Supporting Learning Online:

Perspectives of Faculty and Staff at Broad-Access Institutions During COVID-19

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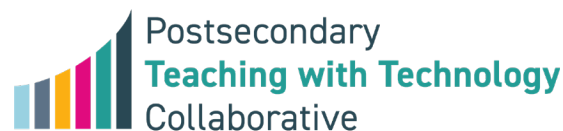Community College Research Center

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The Postsecondary Teaching with Technology Collaborative (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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INTRODUCTION

Overall failure rates have long been higher in online courses than in in-person courses, and disparities in those rates by race/ethnicity have also endured.[1] The rapid shift to online courses (and online student support services) during the COVID-19 pandemic have exacerbated concerns about student experiences and outcomes in such courses, as higher education institutions and especially the students they enroll faced a number of difficult challenges because of the pandemic.[2] At the same time, the move to online courses has galvanized technological innovation and sharpened faculty and staff members' focus on the complex mix of student life circumstances and college policies and practices that can help or hinder engagement, learning, and achievement, particularly for students historically underserved in higher education.

In broad-access institutions, including community colleges, concerns about student learning, persistence, and success are particularly profound because these institutions have not consistently delivered on their mission to support the success of low-income and racially minoritized students and students with weaker academic preparation. In the challenging environment of the pandemic, professionals responsible for online learning, instructional design, faculty development, academic support, and equity and inclusion have been re-envisioning their institutions in ways that balance student demand for online courses and services with the benefits and utility of in-person learning and engagement. The pandemic has also heightened awareness of the importance of student attitudes and dispositions—such as motivation—and learning skills—such as planning, help seeking, and reflection—for students learning online, in hybrid modalities, and in person, though they may be most salient when teaching and student services are provided online.[3]

In this report, we examine how faculty and staff at seven community colleges and two broad-access universities reconsidered students' online learning needs in the midst of the pandemic. We focus on a set of interconnected student mindsets and competencies that we call self-directed learning (SDL) skills. In our framing, SDL skills include motivational processes (e.g., building self-efficacy and sense of belonging), metacognitive processes (e.g., identifying and adjusting learning strategies and reflecting), and applied learning processes (e.g., managing time and seeking help). We explore whether and how the colleges offered supports for students to strengthen their SDL skills and the extent to which SDL skill supports were offered within online courses versus outside of class.

Drawing on interview data and secondary sources from the nine broad-access postsecondary institutions, we first describe the course delivery and instructional issues colleges grappled with as they navigated the second year of the COVID-19 pandemic and planned for a future in
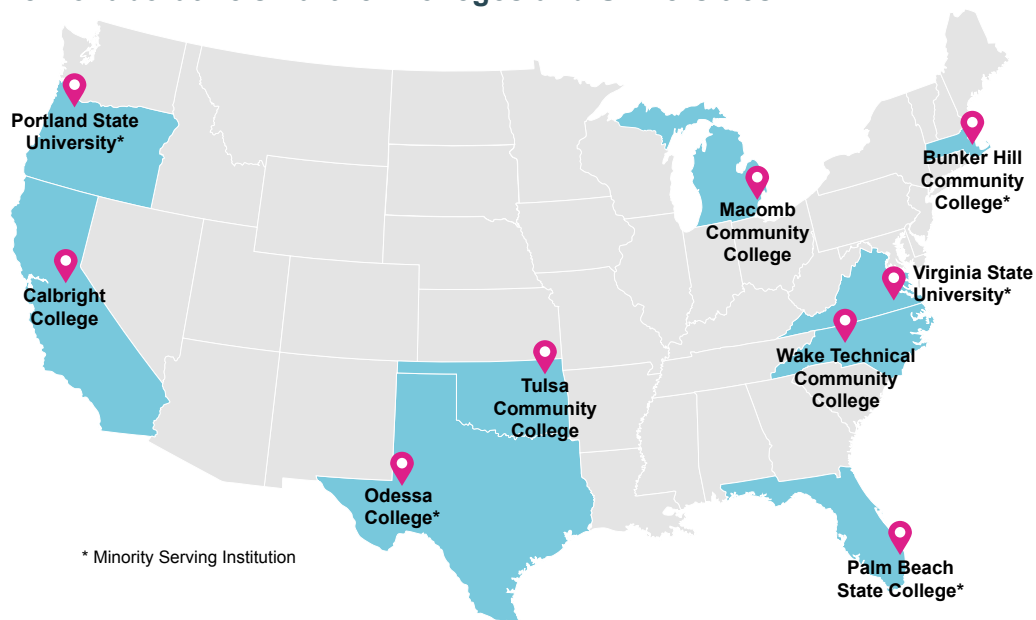
which online learning remains prominent. We then explore how faculty, staff, and college leaders perceived the needs of students in online courses. Finally, we draw on research showing how students' SDL skills can support their success in online courses and highlight examples of how institutions and instructors are supporting SDL skill development as part of approaches to improve equitable outcomes in online courses. We find that:

- Most institutions made changes to improve conditions for online teaching and learning, including improved use of learning management systems, increased professional development for instructors, improved physical technology infrastructure and expanded software licenses, and the development of student-facing online orientation materials.

- At the same time, increased use of online courses continued to present challenges, including poorer student performance in online course sections, lack of meaningful communication and engagement, lower likelihood for online students to seek help when they need it, and increased demands for students to apply SDL skills such as time and task management.

- Many SDL supports occurred at the institution level, outside of specific classes or departments, and therefore were not tailored to particular content areas or course types. These supports provided students with valuable and needed resources to help them succeed in college but also had some limitations.

- While most faculty and staff we interviewed expressed that SDL skills are important and should be supported by the institution, explicit instructional support for SDL skills inside classrooms appeared to be limited and uneven. Faculty may not know how to teach these skills, may not think that they have the time or resources to do so, or may not see it as their responsibility.

The colleges and universities featured in this report (see Figure 1 below) are part of the Postsecondary Teaching with Technology Collaborative (the Collaborative), a research and capacity-building center funded by the U.S. Department of Education's Institute of Education Sciences.

