring and personal relevance influenced their receptivity to workshop content. Two, experiencing a reality check and identifying specific strategies they could implement informed students' motivation and ability to change. Three, conditions for sustained change revealed the factors that supported or undermined students' application of new strategies over the course of the semester. In the following sections we describe each theme and the features that contributed to it.

Receptivity to Workshop Content

The first theme emphasized impactful workshop features related to students' receptivity or openness to the workshop content. Findings suggested that this receptivity could arise through two workshop features: perceiving instructor caring and identifying personal relevance.

Instructor Engagement and Caring

Students perceived their instructor's involvement in the workshop as evidence of his concern for their academic success. The use of class time to learn about effective study strategies stood out from what students had experienced in other classes. As one student noted, "You guys actually took a day off and came in and explained. [Other departments] should be doing this to show that they care instead of just going onto the next lecture ... like 'we know you're going to fail.'" Students expressed that it was beneficial for the instructor, as an expert in the subject area, to share information about learning strategies in relation to biology, whereas it was beneficial for the time management presenter to share an additional perspective that was "kind of separate from bio." Describing the presenter from the learning center, students noted that, as "somebody who does higher education...

you care [about] actually learning, and actually understanding, and how we can do better.”

Another student had an experience in a separate course where the instructor was required to present study strategies information. This other experience was different in that this instructor did not seem to value the content and thus did not pass on this value to the students. The student shared “Whenever I took [the other class] they did the metacognition talk with us, but my teacher, ... she’s like, ‘Okay, I just need to waste the day after the exam to talk to you guys about this.’” These contrasting experiences showed that mere exposure to study strategies content in a workshop format could not guarantee the information would make an impact on students; students’ perceptions of instructor engagement and buy-in was also important.

Importantly, students perceived their instructor as having conveyed his confidence that students could learn and understand biology. As a result, students were open to changing how they approached preparing for the class. As one student explained, “having him come in and take the time and show that he wanted us to do well, I was like, ‘Well, if he wants us to do well, I should want to do that well, too.’” Another student elaborated, “He showed me that he cares. ... I can’t just put my grades in everybody’s hands, [but] I listen to him because he for real cares and he’s on my side.” Overall, actions and attitudes that communicated the instructor’s concern for learning contributed to students’ receptivity.

Personal Relevance

Another factor in receptivity to the workshop was students’ perception of personal relevance, or a connection with their academic lives. Students perceived the examples and stories the presenters told as representing their own college experiences. One student emphasized how much the information from the intervention resonated with her:

What stood out to me was the fact that he was talking

about me the whole time, because I never had to study. Then I got to college, and I had to study. So, I mean, that was me. I was like, ‘Why is he talking about me right now? Why is he talking about me?’

This student felt “seen,” or understood, when the instructor described the struggles many students experience as they transition from high school to college. Grounding the content about study strategies with examples that many students faced created a sense of a shared experience that increased the relevance of the workshop material.

Timing the workshop soon after students received the results of their first exam also made the content feel relevant. Some students pondered whether it would have been valuable to have the workshop early in the semester, but they were unsure whether they would have taken the material seriously at that point. One student summarized the options:

In some ways it would be helpful to have it in the beginning, to know how you should be studying. But in a way I kind of feel like, I had to fail ... in a sense, to know that I needed to do something differently.

It was important for students to experience the workshop when their academic performance was salient. Although the idea of an earlier workshop seemed appealing, students acknowledged that “people aren’t really thinking about how they’re going to be studying for something until what they’re doing, it doesn’t work.” In this way, tying the workshops to the completion of the first exam created relevance due to students’ openness to examining their study strategies.

Motivation and Ability to Change

The second theme revealed the need for students to have a motivation to change, paired with a sense of being able to change. Impactful workshop features drew students’ attention to gaps in their knowledge, skills, or outcomes, as well as how to potentially fill these gaps. Recognizing discrep-

ancies between their actual and desired academic outcomes stirred students' motivation to change. Increasing their knowledge of college learning supported students' ability to change.

Recognizing Discrepancies

Whereas perceiving personal relevance encouraged students to have an open mind toward the workshop content, recognizing discrepancies was a more specific experience of cognitive dissonance that was tied to students' subsequent efforts to change. Students described the workshops as prompting them to reflect on the discrepancies between their previous and potential study strategies, as well as their previous and potential academic outcomes. Having concrete examples of these gaps motivated students to begin making changes. One student remarked on how different the strategies shared in the workshops were from those she was used to using:

This whole thing was a wake-up call for me. I was like, I really need to get it together. The analysis [i.e., depth of learning] ... it only goes up to here in high school, but then here's where you need to be. ... So that really got me thinking that I can't just study the information and memorize it. I really have to make the connections.

