

Supporting Self-Directed Learning in Online Courses: Findings from a Pilot Study

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Summary

The Postsecondary Teaching with Technology Collaborative created the Self-Directed Learning (SDL) Instructional Model to help students in online courses develop effective learning habits. The Instructional Model consists of three strategies—involving collaborative activities, videos, and short-answer prompts—that can be implemented in a course in any content area to promote students' sense of belonging, self-efficacy, planning, reflection, and help-seeking.

This research brief reports findings from a pilot study of the SDL Instructional Model conducted with 24 faculty in four community colleges and one university. Study activities included interviews with faculty, students, and administrators; surveys of faculty and students; and analysis of course outcomes. The study found that faculty and students perceived the Instructional Model as valuable and distinct from typical practice in online courses. Faculty reported that the model was relatively easy to implement, although designing collaborative activities appropriate for an online course was challenging for many. The study did not detect statistically significant effects on students' self-reported skills or mindsets or in their end-of-course grades. Null effects may be the result of low survey response rates and the small sample size; they may also suggest opportunities to refine the design and implementation of the Instructional Model. Other studies of the model's strategies point to their promise to improve skills and academic outcomes.

Study findings suggest that institutions can promote adoption of the SDL Instructional Model and support faculty to realize its full potential by offering professional development and peer learning opportunities and by embedding the strategies into course shells in an institution's learning management system (LMS).

The Self-Directed Learning Instructional Model

Online courses are popular among postsecondary students at broad-access institutions, including community colleges. Online formats can increase students' access to postsecondary education, particularly for students who commute to campus, students with caregiving responsibilities, and students who work.

Yet research on outcomes for students enrolling in online courses shows a mixed picture of academic success, with lower success rates likely driven by challenges that are unique to online courses.¹ For instance, students in online courses commonly report feelings of isolation, and faculty teaching online courses report knowing less about whether and when students need help.² Without regular in-person interaction with peers and faculty, students in online courses may need to take more ownership over planning their learning approaches and study methods, organizing their time, seeking help, and following through on coursework.³ The dramatic growth of AI tools suggests that the importance of these learning habits is increasing across all course modalities.

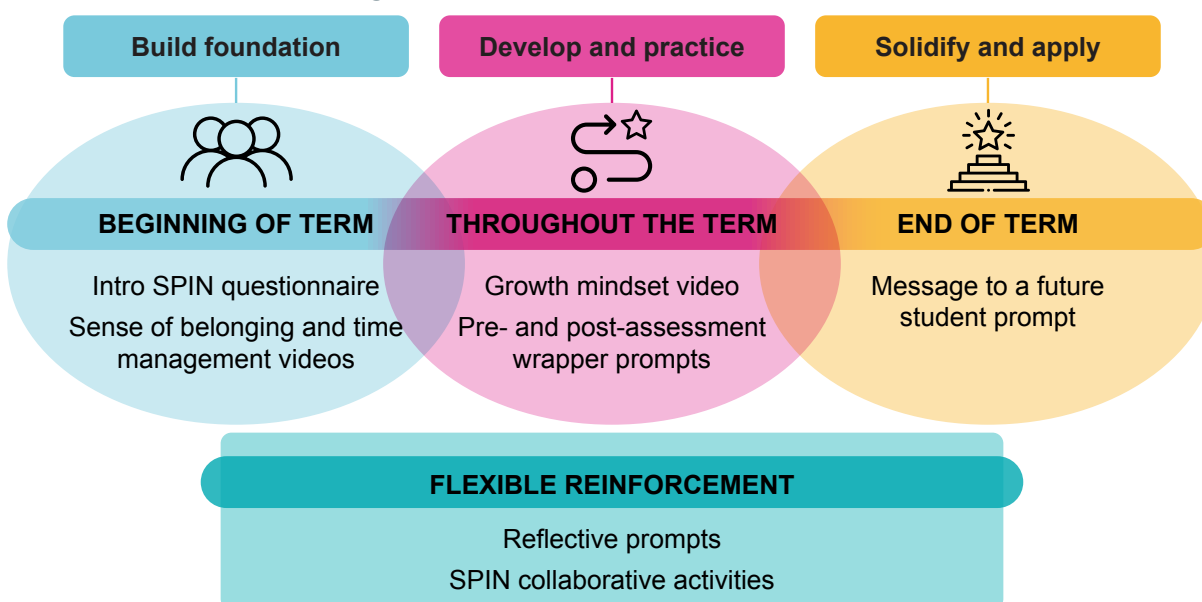
The [Postsecondary Teaching with Technology Collaborative](#) developed the [Self-Directed Learning \(SDL\) Instructional Model](#) to address these challenges and improve student learning and success in online courses. The Instructional Model consists of a set of SDL strategies that faculty can use to promote learning habits associated with student success, including developing a sense of belonging that builds social connections, planning time for coursework, reflecting on progress to develop confidence and self-efficacy, and learning how to seek help when needed. These strategies include:

- **Student-peer interaction and networking (SPIN):** An introductory questionnaire and two content-based collaborative activities paired with a collaborative reflection tool.
- **SDL videos:** Three 10-minute videos with a corresponding set of reflection questions that focus on sense of belonging, growth mindset, and time management.
- **SDL prompts:** A series of prompts embedded throughout the course, including short-answer questions that can be assigned at any point, an assessment wrapper tied to a major graded assignment, and an end-of-term message to a future student who takes the course.