Figure 1. The Collaborative's Partner Colleges and Universities

Portland State University*

Calbright College

Bunker Hill Community College*

Macomb Community College

Virginia State University*

Wake Technical Community College

Tulsa Community College

Odessa College*

Palm Beach State College*

* Minority Serving Institution

The nine institutions contribute national geographic, sector, and mission diversity. These institutions were included in the Collaborative because of their significant online course and program offerings (including one fully online institution, Calbright College), existing efforts aligned with SDL skill development and instructional improvement, and desire to participate in the research and capacity-building activities of the Collaborative. They also reflect institution types and student populations that have typically not been well represented in previous research on the learning skills and mindsets in our SDL framework.[4]

We conducted virtual interviews and focus groups in fall 2021 and early spring 2022 at all nine institutions to learn more about institutional priorities and initiatives related to online instruction and promoting students' SDL skills. We also were interested to learn about challenges and opportunities for using educational technology and improving equitable outcomes for students enrolled in online courses. We spoke to 139 stakeholders including administrators, deans and department chairs, instructional designers and online learning administrators, chief diversity officers, faculty development coordinators, and faculty with expertise in designing and teaching online introductory science, technology, engineering, and math (STEM) courses. To complement these data, we draw upon selected findings from a separate faculty survey conducted in spring 2022 with 141 biology and math faculty at eight of the Collaborative's partner institutions (all except Calbright College).[5] We interviewed and surveyed faculty teaching introductory online STEM courses for multiple reasons, including because these courses represent a critical milestone for students' academic progress, have chronically high failure rates, and may present particular SDL demands. We thought that, in response to these demands, faculty teaching these courses may incorporate innovative SDL support strategies.

WHAT CHANGES DID PARTNER INSTITUTIONS MAKE OR ACCELERATE DURING THE PANDEMIC TO SERVE THEIR STUDENTS ONLINE?

Like postsecondary institutions around the country, the Collaborative's partner colleges and universities made rapid and dramatic changes to the way they delivered instruction and student services as a result of the COVID-19 pandemic. While most partner institutions had some online course offerings in 2019, most students were taking online courses in 2020, a trend that continued into the fall of 2021 and to a slightly lesser extent in the fall of 2022. Table 1 shows the percentage of students enrolled in online courses at selected partner institutions.

Table 1. Proportion of Students Enrolled in Some/Only Online Courses at Selected Partner Institutions

Institution	Fall 2019	Fall 2020	Fall 2021	Fall 2022
Bunker Hill Community College (MA)	23%	100%	96%	82%
Macomb Community College (MI)	35%	64%	89%	71%
Odessa College (TX)	55%	68%	66%	59%
Palm Beach Community College (FL)	27%	96%	77%	73%
Tulsa Community College (OK)	40%	80%	67%	62%
Wake Technical Community College (NC)	51%	91%	77%	77%
Average for all public two-year colleges (901 institutions)	**36%**	**70%**	**66%**	**58%**

Source. *Integrated Postsecondary Education Data Survey (IPEDS).*

With these expansions in online offerings, formal and informal policies and practices around online courses were reimagined. For example, some institutions had previously targeted their marketing of online courses to select students who were identified as likely to succeed in this modality. In other cases, particular course types (e.g., developmental courses and laboratory sciences) were not offered online. In addition to increasing the number of online sections, institutions diversified the modalities for their virtual offerings to include asynchronous online courses, hybrid courses with in-person and online components, synchronous remote courses that meet on Zoom or another virtual conferencing platform, and hybrid-flexible (HyFlex) course sections in which students can participate either in person or online. At most institutions, the latter two modalities were first offered during the emergency shift to remote instruction; administrators expected they would remain on the schedule beyond the pandemic.

Opportunities and Benefits Emerging From the Pandemic

I think, if there [was] some silver lining from the pandemic, it's that I do think that, by and large, our faculty has increased their focus on student [online] learning.

—Faculty development coordinator

As has been reported in the literature and press, the shift to primarily online instruction in concert with the health, economic, social, and educational disruptions of the pandemic created significant challenges for institutions and their students. (An array of instructional challenges identified by faculty is detailed below.) Yet, institutional stakeholders also reported benefits and opportunities that emerged from this period. Driven by the emergency and subsidized in part by federal pandemic relief dollars, colleges invested in professional development for faculty, mechanisms to standardize and improve course quality, licenses for new software, student-facing online orientation materials, and physical infrastructure including updated tech-enabled classrooms and laptops for students. Some institutions hired additional instructional and technical support staff to provide more robust and comprehensive assistance and resources to faculty.

Opportunities and benefits emerging from the pandemic	
	Improved use of learning management systems
	Increased professional development for instructors
	Improved physical tech infrastructure and expanded software licenses
	Development of student–facing online orientation materials

Use of learning management systems and attention to instructional design. Before the pandemic, instructor use of the institution's learning management system (LMS) (e.g., Canvas or Blackboard) at some partner sites was uneven. During the pandemic, institutions formalized standards for LMS usage, requiring, for example, that at minimum instructors upload the syllabus to the LMS in each course section, or preparing and distributing course templates that all sections are expected to follow. In the quote below, a college administrator describes how the college used an existing professional development course to improve instructor usage of the LMS. This standardization was perceived to improve the continuity of the student experience at the college:

> *I think that COVID presented the perfect opportunity for us to really take our online teaching to a whole different level. [Previously] the main online teaching fundamentals course was in place, but it was completed on an as-needed basis. When COVID hit, every [instructor] was required to take that full-week course. That provided us with what we needed to support our students—from ensuring that we had ongoing communication [using] the [LMS] announcements and ensuring that our materials were accessible for our students [and] compatible with screen readers. And also to make sure that all of our courses were following the same structure, that students knew where to find information, that students knew where to locate assignments, [and] that students knew where to submit assignments and by when.*
>
> —Academic affairs administrator

Professional development for instructors. At some institutions, professional development and instructional design staff developed new faculty learning resources and supports focused on teaching online. At other institutions, existing resources were adjusted to be more relevant for online and hybrid modalities. The format for these instructional supports varied and included mentoring by experienced online instructors, homegrown training sessions, and partnerships with external professional development providers. At many institutions, large numbers of faculty participated in intensive professional learning experiences, sometimes earning locally developed or national certificates. Some stakeholders considered this a welcome development, as more faculty gained skills in online instruction:

> *One challenge I had [when I was first hired] was trying to move faculty to that space of online teaching, online learning, and remote instruction. And of course, COVID-19 kind of sped that up. If you want to take some of the positive from COVID-19, over that summer of 2020 so many of our faculty members jumped on and were certified to teach online [through Quality Matters].*
>
> —Academic affairs administrator

Reflecting on the pandemic period, college stakeholders perceived that these investments in infrastructure, professional development, and student supports would have longstanding benefits. Robust online offerings, including fully online programs, could help enrollments rebound and position the college positively in an increasingly competitive environment:

If everything goes according to plan, we are actually planning to enlarge our [online learning] staff and take on more and expand our programs. We need to have some kind of a set of competitive advantages, and we're looking for those. How do we package our program in such a way that it would be an advantage for a student in [another region or state] to take it with us?