For this student, the workshop helped her recognize that the depth of learning that she associated with high school was different from the depth of learning required in college. Understanding these discrepancies was key to students' recognizing the need to bring more intentionality to their studying.

For many students, noticing the discrepancy between their prior and potential strategies and grades prompted a reality check or wake-up call. Experiencing this reality check or wake-up call was an important factor in students' willingness to change. One student attributed this sense of realization to her improvement on the next exam:

It was kind of a reality check. I think I got a 59 [on

exam 1], and for me coming from being in high school and getting straight A's to not doing as well in college as I wanted to kind of sucked so I kind of had to kick myself in the butt and tell myself I had to do better. I had to make changes. And it paid off.

This new experience, receiving a poor grade on her first biology exam, prompted the student to reconsider her understanding of how to learn in college, correcting the misconception that the skills and strategies she used in high school would seamlessly transfer to college. Recognizing this discrepancy stirred up motivation to identify and apply ways she could approach studying differently.

Knowledge of College Learning

The recognition of a need to change was not the only factor in students' abilities to change; a clear sense of how to change through a better understanding of college learning was essential to feeling ready to take a different approach to studying. Students pointed to specific aspects of the workshops that provided them with a deeper understanding of college learning. For example, students described the value of learning about the deep-level understanding required in college-level biology. Gaining knowledge of the types of strategies that could be used at each level of learning (e.g., surface understanding versus deeper-level analysis) provided a helpful framework for thinking about studying and learning. As well, students reflected on gaining new insight into why and how managing time supported college-level learning. One student explained the need for this knowledge as follows:

When I first came into school ... no one really ever showed me any examples of any other way to do time management besides just writing everything down on a calendar and it's what I stuck with for ... four years now. I definitely think just going through those examples, those were good to showcase the different tools that you can use.

Although the strategies that resonated with each student differed, the key factor was students' identifying something specific they could implement. Students' discussions of applying specific ideas from the workshops illustrated the importance of gaining knowledge of college-level learning, as well as how to implement this knowledge in practical ways.

Conditions for Sustained Change

The third theme involved conditions that helped or hindered changes in students' study strategies. Students' engagement with the follow-up assignments provided two features that seemed to drive sustained change: self-regulation and accountability. Conversely, students' difficulty in modifying fixed study habits and routines erected barriers to change.

Self-regulation

Students described their engagement in extra credit assignments related to the workshop as providing reinforcement for changes in their study strategies. These assignments encouraged students to both consider strategies they planned to utilize in the coming week and reflect on the effectiveness of these same strategies. Students' recollections of the follow-up assignments emphasized the importance of regular engagement in planning and reflection, key processes in self-regulated learning (Pintrich & Zusho, 2007). For example, one student described how the assignments helped her to assess progress toward her study goals and make adjustments each week:

It's been a good way to plan out how I'm going to study for the week. Then reflecting like, "Did I actually do what I wanted? Did I get enough studying in?" And like, "No. Okay, this week I didn't do as much studying as I wanted to, but next week I'm going to get better at it."

Because the recurring nature of the assignments meant that each week was an opportunity

for improvement, not achieving as much as she had intended was motivating rather than discouraging.

Completing the extra credit assignments each week helped the intervention to remain present in students' lives and provided continuous direction. As one student explained, it "gets people looking back at these [workshops] specifically, when you've provided different strategies that you can be using." The assignments encouraged students to be flexible and take risks with the strategies they used. "I tried to put down one new thing every week and try it," a student shared. In addition, the assignments helped students critically evaluate which strategies were most effective for them; "they made me really figure out what's working and what's not," a student explained.

Accountability

In addition to serving as a prompt for planning and reflection, the extra credit assignments provided students with a sense of accountability to their instructor and to themselves. Students assumed their responses might be read by their instructor and shared that they did not want to let him down by not following through with their plans. For one student, completing the assignment felt like she was sharing her experience with the biology instructor while also helping herself to be aware of her own progress:

I don't know how detailed he reads them, but I've been telling him all about my [practice questions] on here and how helpful it's been for me, and just updating him on how my experience has been and how I've grown. ... I know it's another thing you have to do, but it really does get me to reflect on, like, am I growing? Am I making this change? It's just like a voice in the back of your mind kind of thing.

For another student, completing the assignments "ke[pt] me honest, it ke[pt] me accountable for the things that I la[id] out for my own plan." Having made a commitment in writing made stu-

dents more likely to follow through on their intentions.