Each Instructional Model strategy is intended to be easy to integrate into any course taught in any modality. As shown in Exhibit 1, the strategies are intentionally sequenced to help students build a foundation and then practice and apply skills throughout the term. Many postsecondary institutions introduce these and related academic skills in orientation workshops, in freshman seminars, and through academic coaching. However, the Instructional Model is unique in that it asks students to apply effective learning habits in the context of a content-area online course.

To support implementation, the Collaborative developed a [Course Implementation Guide](#), which includes step-by-step instructions for faculty seeking to integrate the strategies into a course. The Collaborative also developed a [Campus Resource Guide](#), which includes materials for institutional leaders, professional developers, and others who can support faculty to implement the Instructional Model in their courses.

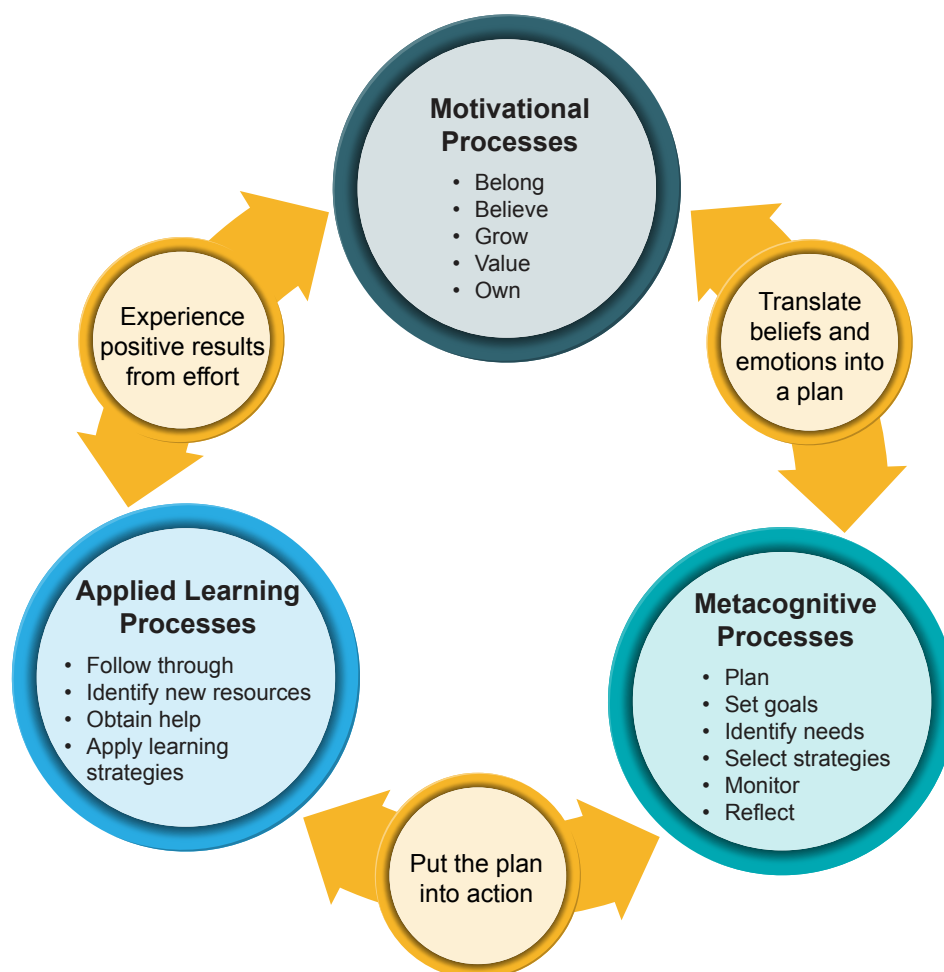
Exhibit 1. Sequence of Strategies in the SDL Instructional Model



The Instructional Model is informed by a framework for self-directed learning that establishes how three core psychological processes interact with one another to promote student success (see Exhibit 2).⁴ Using this framework and the body of rigorous literature on effective interventions as a guide, researchers at the Collaborative partnered with faculty, administrators, and students at seven community colleges and two broad-access universities on a series of iterative research and development activities. First, the team adapted evidence-based interventions for use in online postsecondary contexts. They tested these early versions of the three SDL strategies through rapid-cycle evaluations. Then, the team conducted a feasibility pre-pilot study at three of the nine institutions to understand if faculty could use all three strategies in one course. After each phase of the research, the Collaborative made refinements and improvements to the model.