—Online learning administrator

Challenges With Online Teaching and Learning

Interviewees reported a range of challenges associated with online learning that should not be understated. At institutions that reviewed course success rate data by modality, respondents noted a general trend of poorer student performance in online course sections. In this section, we discuss several challenges that may be addressed with a more explicit focus on SDL skills.

Challenges with online teaching and learning

- Poorer student performance in online course sections
- Lack of meaningful communication and engagement
- Increased demands for students to apply self-directed learning skills
- Challenges especially apparent in online STEM courses

Many faculty reported that teaching online courses was more challenging, often because they believe they have less information about the students and their learning relative to face-to-face courses. The in-person classroom environment enables students and faculty to communicate in ways that can be difficult to replicate online. One faculty member explained how they adjust their teaching in response to feedback in an in-person class:

When I'm in a seated class and I use language that students aren't familiar with, I can see the look on their face, I can see that, hey, they didn't understand. I can read the subtext of their responses. But in an online class, I don't have those visual cues. And so, when a student is looking at the lecture—whether it's interactive notes, slide deck, video—they hear a word that they don't understand, [and] students don't always

know what to do because they haven't been in that environment. And so, I think that that poses a challenge that students aren't necessarily prepared for and that we have to work to help students recognize.

—STEM dean/faculty member

Other instructors similarly reported that the in-person learning environment can lower barriers for students to ask for clarification:

I feel like I do have more control in [the in-person] class. And then those students are able to just walk up and ask questions, or they feel like, "Okay, I'm going to set up an appointment with you." Or they may just bring the question right to me, and we work it out at the end of class.

—STEM faculty member

In a classroom, they can immediately turn to their neighbor and say, "What did he say? What does that mean?" They can raise their hand and they can get that immediate feedback, just at the moment when that lecture is happening.

—STEM dean/faculty member

Although low levels of in-class engagement and limited use of office hours have been perennial challenges in all course modalities, faculty reported that students enrolled in online sections were more likely to be disengaged from their courses and less likely to seek help. In some cases, students who were falling behind in their assignments or struggling with course content did not respond to messages from faculty offering support or resources:

I really, really encourage them to have a one-on-one meeting with me because in five minutes I can save them hours of time, but they just are so resistant to meeting. I'm convinced they have not carefully gone through the material and they just keep submitting stuff hoping that either I'm not going to check it or that they're just crossing their fingers that it's correct. And if they would just slow down, read the assignment, or ask me a specific question, it would be solved.

—STEM faculty member

Another challenge of teaching online was sparking student curiosity and interest with the content. In face-to-face STEM classes, instructors reported that working with physical materials and engaging in a lab setting are often ways to engage students. The absence of these learning experiences was cited as another source of student disconnection:

*There's something to be said about that hands-on [environment].
And I think that that's even more so in our introductory courses.
... We have a lot of students who are in our science courses [who]
aren't interested in science. And because we've done everything
so virtually, I think that it takes away some of the wonder and the
magic. And we lose some of those aha moments that we would be
able to help create more of in the classroom, or at least it's harder
to create them in the online classroom. And so I worry that we're
losing students [by] not being able to show them the magic of our
fields because they don't see our excitement when we're teaching
[them].*

—STEM dean/faculty member

Finally, faculty pointed to the ways that online classes increased the demand for strong time and task management skills. Asynchronous courses do not offer the natural routines and deadlines provided by courses meeting on a regular schedule. In addition, the time that would be spent in class is replaced with independent work time. Faculty reported that these challenges often resulted in poorer work quality and fewer opportunities for deep learning, with students rushing to complete assignments at the last minute:

*I think the biggest hurdle for my students is just when you have an
online class, managing your own time is harder. I think it's hard to
manage your time as a college student anyways because you will
have multiple aspects of your life—school is [just] one of them. ... So
that is the biggest hurdle for my students, is organizing their own
time. And I've noticed that, no matter when you set the deadline,
half of the class is going to work to the deadline.*

—STEM faculty member

These reflections point to a constellation of dispositions and academic behaviors that are key to students' learning and success in an online environment. Specifically, faculty underscore the need for additional strategies and supports—for both instructors and students—to increase student help seeking, feedback, communication between students and faculty and among students, student motivation, and time management skills. In the sections that follow, we draw on prior research as well as our data from the partner institutions to identify promising approaches to help students build learning skills and mindsets that can lead to success in online courses.

THE ROLE OF SDL SUPPORT IN STUDENT LEARNING, ENGAGEMENT, AND SUCCESS IN ONLINE COURSES

Researchers have long examined learning attitudes and behaviors—such as motivation, social belonging, fixed and growth mindsets, goal setting, metacognition, help seeking, and reflection—though often not as a cohesive collection or in broad-access higher education contexts. The Collaborative is interested in learning more about and elevating the potential of SDL skills to mitigate some of the aforementioned challenges and improve the academic outcomes of students in online courses. We suspect that, given the unique challenges of online learning environments, SDL skill support may take on particular importance.

Defining SDL Skills

As explained in the paper *Teaching and Designing Online STEM Courses to Support Self-Directed Learning Skills* (Yarnall et al., 2023), the Collaborative defines SDL skills as "a collection of emotions, beliefs, attitudinal mindsets, and cognitive or behavioral processes used to manage learning tasks [that can] improve students' academic and career outcomes."[6] This definition draws from research on self-regulated learning, motivation, self-determination theory, and sense of belonging. We use the term "self-directed" to emphasize ways to support students in taking an active, directive role to manage their online learning, and we call them "SDL skills," though they also include mindsets and processes that we think should be grouped together. Yarnall et al.'s (2023) paper introduces our framework for SDL skills, which is built upon prior research and includes three types of self-directing learning processes that reinforce one another. The framework is intended to guide the design of instructional strategies in the classroom.