Barriers to Change

Although certain elements of the intervention promoted change, students also described barriers to sustained change. For some students, making changes involved the difficult task of breaking bad habits. As one student explained, “It’s not easy to do this, because you have to build time in for this. You have to break your habits that you already have, because I’ve been doing this for 20 years now.” As this student exemplified, primarily focusing on the implementation of new strategies was not enough. She needed additional support to break entrenched habits.

Timing in the semester played a role in the difficulty of implementing changes. Facilitating the workshops partway through the semester meant some students had already created routines for the semester that they were reluctant to add to or modify. One student described her challenges implementing an assignment tracking tool: “I liked the master syllabus idea. I really, really liked it and I went online, I downloaded it. The only problem I had was we ... were already pretty far into the semester.” In this case, the amount of time and effort it would take to implement a new tool seemed to outweigh the potential benefits. Whether in terms of a habit developed over the course of years or a routine established for the semester, students’ existing approaches to academics could create barriers to adopting new strategies.

Discussion

The present study offers three key findings that advance scholarly and practical understanding of workshops as an educational intervention, particularly in terms of developing undergraduates’ study strategies. First, perceptions of instructor caring and personal relevance may impact students’ openness to new strategies. Second, engaging in timely self-evaluation and encountering

specific, actionable content may increase students’ motivation and confidence for implementing new strategies. Third, follow-up activities that keep strategies at the forefront of students’ minds may bolster change, while established habits and routines may make change difficult. In the following sections, we elaborate on these findings and consider how they relate to and extend prior research.

Researchers have consistently shown that instructor caring, defined as the “perception that [an] instructor respects and cares about students and wants to help them learn” (Zusho et al., 2007, p. 641), is essential to college students’ academic motivation and engagement (Covington, 2007; Zumbrunn et al., 2014). Our findings provide an additional example of how an instructor can demonstrate caring by expressing concern for students’ learning through both words and action, and how doing so can encourage students’ openness to learning new strategies. Moreover, the findings provide an illustration of attachment theory, which posits that having an existing trusting relationship helps students to build additional trusting relationships with other individuals who offer support (Davis, 2003; Pianta et al., 2012). In higher education, it is common for representatives from various campus resources to offer workshops and other support services. However, these resources can be underutilized or stigmatized (Ciscell et al., 2016). Our findings suggest that instructors’ sincere and specific endorsements of these resources may positively influence students’ perceptions of them.

Notably, in the present study an instructor’s belief in the value of study strategies and collaboration with student support services played an important role in students’ openness to information about succeeding in college. One challenge for student affairs professionals is that some faculty may be resistant to making changes to their classrooms and may not see a place for teaching about study strategies. While it is not necessary for students to learn about study strategies in every class, it is important for them to encounter consistent messag-

es about the value of applying strategies to learn in a deep and lasting way (Boretz, 2012; McGuire, 2015). We suggest that student affairs professionals clearly articulate the ways they can partner with faculty in the shared mission of supporting student success. The support of both faculty and staff is critical for college students' persistence (Schreiner et al., 2011), and developing academic success strategies is one area where synergy can occur (Commodore et al., 2018; Long, 2012). It may help to build buy-in by starting with a single faculty member who is open to collaboration and can be an advocate within their department. From this initial strong partnership, student affairs professionals can gather evidence of student outcomes, refine content and logistics, and gradually expand workshop partnerships.

In addition to the role of instructor caring and engagement, findings also point to the value of academic support throughout students' college experience. Often, workshops and other programs designed to support student success focus on students during orientation or in the first semester of college (e.g., Purdie & Rosser, 2011). The goal of these interventions is to provide students with an understanding of college learning as early as possible and to equip them with skills to engage in effective learning and face future challenges (Arendale, 2010; Kuh et al., 2007; Padgett et al., 2013). The rise in second-year programs has begun to address the need to support students' academic development beyond the first year (e.g., Pitstick, 2018), but support for study strategies still is not commonplace beyond students' initial year in college. While students may find it helpful to receive this type of information earlier on in their academic careers, students may need to experience the demands of college first-hand in order for the information to be relevant and actionable (Wilson & Arendale, 2011). Presenting in-depth study strategies workshops at the beginning of the semester or in the weeks leading up to college may provide an inoculation effect that keeps students from academic difficulty, but further research is

needed to understand the relative utility of interventions that take place once students are further along in their studies. A middle ground may be to present workshops when students are receptive to feedback—such as after an exam (Cook et al., 2013; McGuire, 2015; Zhao et al., 2014) —while integrating tips about succeeding in the class into early course lectures and emphasizing sources of academic support in the syllabus (Harrington & Thomas, 2018) so that students who are motivated to change their study strategies at an earlier point may do so.