In all research and development phases, the Collaborative focused on gateway STEM courses taught online or in hybrid formats. These courses are important because they often serve large numbers of students and can place high demands on students' ability to plan, monitor their learning, ask for help, and stay motivated. Although the Collaborative focused on STEM courses, the Instructional Model can be used in courses taught in any discipline.

Exhibit 2. Framework for Self-Directed Learning



The Pilot Study

In the fourth year of the project, the Postsecondary Teaching with Technology Collaborative conducted a pilot study to examine the usability, feasibility, and potential impact of using the SDL Instructional Model in online and hybrid STEM courses.

Study at a Glance

The pilot study examined how faculty implemented all three SDL strategies together in online STEM courses. In 2025, the Collaborative collected data from:

- 5 postsecondary institutions
- 24 intervention faculty
- 50 course sections
- 1,338 students

Data collection included:

- Surveys of 24 intervention faculty
- 11 interviews and course tours with intervention faculty
- 5 weekly logs by intervention faculty (one per institution)
- 3 interviews with faculty who were not familiar with the Instructional Model
- 5 interviews with administrators
- 1,338 students' administrative data
- Surveys of 300 students
- 14 interviews with intervention students

Context

The pilot study included five institutions—four community colleges and one 4-year university—that varied in size, geography, and student demographics. Across these institutions, 24 faculty implemented the Instructional Model in 25 intervention course sections. The Collaborative also recruited comparison sections of the same courses taught in the same modality, often by the same instructor. In total, the study included 50 intervention and comparison course sections and 1,338 students across those sections.

Intervention faculty received supports to implement the Instructional Model prior to the start of the term, including detailed implementation guidance and ready-to-use text for each SDL strategy. The Collaborative research team led two 1-hour virtual training workshops, provided a planning template to guide decisions about when to implement each strategy, and sent reminder emails to encourage strategy implementation throughout the term. Members of the research team were available to answer implementation questions via email and video calls, as needed.

Data Sources

To understand how the Instructional Model worked in practice, the Collaborative research team collected data from multiple sources. The team interviewed faculty who implemented the SDL strategies, students who were enrolled in intervention course sections, faculty who were not familiar with the Instructional Model, and college administrators. During the interviews with intervention faculty, researchers asked to view the course LMS to see how faculty embedded the SDL strategies.

In addition, the research team collected administrative and survey data from students in both intervention and comparison course sections. The survey yielded a 26% response rate. These data allowed the team to examine differences in students' self-reported SDL skills and mindsets across the intervention and comparison course sections. Intervention faculty also completed a survey near the end of their courses. This survey yielded a 100% response rate. One instructor from each campus completed weekly logs to document the time they spent implementing the SDL strategies, as well as the implementation resources they used and supports they accessed, in a given week.

Analytic Approach

The Collaborative research team analyzed the data in several stages. First, researchers reviewed each data source separately and wrote analytic memos that summarized key takeaways for each data source. Next, researchers read the analytic memos to identify patterns across the data sources and wrote triangulation memos for each research question synthesizing patterns across data sources. The research team also used rigorous statistical modeling techniques to compare the academic outcomes as well as the self-reported motivational, metacognitive, and applied learning skills of students in the intervention and comparison course sections who were similar on key characteristics.

Find more details about this pilot study's sample, measures, and analysis and findings in the [technical report](#).

Findings

The Instructional Model combines familiar and novel activities in an intentional way

Faculty, students, and administrators described the SDL Instructional Model as different from typical online course practice because it intentionally and systematically brought together a series of familiar and novel activities to support students' motivation, planning, reflection, and connection. As one administrator noted, "Some faculty are doing some of these practices already ... but they may not be as strategic or intentional as [the Instructional Model]."

In interviews, faculty and students described the SPIN introductory questionnaire as similar to other get-to-know-you activities or icebreakers. Additionally, several faculty described implementing activities similar to the reflection prompts and videos on growth mindset and time management, and some said they had already used an activity comparable to the message to a future student.