Figure 2. The Collaborative's Model of SDL
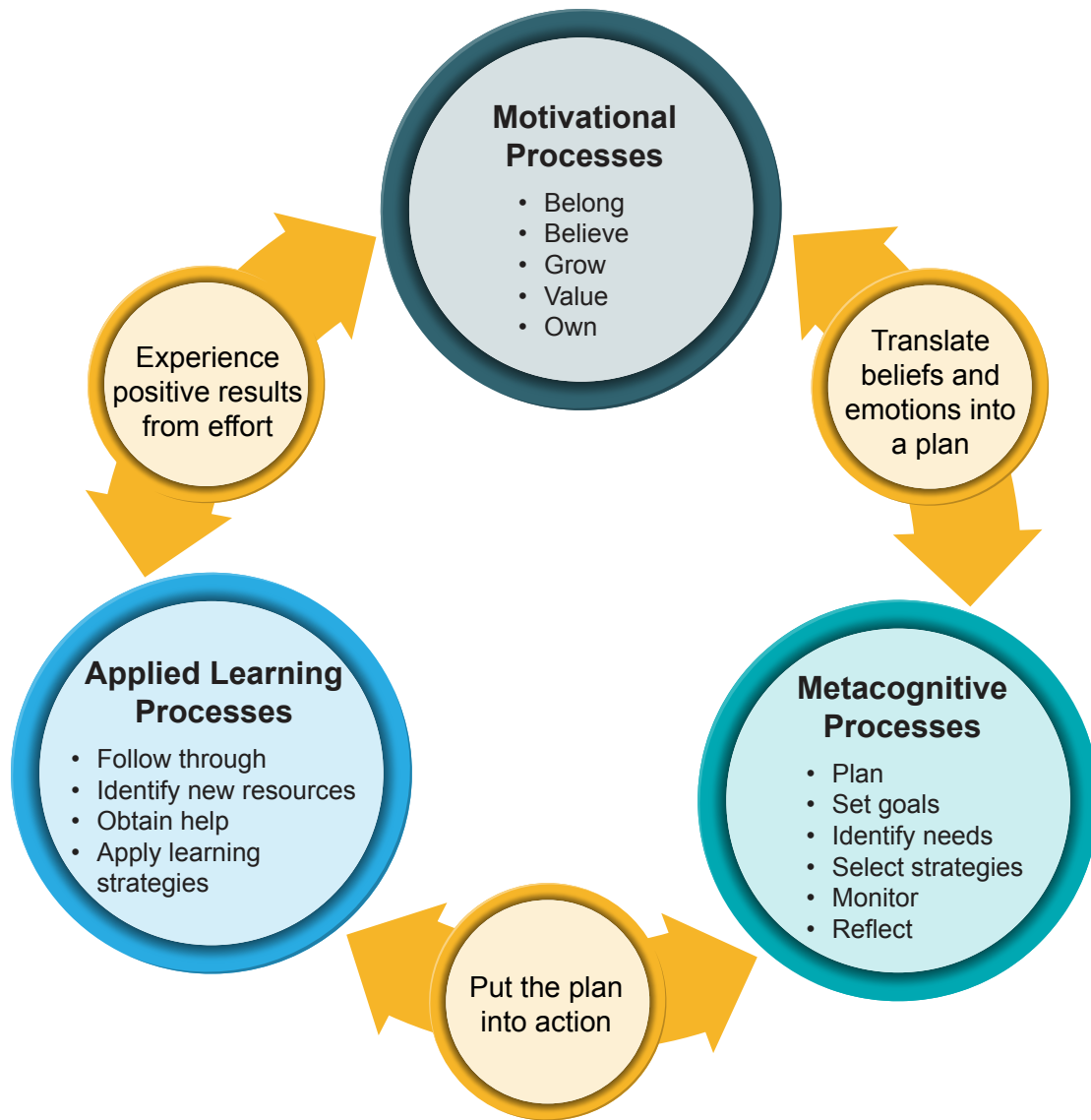
- "**Motivational processes** energize and direct behavior, and they build on students' beliefs—such as their sense of control, self-efficacy, and belonging."[7] To set the foundation for motivational processes, students build sense of belonging, self-efficacy, and a growth mindset and assess the personal value of the course. To practice and grow their skills, students maintain a positive mindset and connections to their peers and instructor. The learning and social environment is an important factor here.

- "**Metacognitive processes** help students manage their learning. When effectively performed in a cyclical manner around each task or assignment, these processes help students actively adjust to the demands of any learning task."[8] To set the foundation for metacognitive

processes, students use planning processes to identify learning needs, define goals, and select learning strategies. To practice and grow their skills, students monitor progress, adjust learning strategies, and reflect on completed performance and lessons learned.

- "**Applied learning processes** comprise learning techniques and management strategies that help students take greater ownership for achieving their learning goals."[9] To set the foundation for applied learning processes, students enact time management plans, set up their study environment, and identify resources to support learning and obtain help. To practice and grow their skills, students use spaced practice to retain knowledge, quiz themselves, read actively by summarizing and elaborating, and use problem-solving heuristics.

For more about our SDL framework, please refer to Yarnall et al. (2023).

Stakeholders' Views of SDL Skills

In our interviews with faculty and staff, we were interested to learn what language they used to speak about these types of skills at their institutions or in their departments and how they saw these competencies and mindsets interacting to affect learning.

We encountered varying levels of awareness of both the distinct skills that we include in our definition of SDL and the use of SDL to refer to them collectively. Most stakeholders had familiarity with discussing these types of skills, but most did not use the term SDL. A few people used alternative terms such as portable skills, metacognitive skills, cross-functional skills, soft skills, or self-sufficiency. Interviewees also commonly talked about individual skills and additional dispositions, competencies, or concepts related to SDL such as growth mindset, self-discipline, confidence, grit, reflective practice, advocating for oneself, and college and career navigation:

Other things that I think about [related to SDL skills] are kind of navigating a little bit of the hidden curriculum of higher education, right? And when, for example, in thinking of how do you seek help— you know, is it going to a professor's office hours? And do you know how to navigate going to a professor's office hours and having a conversation with them to get some help with your assignments?

—Diversity, equity, and inclusion administrator

One interviewee expressed their discomfort with the term "self-directed learning":

> *I really don't like the phrase self-directed learning. ... And I'm 100% behind the [specific skills you are discussing], but that title, self-directed learning—and it just could come back to me and my experience with students—we have way too many students who take an online course and feel like they're teaching themselves and that they're on their own. And the phrase self-directed learning seems to feed into that. ... [So] categorizing them under self-directed learning, I would not want to use that phrase in front of students and feed into their stereotype of what online learning is.*
>
> —STEM dean

Because people use many different terms and concepts to describe these types of skills, it can be challenging for the field to discuss and prioritize them collectively, measure them, and identify practices that support students' development of them.

When we asked stakeholders about their perspectives on SDL skills, most viewed these skills as important and saw a role for the institution to help students develop them; in general, they do not assume all students will arrive to college with these skills:

> *Students have said, "How do I balance being self-directed and setting aside time to do the classwork with whatever other obligations I might have?" And that's come up in a number of different spaces when we've interacted with students. It was very interesting in our conversations; [some students] felt like "I'm the only one that's working full-time" or "I'm the only one that's a parent." And it's like, no, actually a lot of your classmates are, but how do we make them feel that this is actually a very normative experience to have to try to balance their life with school?*
>
> —Student services staff member

> *I teach literally from the beginning to the end of the [program], and I'm one of the few professors that do that. I do weave [SDL skill support] throughout all my courses because I think they're really important. When it's time to register for courses again, I'll say to everybody, "Okay, you've got to make sure you've got enough time to do all this. We're going to look at, What are the milestones in the program? Why do you want to take this course face-to-face? Why do you want to take this course remote[ly]? What are your reasons*

for this?" Because I think all those things are really important for a student to actually evaluate. ... So we talked about, "What is your environment setup? Are you trying to do everything in the same room that you eat and sleep in? It's time to mix that up."