Of course, to benefit from study strategy interventions, students must be able to implement information from the intervention into their own lives. The intervention examined in this study highlighted several features that seem to help college students apply what they learn: occurring at a timely point in the semester, conveying specific examples, and providing opportunities to generate self-reflective feedback. These approaches, address three primary barriers to change: not wanting to change, not knowing what to change, and not knowing how to change (Dembo & Seli, 2004). By incorporating these features, workshops also can connect to the necessary intervention ingredients described by Daniel and Einstein (2020): commitment to the strategy and planning how and when to use the strategy.

Still, implementing new strategies can be challenging for students. As new strategies compete with old strategies, students might show preference to their old strategies (Ryan et al., 2011; Pressley, 1995). The present study underscores the challenge of two crucial barriers to change: students' not believing they can change and not seeing the value in the time and effort required to change (Hensley & Cutshall, 2018). To address these barriers, it could be helpful for future interventions to directly address the process of change. With regard to changing older, less effective habits, this approach might incorporate discussions about the habit cycle and its connection to self-regulation (Fiorella, 2020). For example, grounding

discussions in habit research and exploring ways to change old habits and form new habits might be helpful for students (Wood & Runger, 2016). In addition, follow-up reflection assignments could prompt students to create environmental cues and appealing rewards for the new habits they want to build (Fiorella, 2020).

The present study also identifies design considerations for future interventions. Integrating the intervention into the curriculum of an academic course, where workshops take place during class time and students have the opportunity to complete follow-up assignments for extra credit, may provide benefits that typically do not exist in a standalone workshop (Wolters & Hoops, 2015). One of the traditional challenges of teaching study strategies is that they can be difficult to transfer; that is, students may understand strategies when they are being taught but then may have difficulty applying these strategies in their classes (Hattie & Donoghue, 2016; Simpson & Rush, 2003). For this reason, scholars recommend “embed[ing] them into the cycle of teaching” (Hattie & Donoghue, 2016, p. 9). Facilitating the intervention within the context of an academic course demonstrates one approach to embedding. In addition, low-stakes follow-up assignments seem important to sustaining students’ changes beyond the initial burst of recognition and motivation in the workshop. Thus, the value of a workshop experience may be extended by having a structured way to remain cognizant of the strategies and gain experience applying them. Similar to prior research, our findings demonstrate the importance of practice and application when it comes to developing and sustaining effective study strategies (Dorrenbacher & Perels, 2016; Hofer & Yu, 2003). The opportunity to practice using strategies in a reflective manner promotes procedural knowledge (i.e., how a strategy supports learning) as well as conditional knowledge (i.e., when and why to use a strategy) (Pintrich, 2002), which are two key self-regulated learning competencies (Dresel et al., 2015). Our study also provides evidence that writing down—

and sharing—one’s intentions and progress can support the use of effective strategies by prompting planning, reflection, and accountability (Hensley & Munn, 2020; Scheithauer & Kelley, 2017). As a whole, the findings highlight processes that can support students in not simply knowing about study strategies but, more importantly, being able to use them effectively.

Limitations and Future Directions

Limitations should be considered when understanding and applying findings from the study. One, the intervention took place in introductory biology and its findings may not apply to all contexts. Although focusing on a biology course extends prior research on workshop interventions in chemistry courses (e.g., Cook et al., 2013; Zhao et al., 2014), future research should investigate workshops in other subject areas. Two, our research included a sample of students who volunteered to be interviewed and might not be representative of all workshop participants. Although the interviews allowed for an in-depth exploration of students’ perceptions, methods such as surveys that seek to gather responses from all participants must continue to play a role in student affairs evaluation and assessment. Three, the intervention involved ongoing instructor engagement to support study strategies, which may not be the norm. We encourage others to share their challenges and successes in developing student-academic affairs partnerships in order to better understand effective contexts for teaching study strategies.

Conclusion

Our findings point to important features to consider when designing workshops in higher education. They also highlight the potential benefits of embedding a workshop into a specific course, rather than as a standalone experience. Courses offer unique affordances (e.g., students’ existing relationship with the instructor, the ability to build in follow-up assignments) that may enhance

initial and ongoing engagement with the workshop content. By exploring and developing the most effective features of workshops, student affairs researchers and practitioners can ensure this commonplace intervention remains relevant and impactful.

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