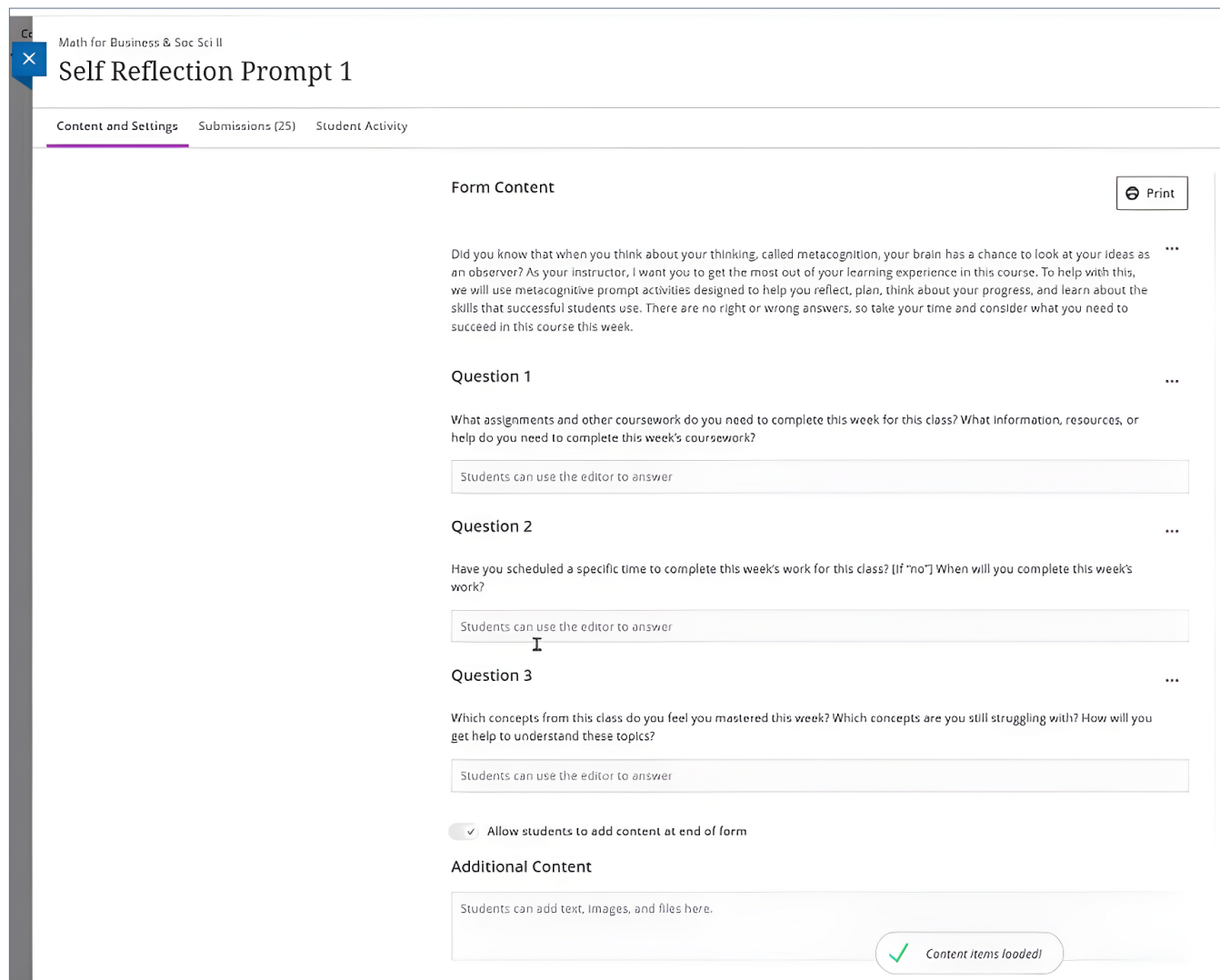
However, faculty and students described several activities as novel. For example, the SPIN collaborative activities stood out to faculty and students as most different from what students usually experienced in online courses, particularly in terms of their interactivity and connection with the instructor and other students. In interviews and survey responses, some students also described the intervention courses as more interactive than other online courses they had taken, with more opportunities to connect with classmates or the instructor. In addition, faculty and administrators reported that the Instructional Model was distinct from typical practice because of its structured integration of metacognitive supports at multiple time points throughout the term.

Faculty largely found the Instructional Model feasible to implement

Faculty said that implementing the model was feasible overall, although SPIN presented some challenges.

In interviews and open-ended survey responses, faculty generally described the SDL strategies as feasible to implement. Following the implementation guidance, faculty embedded the strategies into their LMS as discussion board prompts, standalone short-answer assignments, or additional questions in existing assignments (see Exhibit 3). Incorporating the strategies into courses was a time burden: In the weekly logs, faculty reported spending an average of 28.6 total hours setting up and implementing the SDL Instructional Model over the course of the term. (If faculty choose to use the strategies in the same course in subsequent terms, implementation should be less time-consuming once the activities are loaded in the LMS.) Despite the time involved, faculty largely did not perceive implementation as difficult. Seventy-nine percent of faculty survey respondents agreed or strongly agreed that the SDL prompts and SDL videos were easy to implement.