—STEM faculty member

Some stakeholders perceived that the pandemic amplified awareness of the importance of SDL skills. In response to the challenges students faced, several colleges expanded, refined, and elevated efforts to help students develop the skills and mindsets needed to be successful in college:

I think what's really cool is that you're hearing [about SDL skills in] a lot of places now, and I think it was COVID: I think that COVID kind of exposed the interconnectedness of so many things. I'd say the Wellness [Office], certainly the Office of Diversity, Equity, [and] Inclusion, certainly the Academic Affairs [Office]. I think everyone is walking around with an awareness [of SDL] because of the importance of goal setting and task planning and motivation within the context of what has just been an incredibly challenging time.

—Academic affairs administrator

As will be discussed below, while we found general buy-in for the notions that SDL skills are important and should be supported by the institution, explicit instructional support for SDL inside online classrooms appears to be limited and uneven. In the following sections, we offer examples of the ways that institutions offer SDL support at the institution and classroom levels.

HOW ARE STAKEHOLDERS AT OUR PARTNER INSTITUTIONS SUPPORTING SDL SKILL DEVELOPMENT IN ONLINE COURSES?

We were interested to learn of any current or recent initiatives related to SDL skills and what strategies, if any, institutions and instructors use to help students develop these skills in online courses. In this section, we identify examples of SDL supports at the institution and classroom levels and describe facilitators of and barriers to their implementation.

Some of these strategies involve explicit instruction of SDL skills, while others present SDL concepts implicitly. In other words, some instructors and staff are more clearly outlining the skills they are expecting students to apply and may discuss how students could use these skills in other assignments, courses, or life situations. Other instructors and staff are asking students to complete tasks that require the use of SDL skills, but they may not explain to students what these skills are or how they might contribute to their learning. In addition, when we asked instructors about what SDL skills they support students with, most focused on one or two, such as planning and goal setting. We spoke with very few instructors, if any, who were supporting the full constellation of skills that the Collaborative is focused on.

Institution-Level SDL Skill Development Supports

Many of the SDL supports we identified were offered at the institution level; they occurred outside of specific classes or departments and therefore were not tailored to particular content areas or course types. Interviewees identified new student orientation, student success courses, affinity group programs for targeted student groups, and online course orientation as part of how their institution provided support to help students learn online. These efforts and initiatives emphasized applied learning processes such as note-taking and time management. In some cases, programs included activities related to students' sense of belonging and self-efficacy, particularly when aimed at student groups that have been historically and systemically marginalized from higher education:

> *So, for example, [name of program] is our cohort-based ... program that helps indigenous Native American students. So, those students participate in a two-week pre-fall summer intensive where they talk about exactly these pieces, but it's also done within the lens of striving to not be identity neutral, striving to be identity conscious and letting students know that, even if you are entering a space in which you may not see a lot of your language or your identity, that this is still a place in which we're striving for you to belong. We're striving for you to boost that self-confidence and that you don't do it alone, right? You do it with supportive peer mentors, you do it with supportive advisors.*
>
> —Diversity, equity, and inclusion administrator

Academic support centers (e.g., tutoring and writing centers) were often places where stakeholders described a focus on building students' SDL skills. Some stakeholders described the mission of tutoring sessions as building students' self-sufficiency as learners rather than solely answering students' content-related questions:

> *From our perspective, in tutoring, what we're doing is walking them through what the more self-directed learner would do. ... We talk about thinking about your learning, strategies for goal setting, planning. We talk a lot about next steps. And if you get that far along, we talk about reflecting on progress. We would refer internally to things like closing the session. But that's all modeling for the student what the classroom instructor wants from them in terms of approaching an assignment.*
>
> —Student services staff member

Stakeholders reported that these institutional SDL supports provided students with the necessary resources to help them succeed in college. However, they have some limitations. Many institutional SDL supports tend to be provided near the beginning of students' time at the institution through student services divisions (e.g., in the form of a recommended or required first-year student success course) and therefore do not offer many opportunities for sustained practice and application, which are necessary for the continued use of these skills. Other institutional SDL supports are offered as out-of-class opportunities that students have to learn about and then opt to participate in (e.g., tutoring and some cohort-based programs), which may give students few opportunities to apply skills to disciplinary content learning and may not adequately demonstrate the relevance of these skills within courses. In general, these supports served students in all courses across modalities and did not seem to be tailored to students in online courses, with the

exception of online course orientations, which were required at one institution at the time of our data collection, and various online learning support resources made available to students at all nine institutions, with students encouraged but not required to access them.

Furthermore, part-time faculty, who make up a significant portion of the instructional staff at community colleges and broad-access institutions, may not be very knowledgeable about their institution's available resources and supports and therefore may not be able to pass on information to their students. Even full-time faculty may not be well informed because of persistently siloed higher education departments and initiatives and therefore may not guide students adequately, leading to inequitable access to resources that students may benefit from. In addition, responsibility for supporting these skills is sometimes delegated to faculty teaching developmental-level courses, tutors, and student success course instructors. As such, many faculty may not feel empowered or responsible to refer students to available SDL resources or to fill in gaps in support. For these reasons, institution-level approaches to SDL support—even at their best—may have limited or short-lived effects.

To address these limitations, administrators, staff, and faculty pointed to opportunities to increase collaboration and coordination between student services divisions, which in many cases explicitly attend to SDL skills through their programming, and academic divisions, which are keenly aware of the challenges students face in online courses and are seeking resources to improve student learning and success. Stakeholders in both academic affairs and student services reported the need for more communication across these areas:

> *How do we get people to understand the importance of this [student success] course? Maybe some of the activities we're doing in this class could be utilized in other disciplines. Maybe I'm teaching science and I'm struggling to get them motivated.*
>
> —Student services staff member

Wake Tech's Online Teaching and Learning Initiative, EPIC

One example of an institution-level SDL skill support effort focused on online teaching and learning is EPIC (eLearning Preparedness Initiative across the College) at Wake Technical Community College. Developed by multiple stakeholders at the institution, EPIC emphasizes faculty training rather than individual course certification (e.g., Quality Matters), meaning that once faculty are trained, they can develop and teach online courses. All Wake Tech faculty teaching online courses are required to complete the 30-hour basic course (EPIC 30), which covers topics including the principles of Universal Design for Learning (UDL); how to create accessible digital content; instructional design practices for online courses; strategies to facilitate online communication, collaboration, and student engagement; and use of Blackboard. EPIC 30 is available to Wake Tech faculty and staff, and the basic course is available online for the general public as well. Faculty can become certified as EPIC Master Online Teachers, which involves completing additional training on peer review, mentoring, accessibility of online content, and course design, and then they can mentor faculty in their department. Paired with an instructional designer, faculty receive feedback as they develop a new online course or revise an existing online course. In addition, the college developed a set of EPIC eLearning Quality Standards, which are modeled after rubrics like those from Quality Matters and used to review online courses. The EPIC eLearning Quality Standards include course structure features such as consistency in organization and navigation; clarity of expectations, tasks, and due dates; and the importance of instructors' online presence and responsiveness. Faculty are guided to include links to the college's student support resources as well as a student help forum for course-related questions, which can facilitate students' identification and use of resources to support their learning. As part of a course introduction, the online teaching standards prompt faculty to introduce themselves and include an icebreaker activity to help convey approachability and course expectations, build connections with students, and foster a welcoming classroom community, all of which can contribute to students' motivation, connection to peers and their instructor, and sense of belonging in the course.

In addition, EPIC incorporates online learning support for students. Before enrolling in an online course, students are required to complete and pass eLearning Introduction, a free orientation to online learning also developed by multiple stakeholders at the institution. The orientation typically takes students 1–4 hours to complete and contains three modules on topics including online learning skills and expectations for engagement in online courses, persistence and time management, and Blackboard basics. Students assess their strengths and weaknesses as online learners and work to improve weaker skills by completing the orientation. The orientation aims to help students build academic behaviors that contribute to their sense of belonging through effective communication online with instructors and peers; it also seeks to increase their confidence as online learners by teaching skills important for navigating and submitting

assignments and assessments in the LMS. Students can also access the orientation curricula at any point during their time at Wake Tech. During periods of lower enrollment following the COVID-19 pandemic, some people at the college suggested eliminating the eLearning Introduction requirement to reduce barriers to enrollment, but the requirement was preserved because of several semesters of data indicating its positive impact on student success in online courses.

Classroom-Level SDL Skill Development Supports

In our conversations with faculty, we learned that SDL support at the classroom level is implemented unevenly, with some faculty focusing on several SDL skills in their courses, others touching on some, and others not addressing any. Faculty identified a variety of instructional approaches related to SDL support in online courses:

- To address motivational processes, including building a sense of belonging, faculty created videos to introduce themselves to their students in online courses and communicated with students early, with a focus on being supportive.

- To facilitate students' sense of belonging and confidence, faculty incorporated examples of diverse scholars in their field, such as scientists of color and women scientists in introductory STEM courses.

- To support student success in task planning and time management, faculty often broke down assignments into smaller chunks or made use of technology tools and LMS features to integrate syllabus deadlines with the LMS calendar.

- To encourage reflection and the use of applied learning processes, instructors invited students to share effective study strategies with each other. Faculty also used exam wrappers to facilitate reflection and adjustments to learning strategies. Exam wrappers are often short handouts that students complete before and/or after an exam to plan their review of content before or after an exam, review their performance and their instructor's feedback, assess their preparation strategies, and determine which preparation strategies to use for the next exam.

In a survey conducted in spring 2022 with STEM faculty at eight of the Collaborative's partner institutions (all except Calbright College), the SDL skills that faculty discussed most often with their students were seeking help (70% of respondents), monitoring progress (45%), and planning (45%). The least common SDL skills discussed with students were self-efficacy (25%) and reflection (29%).[10]

Real–Time Discussion and Note–Taking Guidance in Physical Geology

This example of classroom-level SDL support is from an instructor teaching an online asynchronous introductory physical geology course. The instructor uses the video feedback tool GoReact to promote sense of belonging, help seeking, and reflection in a virtual learning environment. First, the instructor uploads their course lecture videos into GoReact, which allows students to contribute to a comment thread as they watch the lecture using a range of modalities for their comments, including text, video, audio, document upload, and YouTube links. The instructor previously used discussion boards for this purpose but found that students interact more meaningfully in the GoReact comment thread. One of the instructor's class lecture videos yielded more than 150 comments in GoReact. This strategy has helped students to develop academic behaviors associated with building a sense of belonging, such as growing connections to their peers and instructor and sharing outside learning resources with classmates; metacognition, such as monitoring their own understanding while viewing the lecture; and applied learning, such as asking for help.

This instructor also explicitly teaches note-taking in their course and emphasizes a read–write–share strategy in which students move from more passive documentation of content to more active engagement; this aligns with the applied learning processes in the Collaborative's framework of SDL skills. The instructor describes to students how this note-taking strategy activates the brain to deepen their processing and learning and the importance of this understanding for science learning. To satisfy the share portion of their note-taking process, students can use the GoReact video platform to explain course concepts to another person. This strategy helps students recognize effective learning strategies and put them into practice. Students are also encouraged to submit their notes each week to the instructor, which offers insight into their understanding and affords extra credit at the end of the term if they submit notes every week.

Faculty who used strategies to build SDL skills in their courses mostly did so voluntarily rather than as part of broader institutional or departmental efforts. Some discussed their growing awareness of the importance of SDL skills in content courses and had pursued their own learning about SDL. Faculty seemed more likely to use SDL skill support strategies in courses for new students. In addition, some faculty who had taught college success courses alongside their content area courses were likely to have encountered SDL skill support strategies in the success course curriculum and were sometimes inclined to transfer some SDL supports to their content courses. For example, one faculty member discussed bringing over a time management activity from a college success course into an online STEM course to help students plan how many hours per week they would study for the course.

In general, our partner sites had a small number of efforts to support faculty in using strategies to build these skills in their courses that were housed in or tailored to a particular academic department. The few cases when faculty collaborated on supporting SDL tended to occur in the context of the further development of an existing course or in a course-teaching team at the institution. Some faculty also remarked that if their institution had focused on a particular topic (such as metacognition) as part of faculty professional development, they noticed it was more likely to show up in their colleagues' classrooms.