Exhibit 3. Example of an SDL Reflection Prompt Embedded in an LMS



Math for Business & Soc Sci II

Self Reflection Prompt 1

Content and Settings Submissions (25) Student Activity

Form Content Print

Did you know that when you think about your thinking, called metacognition, your brain has a chance to look at your ideas as an observer? As your instructor, I want you to get the most out of your learning experience in this course. To help with this, we will use metacognitive prompt activities designed to help you reflect, plan, think about your progress, and learn about the skills that successful students use. There are no right or wrong answers, so take your time and consider what you need to succeed in this course this week. ...

Question 1 ...

What assignments and other coursework do you need to complete this week for this class? What information, resources, or help do you need to complete this week's coursework?

Students can use the editor to answer

Question 2 ...

Have you scheduled a specific time to complete this week's work for this class? [If "no"] When will you complete this week's work?

Students can use the editor to answer

Question 3 ...

Which concepts from this class do you feel you mastered this week? Which concepts are you still struggling with? How will you get help to understand these topics?

Students can use the editor to answer

☒ Allow students to add content at end of form

Additional Content

Students can add text, images, and files here.

✓ Content items loaded!

Faculty were more likely to experience implementation challenges with SPIN. Some interviewed faculty reported difficulties identifying an assignment suitable for collaborative learning in an online environment. Faculty also encountered technical challenges with creating group assignments in their LMS. Only 46% of surveyed faculty agreed or strongly agreed that SPIN was easy to implement. For the survey respondents, SPIN also required the most time to implement, although the differences in time burden were relatively small across the SDL strategies.

Some interviewed faculty also mentioned the difficulty of fitting all the SDL strategies into a course, particularly in a shortened 8-week course, and balancing these activities with the preexisting course workload. One faculty member suggested that the Instructional Model would be most beneficial if faculty could choose which strategies to implement. A few interviewed faculty

recommended reducing the number of SDL prompts, and some had challenges with reviewing and responding to the volume of student reflections on the prompts.

Despite these challenges, all surveyed faculty reported implementing the model with fidelity. During interviews, the Collaborative research team found that some faculty unintentionally deviated from the Instructional Model by implementing SDL prompts or SPIN collaborative activities only once or replacing reflective prompts with content-oriented questions. These deviations appeared to be oversights or the result of a misunderstanding of the goal of the activity.

Faculty appreciated the ready-to-use materials and their associated flexibility.

Faculty reported that the “turnkey” templates and materials provided by the Postsecondary Teaching with Technology Collaborative facilitated implementation of the SDL strategies in their courses. These materials include activity descriptions and instructions for students that faculty can copy and paste directly into their LMS. One interviewed faculty said, “I really liked that you actually had given us sets of questions we could ask. We didn’t have to reinvent the wheel.”

That said, the SDL Instructional Model allows for adaptations and customization, and some faculty reported that modifying the format and timing of strategies made implementation more feasible. Half of all intervention faculty made some modifications, most of which did not deviate from the Instructional Model’s intent. These changes included tailoring the SPIN introductory questionnaire and making modest adjustments to the phrasing, timing, or content of the SDL prompts.

Students and faculty saw value in the Instructional Model activities

Faculty perceived value in the strategies.

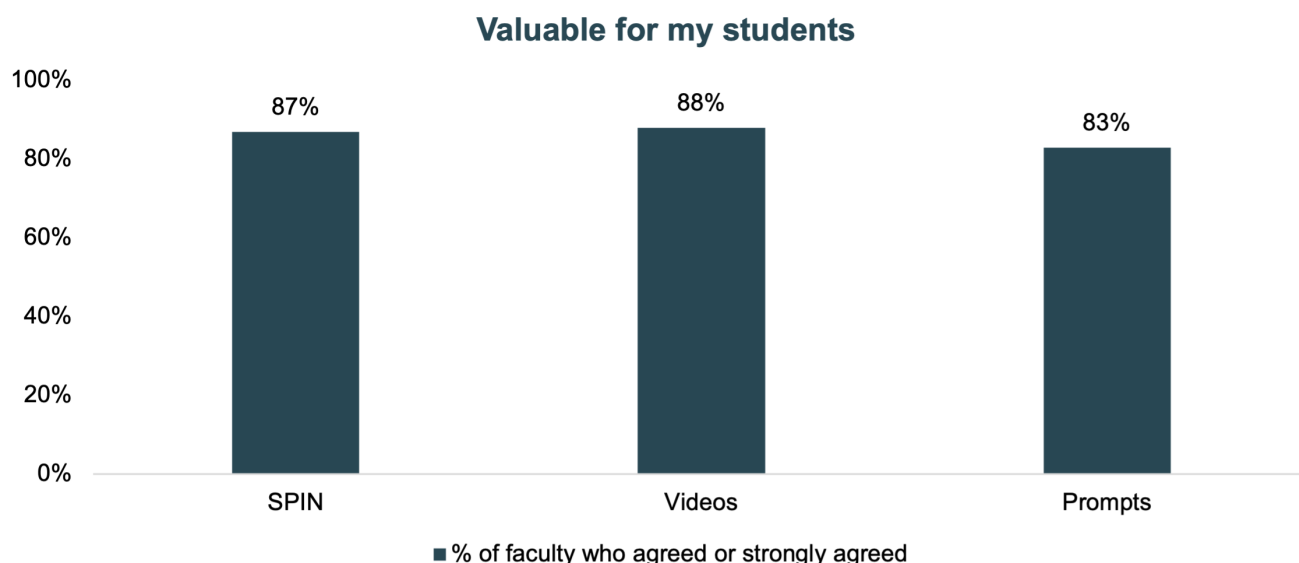
Most faculty reported seeing the value of the SDL strategies. On the survey, the majority of faculty agreed that each strategy was valuable for students (see Exhibit 4). In open-ended survey responses and interviews, faculty explained that students seemed to enjoy the activities, particularly the SDL videos and prompts. Many faculty perceived that students improved their learning as a result of the Instructional Model. One explained:

The SDL strategies proved to be valuable in encouraging students to take more responsibility for their own learning. ... While not all students fully embraced the autonomy, the exposure to SDL is likely to have long-term benefits, especially in promoting independent thinking and lifelong learning habits.

Another faculty member felt that the strategies strengthened the classroom community. They stated that students, especially those for whom this was their first online course experience, seemed to have a deeper sense of belonging as a result of communicating with classmates.

Many faculty reported that the information students provided in response to the SDL prompts and video questions was useful in their teaching. One faculty member reported making adjustments to course content based on what they learned from reading students' reflections. Some faculty perceived increased help-seeking and rapport among students and improved attendance in the course sections implementing the Instructional Model.

Exhibit 4. Faculty Survey Responses on the Perceived Value of the SDL Strategies



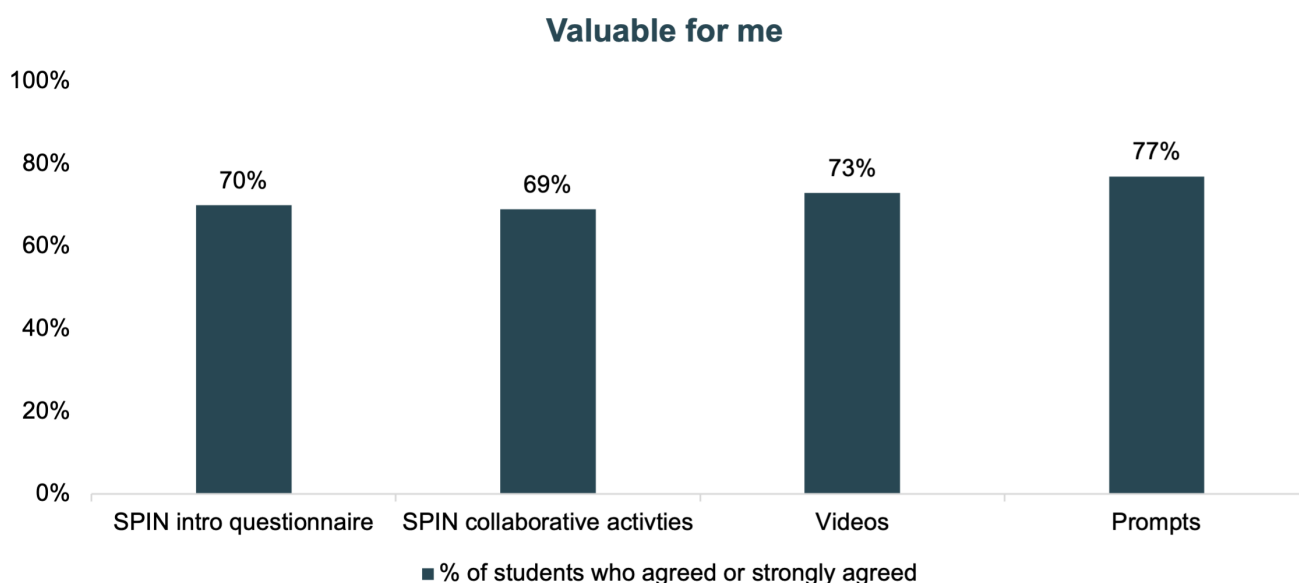
Students perceived value in the strategies, although some felt that the model was more valuable for other students than for themselves.

Student survey results indicate that, overall, students also found the SDL strategies to be valuable (see Exhibit 5). In open-ended survey responses, students explained how the strategies supported their learning. For instance, one student said the prompts encouraged reflection, sharing, “I reviewed and reflected on the prompts when I was able to look back and see if what I was doing worked for me. I tried something new each time!” Another cited the videos as pivotal to gaining confidence, explaining, “I also struggle a lot with doubting myself and my abilities and intelligence. One of the videos helped me gain confidence and allowed me to realize that if I put the work in and stay committed, I will succeed.” Finally, one student said the collaborative activities supported their learning more than independent assignments:

The assignments in which we could work together is when I felt I was learning the most in the class. Being able to bounce ideas off of each other, and working together to find the answers is when I felt most comfortable in my submission of an assignment. When working alone, it's harder to gauge if I'm on the right track or how anybody else in the class is feeling about that particular assignment.

While students' perceptions were generally positive, many also reported that the SDL prompts and videos were more likely to be useful for other students. Some students felt that the videos were more appropriate for high school students. These students felt they already had strong SDL skills. Perhaps relatedly, the survey showed that students with less favorable perceptions of the SDL Instructional Model were more likely to be taking the course for their major. This finding may suggest that students in major-required courses feel less need for motivational, metacognitive, or applied learning support.

Exhibit 5. Student Survey Responses on Perceived Value of the SDL Strategies



Faculty reported that students engaged with the activities.

Another positive indication of the SDL Instructional Model's value for students was a high degree of student engagement in the strategies. Most surveyed faculty estimated a high degree of student participation in the activities, with a majority estimating that 75% to 100% of students had completed most of the activities. (Two SDL strategies had lower reported engagement—the second SPIN collaborative activity and the message to a future student—which was due to their timing in the term relative to the survey administration.)

In interviews and open-ended survey responses, faculty were more equivocal about student engagement. About half of faculty reported they were impressed by student engagement, while some reported unclear, mixed, or lower levels of engagement. One faculty said, “The rate of completion was high. However, it felt as though the amount was low. ... It seems as though the students rushed through [the SDL strategies].”

Faculty reported higher rates of student engagement with the SDL videos and prompts. One surveyed faculty member wrote:

Student participation has generally been strong, especially with video-based and individual tasks, which tend to be more straightforward and easier for students to complete alongside their other responsibilities, while participation has been lower for reflective and collaborative activities, which often require more time, thought, or coordination with others.

A majority of surveyed students (ranging from 64% to 74%) reported completing each of the SDL strategies, although about half of interviewed students did not recall completing at least one of the strategies.

Additional supports and resources can promote broader adoption of the Instructional Model

When asked about scaling the SDL Instructional Model to other faculty at their institution, most intervention faculty were positive. In the survey, 75% of faculty reported agreement that other faculty at their institution would be interested to learn about and use the SDL strategies. Seventy-one percent agreed that it would be easy for other faculty to implement the Instructional Model.

Interviews with administrators and faculty pointed to challenges that would be associated with scaling the Instructional Model beyond the context of this pilot study. Multiple faculty noted that many initiatives compete for the attention of faculty, making it difficult to obtain their buy-in for something new. As one faculty member put it, “We are bombarded as faculty with ‘Try this, do this, use this software. ...’ It’s all really helpful, but it can also be very overwhelming. And we kind of have to pick and choose.” Likewise, faculty noted that the workshop sessions and “on-call” support provided by the Collaborative researchers were helpful for implementation. In their absence, other supports would be needed.

Interviewees and survey respondents offered several suggestions that would promote broader adoption of the Instructional Model:

- Integrate training on the Instructional Model into existing professional development structures (e.g., a Center for Teaching and Learning or new faculty orientation).
- Incentivize participation in training by offering a certificate or providing a stipend.
- Preload the strategies into the institution’s LMS to reduce the start-up time associated with implementing the Instructional Model.
- Use a cohort-based approach to encourage peer-to-peer collaboration among intervention faculty. Half of interviewed faculty described collaborating with other faculty members who were also participating in the study. One faculty member explained, “Luckily I have another coworker here [implementing the Instructional Model], and so she and I sat down together. ... Being able to work with a partner, and talking it through, helped get it all down.”

- Create customized resources for implementing the SDL strategies in a range of contexts. Respondents requested additional resources to help design collaborative activities (e.g., mock assignments) and to adapt the Instructional Model activities to shortened course formats. Several respondents suggested a discipline-based approach: “I think it would be good to have a lead group or a captain for each discipline so they can create or adapt the material to make it more relatable to the topics in their field.”

The Instructional Model shows early evidence of promise

Across multiple phases of research, the SDL Instructional Model has shown early evidence of promise. However, the pilot study did not find statistically significant differences in students’ self-reported SDL skills or mindsets or in their end-of-course grades. Null findings may be attributed to the small sample size or low survey response rates, which may have limited the study’s ability to detect small or moderate changes.⁵ Additional rigorous analyses that considered these impact estimates in the context of the evidence base for postsecondary interventions indicated a 67% probability that the SDL strategies had a positive effect on grades. (These analyses used the Bayesian Interpretation of Estimates Framework and evidence of impacts on achievement from studies conducted in postsecondary settings that met What Works Clearinghouse standards with or without reservations.⁶ This approach estimates the probability of a positive effect given the Collaborative’s estimates and the prior evidence.)