Implementing classroom-level SDL support: Barriers and facilitators. While most faculty reported that SDL skills are important to students' success in college and few seemed opposed to supporting SDL skills in their courses, faculty reported a range of reasons that they were not currently incorporating SDL skills into their courses across all modalities. These reasons included a lack of time, heavy course content, limited ability to make changes to course activities and assessments, a lack of knowledge about the best ways to support the development of these skills, and disconnection between student services departments that may support these skills and academic departments. Some faculty expressed hesitation to incorporate SDL skills into their courses and instead expected students to arrive with those skills or to learn them elsewhere in the institution, as in this quote from a faculty who points to services provided by Career Services:

> *I'm teaching [students] the technology, not the people skills. ... An employer wants somebody who shows up on time, is dependable, responsible. ... I can tell, oh, this student is really smart. But time management—you can't get [things in] on time, you turn in things late. You see [a student] that could be really good, but I guess I kind of rely on Career Services to accomplish those things or to let them learn on their own. ... I really should; they [would] be better people if I were getting on them, but I don't [take] the risk. I don't want to be too preachy and like a [parent].*
>
> —STEM faculty member

This faculty member also raises concerns about the risk of being too moralistic in telling students what to do to succeed. This perceived risk may be related to concerns expressed by other faculty about not knowing the best ways to support the development of these skills as well as questions about whether SDL content is important enough to embed alongside disciplinary content.

Because STEM is the Collaborative's area of focus, we were particularly interested in STEM faculty's perspectives on the value of SDL skill supports and the degree to which they prioritize them in their teaching. In general, we did not note consequential differences between the faculty we spoke with who teach STEM courses and faculty teaching in other disciplines, though our interviewee sample likely comprised faculty who are more likely to use SDL supports than their

colleagues. STEM faculty noted that the amount of content that has to be covered in STEM courses can limit time for student reflection, revision, and learning about real-world application of skills (including limited time to integrate SDL skills, as stated and implied in some interviews). We did notice some differences between STEM courses for STEM majors and STEM courses for non-STEM majors taken as part of general education requirements. Faculty seemed more likely to use SDL skill support strategies in general education courses than in major-specific courses. Some general education science courses incorporated more projects than courses for STEM majors, and faculty seemed to have more opportunities to help students learn about and embrace the methods of experimentation used in STEM that inherently include time management, planning, goal setting, monitoring progress, and reflection. These faculty also stressed building students' self-efficacy in terms of confidence in being able to "do" math and science. We speculate that less SDL skill support in major-specific courses may be related to faculty expectations that students in major-specific courses have already developed these skills; major-specific courses may also be perceived as having greater content demands and therefore less time available for attending to SDL skills.

SDL Support Initiatives in Biology and Beyond at Virginia State University

Two notable initiatives at Virginia State University (VSU), a public historically Black land-grant university, originated in the biology department and have incorporated SDL skill support to help students in introductory STEM courses: the biology department's 1-credit-hour introductory course to support major choice and learning in subsequent courses and the college's STAR (Successful Transition to the Academic Realm) program. (While neither of these initiatives is focused on online learning, the second effort focused on metacognition has been implemented in a few online and hybrid courses in addition to larger numbers of in-person courses.)

Because of concerning attrition rates (after enrollment in introductory courses) for students historically underrepresented in STEM, the department has taken multiple actions to improve retention in biology. First, the department created a 1-credit-hour course—BIOL 130: Professional Practices in Biology—required for all first-year students intending to major in biology. The course enabled students to gather with other intended majors to discuss what majoring in biology entails, identify their own learning strengths and weaknesses, discuss ethics in science, and plan ahead for learning and professional experiences, including relevant research experiences.

The biology department saw the benefits of helping students understand their own learning and STEM career fields in BIOL 130 and then integrated similar metacognitive learning strategies in general biology courses taken by most first-year students. Biology faculty (and sometimes staff including academic advisors and residential life advisors) in the STAR program worked to develop, implement, and study evidence-based approaches to build VSU undergraduate students' STEM identity, resilience, and self-efficacy and to prepare them for STEM graduate programs and careers. One of the classroom activities developed through the STAR program is a class-period-long presentation delivered near the start of the term to teach students how to apply metacognitive learning strategies, how to develop a growth mindset, how to use a study cycle, and how to increase their self-confidence. The presentation also helps students think about how to manage, plan, and block out time needed to support their own learning. This is how one faculty member described the initiative:

> [STAR] is involved in engaging [students] in activities to help them to learn how to be responsible for their own learning, to give them the sorts of strategies and skills that they need, and try to pull them out of the memorization–regurgitation process that works so well through K–12— and to help them to understand they have to do certain things if I'm going to get them to move up Bloom's [taxonomy] to have the higher level cognitive learning.

The program has also incorporated student-facing supports, including peer mentoring and supplemental-instruction tutoring in STEM courses, which the university has expanded to other non-STEM disciplines. In addition, the program now reaches into a local school district to help prepare students for college with mentoring and support for students' learning, organization, and management of activities. VSU is currently working to evaluate the STAR program and learn about its effects on student outcomes.

Insights From Implementing and Scaling the STAR Program: The STAR program began in STEM courses and has since expanded to a broader range of disciplines, with program leadership interested in scaling the program to the entire university and facilitating a culture shift focused on mentoring and affective learning. During most summers since 2019, about ten faculty and staff participate in a twice-monthly cohort-based study of Dr. Saundra Y. McGuire's metacognition work,[11] incorporating strategies from McGuire's texts into course activities and then conducting their own research on the effectiveness of those strategies. As of this publication, more than 45 faculty and staff (with most staff participants coming from VSU's Academic Center for Excellence) have been engaged in this community of practice, and participants receive a monetary incentive provided through the grant funding. The program activities use a train-the-trainer model to prepare participants to lead portions of the program training in the future.

Faculty have sought out the program with renewed interest since the COVID-19 pandemic because the focus on metacognition seemed like a promising way to address concerns about lack of interaction and engagement in online courses, declines in student performance, and the ways life circumstances and challenges could interrupt students' academic progress. One faculty member noted that the program's emphasis on time management proved especially helpful when courses went online during COVID-19 and students were assuming more responsibility to plan their own time and balance their class demands alongside other academic and life demands. Another faculty member noted that after faculty in their department participated in the STAR program, faculty teaching both in-person and online courses across the department began to incorporate metacognition strategies before major exams so students could think about their understanding and preparedness when studying and to incorporate reflection after the exam so that students consider changes to student habits for next time (similar to the exam-wrapper strategy noted earlier in this report). The success of the STAR program has influenced administrators and initiatives across various VSU student services areas that are now also prioritizing support for metacognitive skills and student peer-mentoring opportunities.

CONCLUSION: FACILITATING SDL SUPPORT STRATEGIES

Our conversations with faculty, staff, and administrators at our nine partner institutions help to clarify the numerous successes and challenges of supporting student learning in online courses during COVID-19. While broad-access colleges and universities moved proactively to adapt to a nearly fully online environment through investments in technology hardware and software and professional development that they have continued to develop, they are still seeking to address persistent disparities in outcomes by course modality and by race, gender, age, and other student characteristics. The pandemic may have also supported a growing consensus among higher education institutions and their instructors and staff to provide more support for students' sense of belonging, mindsets, self-efficacy, and likelihood to seek help.

The Postsecondary Teaching with Technology Collaborative theorizes that our SDL framework could be a particularly useful resource for faculty to help students better manage their learning in online settings. Our analysis suggests institutions have multiple strengths that they can build upon to more intentionally and fully implement SDL supports across the institution, both inside and outside of classrooms. Institutions have built capacity for and increased attention to online learning, created increasingly robust professional development to support online course design and instruction, demonstrated greater awareness of and commitment to address students' nonacademic needs and drive equitable attainment, and have highly knowledgeable student services professionals and existing resources (typically at the institution level) dedicated to supporting facets of SDL. Moreover, SDL skill support, with its focus on sense of belonging and what it aims to catalyze, might help institutions operationalize their equity commitment. Innovative approaches to SDL support are occurring with and without technology (e.g., the geology faculty member's use of GoReact and the STAR program at VSU, respectively), suggesting that there are multiple points of entry into these types of support regardless of course modality and instructors' and students' sophistication with technology.

But it is challenging to facilitate a shift from a handful of individual instructors emphasizing a couple of SDL skills to more systemic efforts that normalize these types of supports in academic and student services divisions across institutions. Because people use many different terms and concepts to describe the skills emphasized in SDL, it can be difficult for the field to discuss and prioritize these skills collectively, identify practices that support students' development of them, and measure their effectiveness. Coupled with this ambiguity of language is limited rigorous evidence on the collective use of SDL skill supports in broad-access institutions. Furthermore,

there is a tendency to house the teaching of and support for SDL outside of traditional disciplinary courses, and there is some skepticism regarding SDL being the responsibility of faculty and belonging in content courses.

Creating incentives for individual and collective innovation is one way to highlight concrete examples of instructional practice, test their efficacy, and share effective practices within institutions and among faculty. It is also important for institutions to determine effective dissemination models (e.g., the train-the-trainer model used in VSU's STAR program) for scaling the use of effective practices across larger numbers of faculty. There could be more proactive ways to incorporate practices that support SDL skill development within LMSs and online course design templates and rubrics—which also offers opportunities for online learning staff, instructional designers, and faculty development staff to collaborate with faculty to support SDL skill development. While our research is focused on SDL support strategies in online courses, it is likely wise for higher education institutions pursuing such strategies to build alliances between faculty teaching online and faculty who are not currently teaching online to broaden the potential pool of contributors.

Our analysis points to three key recommendations for institutions:

1. ***Name and elevate SDL as an enabling factor for learning and college success.*** Articulating the importance of SDL in ways that are meaningful to stakeholders at the institution can create a vision for change.

2. ***Encourage sharing SDL expertise and skill support strategies across departments and divisions.*** Because of disconnects between student services and academic divisions, faculty may be unaware of available resources for supporting SDL. Creating opportunities for peer learning and sharing can help pockets of innovation to spread.

3. ***Offer professional learning opportunities for faculty to build their knowledge of SDL skills and to develop support strategies that are appropriate to their classroom context.*** These learning opportunities must make the case for why SDL skills are important to support explicitly in academic courses and should address concerns articulated by faculty, including lack of time in content-rich courses.

The Collaborative's upcoming plans include addressing each of these recommendations through various research and capacity-building activities all done in collaboration with faculty, staff, and administrators at our partner broad-access institutions. We are analyzing student perspectives and experiences to better understand students' needs, their use of institutional resources, and the extent to which resources are addressing these needs; testing instructional strategies through ongoing rapid-cycle experiments; and co-developing an instructional model and associated implementation resources.

ENDNOTES

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    S. S. Jaggars & D. Xu (2016), How do online course design features influence student performance? *Computers and Education, 95*, 270–284 (https://doi.org/10.1016/j.compedu.2016.01.014).

    H. Johnson & M. C. Mejia (2014), *Online learning and student outcomes in California's community colleges*, Public Policy Institute of California (https://www.ppic.org/content/pubs/report/R_514HJR.pdf).

2   A survey of college students whose courses suddenly shifted online at the onset of the COVID-19 pandemic illustrates these challenges, particularly for Black and Hispanic college students. In addition to the direct impacts of the pandemic on health and economic security, Hispanic and Black students, when compared to non-Hispanic White students, reported a greater number of barriers to figuring out how to access course help and finding ways to reduce the distractions and demands in their surrounding learning environments. B. Means & J. Neisler, with Langer Research Associates (2020), *Suddenly online: A national survey of undergraduates during the COVID-19 pandemic*, Digital Promise (https://www.everylearnereverywhere.org/resources/suddenly-online-national-undergraduate-survey/).

3   D. M. Rogers & K. Swan (2001, April 10–14), *An investigation of components in Corno and Mandinach's self-regulated learning model applied to internet navigation* [Paper presentation], Annual Meeting of the American Educational Research Association, Seattle, WA (https://eric.ed.gov/?id=ED453817).

    P. E. Williams & C. M. Hellman (2004), Differences in self-regulation for online learning between first- and second-generation college students, *Research in Higher Education, 45*(1), 71–82 (https://doi.org/10.1023/B:RIHE.0000010047.46814.78).

4   L. Yarnall, R. Griffiths, & H. Cheever (2023), *Teaching and designing online STEM courses to support self-directed learning skills*, SRI International (https://postseccollab.org/teaching-and-designing-online-stem-courses-to-support-sdl-skills/).

5   Other details about the survey data and findings will be shared in a forthcoming publication.

6   Yarnall et al. (2023), p. 3.

    As a research center, we have discussed at length what terminology to use, in the absence of a preexisting concept, to describe this collection of related processes that can support learning. Our use of "SDL skills" has some shortcomings, namely that "skills" can describe both the ability to do something and the ability to learn to do something and that mindsets like self-efficacy and sense of belonging are often regarded separately from learning skills. Additionally, the notion of self-direction can be interpreted as locating the responsibility for learning wholly in students, which is not our intent.

7   Yarnall et al. (2023), p. 5.

8   Ibid.

9   Yarnall et al. (2023), p. 6.

10 E. Wasserman, S. Bickerstaff, & N. Edgecombe (2024), *Self-directed learning skills: Supporting student learning in online STEM courses*, Postsecondary Teaching with Technology Collaborative (https://postseccollab.org/self-directed-learning-skills-strategies-to-support-student-learning-in-online-stem-courses/).

11 S. Y. McGuire, with S. McGuire (2015), *Teach students how to learn: Strategies you can incorporate into any course to improve student metacognition, study skills, and motivation*, Stylus Publishing.

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