The earlier rapid-cycle evaluations of individual SDL strategies found more clear, encouraging evidence that the strategies could support students’ learning. The Collaborative found a positive, statistically significant effect on students’ evaluation skills (that is, the degree to which they reflected on and assessed their study habits) and on students’ use of applied learning strategies.⁷ These findings suggest that targeted, easy-to-implement supports embedded in online courses could help students strengthen the skills they need to plan, monitor, and reflect on their learning. There is still more to learn about the Instructional Model. Taken together, the findings suggest that the model shows promise and warrants further testing with larger samples and stronger response rates.

The Postsecondary Teaching with Technology Collaborative’s Self-Directed Learning Instructional Model has been – and continues to be – a vehicle for learning. Explore our [Learning Agenda](#), which identifies critical knowledge gaps and prioritizes questions for investigation.

Implications for Practice

The model addresses faculty and student challenges associated with online learning.

Data collected from faculty and students indicate that the SDL Instructional Model addressed relevant learning challenges in online courses. Faculty and students appreciated that the SDL strategies helped build community and supported the development of learning skills like time management and planning. The largely positive responses from faculty and students about the strategies' usefulness, despite the extra time required to implement them in busy content-area courses, speaks to the potential for the strategies to support student learning and success. Although the overall Instructional Model was different from typical practice in online courses, several of its strategies resembled activities that were familiar to faculty and students.

Overall, findings from the pilot study show a mixed picture. Perceptions and experiences were largely positive, even though the study did not detect positive effects on learning habits or academic outcomes. This suggests that colleges and faculty should continue to experiment with the Instructional Model (or similar strategies) to see how scaffolded interventions targeting SDL learning habits can be integrated into content-area online courses to support student learning and success.

There may be benefits to strategically selecting from among the SDL strategies.

Despite the overall positive perceptions of the Instructional Model, findings suggest that not all SDL strategies were experienced the same way. Faculty identified SPIN as more challenging to implement, while the SDL videos and prompts were more straightforward. In addition, some faculty reported it was challenging to find time to integrate all strategies; this concern was exacerbated in shortened course formats. Some students indicated that, while some strategies were not personally valuable, they thought they could be valuable to other students with less college experience. Although it is difficult to interpret the results from the outcomes analysis because of methodological limitations, the rapid-cycle evaluations, in which faculty selected one or more SDL strategies to implement, showed stronger positive impact on student outcomes. (The rapid-cycle evaluations also had a larger sample size, making it easier to detect smaller effects on outcomes.) These findings suggest that the strategies could be more impactful when faculty can select one or more that they think are most aligned with their students' needs.

Institutional supports are needed for adoption of the Instructional Model.

Findings from this study show that faculty appreciated clear implementation guidance and "ready-to-use" text for each SDL strategy, which made it easy for them to embed the strategies into their LMS. At the same time, faculty encountered challenges with some aspects of the Instructional Model, including identifying and designing SPIN collaborative activities. Several faculty relied on the support of colleagues who were also implementing the model, particularly support to design collaborative activities. Faculty also cited the value of training and supports provided by the

Postsecondary Teaching with Technology Collaborative. This finding suggests that professional development and peer learning opportunities are important to help faculty make implementation decisions and perhaps to realize the full value of the Instructional Model. Relatedly, administrators and faculty pointed to several potential structural supports that are likely to smooth the path to implementation, including a centralized effort to add the strategies to LMS course shells.

Faculty have extensive demands on their time and no shortage of advice on the best ways to support students. The SDL Instructional Model and strategies are appealing to faculty for their ease of implementation and the ways they address student learning challenges. However, it is important that institutional leaders allocate resources to support faculty to integrate these promising supports into their online classes.

Endnotes

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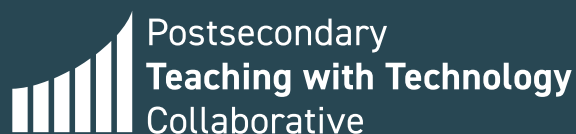
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[The Postsecondary Teaching with Technology Collaborative](https://postseccollab.org/) (the Collaborative) is a U.S. Department of Education, Institute of Education Sciences R&D center, co-led by SRI Education and the Community College Research Center at Teachers College, Columbia University, in partnership with Achieving the Dream. The Collaborative uses research findings to build the capacity of institutions and instructors to establish inclusive learning environments and incorporate technology in ways that improve learning and success in postsecondary online courses. Our research analysis aims to contribute to knowledge and understanding of how instruction can support students to employ a constellation of motivational and metacognitive processes and certain applied learning processes—which we refer to as self-directed learning (SDL)—to manage their learning more effectively in online courses and increase their postsecondary success.



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