

Faculty Learning Communities Facilitated the Rapid Pivot to Online Teaching and Learning

By Becky Talyn, Sara J. Callori, Karen Cerwin, Mike Chao, Kimberley R. Cousins, Carol Hood, Sally F. McGill, Anthony E. Metcalf, and Laura Woodney

Faculty learning communities (FLCs), established prepandemic to disseminate and discuss evidence-based teaching practices as part of an NSF-funded project, Investigating Student Success Using Evidence-Based Strategies-eXpanded (ISSUES-X), proved effective at facilitating learning during a pandemic. As our university made the decision to operate primarily online for the 2020–2021 academic year in response to COVID-19, the nine-facilitator ISSUES-X team supported faculty and their online teaching by offering weekly synchronous open-house video conferences and providing a one-week summer institute. The institute focused on applying principles of How People Learn (NRC, 1999) to the online environment, and intentionally modeled these pedagogical practices. Practices included: online approaches and tools to developing rapport with students; asynchronous reading and assignments sandwiched around synchronous active learning exercises over video conferencing; office hours and other support outside of regular meeting times; and routines for metacognitive reflection. Our pre-existing FLC structure allowed us to support many faculty during a time of crisis, illustrating the value of FLCs as a normative practice in academia.

Having an active community of practice (Wenger & Snyder, 2000), built upon faculty learning communities (FLCs), can have dividends when crisis strikes. California State University San Bernardino (CSUSB) transitioned from quarter to semester schedules beginning fall 2020. The timing of the COVID-19 pandemic resulted in winter quarter final exams and the entire spring quarter 2020 through summer session 2021 being primarily online. Faculty not only needed to become better prepared for emergency online instruction (Darby, 2019), they needed to do it for new semester courses. In the College of Natural Sciences (CNS), a key contributor to our ability to rapidly pivot to a virtual environment was the pre-

pandemic groundwork laid by the Investigating Student Success Using Evidence-Based Strategies-eXpanded project (ISSUES-X; Hood, 2017). One stated goal of the project is to institute cultural change among STEM faculty in their understanding of pedagogy and how people learn. Through FLCs that ISSUES-X supports, a community of practitioners emerged that had developed mutual rapport (Cox, 2004), as well as a fundamental understanding of evidence-based teaching practices (EBTPs) in STEM, and their importance in connecting with students (NRC, 2015). This community of both FLC facilitators and faculty participants had reached a critical mass in CNS. At the end of spring 2020, as the seriousness of the pandemic became clear

and prospects for fall 2020 looked bleak, the value of this human capital became apparent; STEM faculty interested in best practices for online learning provided a receptive audience, and administrators and department chairs provided support.

The ISSUES-X team had three major responses to the rapid pivot to meet the urgent need to support pandemic-mandated online teaching and learning across STEM disciplines and CNS departments:

1. We moved existing and planned FLCs online to maintain continuity for FLC participants and provide structured support for educators over the academic year. Existing FLCs from 2019–2020 moved online during spring 2020, and new FLCs (one for new CNS faculty, and one about culturally responsive teaching) began in academic year (AY) 2020–21, completely virtually. These FLCs, planned before shifting online, aimed to address long-term challenges associated with evidence-based teaching and learning. Online teaching was not their focus, but was modeled and discussed in response to participants' immediate needs and interests.
2. Virtual “Open House” weekly support sessions were held over Zoom every Friday. These one-hour, informal drop-in events were advertised to all instructors

within CNS and allowed faculty to hold informal discussions, share tips about online teaching, and use this space as unstructured time to chat with colleagues.

3. Summer 2020 online pedagogy institutes specifically designed to help faculty prepare for the fully online 2020–2021 academic year constituted the most substantial professional development effort in our response. We facilitated three one-week-long institutes that served as a crash course for effective online teaching.

All of our ISSUES-X FLCs, institutes, and other activities are grounded in research on how people learn, largely based on *How People Learn: Bridging Research and Practice* (NRC, 1999; referred to as “HPL I” henceforth) and *How People Learn II: Learners, Contexts, and Cultures* (NASEM, 2018; referred to as “HPL II” henceforth). We strategically decided that the principles of HPL I and HPL II should continue to guide our design of learning experiences whether face-to-face or online. Three findings identified in HPL I as critical when facilitating learning are (1) engaging learners’ prior knowledge, (2) sequencing to support integration of new content within a conceptual framework to facilitate retrieval and application, and (3) developing learners’ metacognitive skills to enable setting goals and monitoring their learning progress. Building upon this, HPL II addressed culture, context, and motivation, which impact learning.

Response to Covid-19 Virtual “open house” weekly support sessions

We initiated Friday support sessions for all CNS faculty and lecturers, not just those who had participated in FLCs, though our former FLC members dominated the attendees. These sessions were designed as safe spaces

where faculty could share both what was going wrong and what was going right. It was a place to get new ideas to try, get help solving issues that had arisen, and workshop ideas that could use improvement. Examples included how to incorporate new technologies, new ways of encouraging effective group work, and methods of building class community in the online environment. Additionally, these sessions allowed faculty to build community among themselves and turn an overwhelming challenge into a shared experience.

Summer online pedagogy institutes Overview

Our campus made a public decision by May 12, 2020, that most fall 2020 courses would be offered online (Edsource, 2020). This gave our ISSUES-X team time to find and organize content and prepare a weeklong professional development opportunity, offered three times to CNS faculty across departments, that focused on rapid redesign of courses for online STEM instruction. Our nine facilitators had little experience with online teaching before the pandemic. We had spent several previous years

facilitating FLCs about how people learn. Facilitators prepared for and guided discussions, but also could learn and grow themselves through the discussions. Using a wealth of short articles about online teaching that were widely circulated throughout higher education communities, we developed consensus about the most important topics as foci to prepare faculty to thoughtfully design compassionate and rigorous online learning experiences for Fall 2020 (for goals, see Table 1). Each institute met synchronously online for two hours on five consecutive mornings, with independent work expected each afternoon (Figure 1). Unlike much pandemic-motivated professional development, specific technology tools were modelled and embedded in the institute, but the tools were not the focus.

Content

Good online teaching is good teaching (Darby, 2019), and needs to be grounded in research-based principles of how people learn. As with face-to-face classes, effective learning occurs when we engage with our students’ prior knowledge, help them construct conceptual frameworks that integrate new and exist-

TABLE 1

Goals of our Summer Online Pedagogy Institutes.

#	Goal
1	Create a community of learners focused on designing online learning
2	Understand how learning goals are the same whether online or in-person
3	Introduce how people learn and apply it in an online environment
4	Understand the importance of trust and community building in online learning
5	Explore the balance and value of using synchronous and asynchronous activities
6	Discuss assessment (and academic integrity) for the online environment
7	Experience intentionally selected technology tools that can enhance online learning

ing knowledge, and provide opportunities for metacognitive reflection (NRC, 1999). Our summer institutes emphasized this sequence while introducing a two-step process that starts by building a conceptual flow for the whole course, then narrowing focus to create a storyboard for an individual lesson to practice appropriately balancing engaging prior knowledge, introducing new content, leading activities for processing and applying ideas, and prompting reflection and feedback. We chose to directly discuss the philosophy and rationale behind designing various types of learning experiences, while modeling tools to accomplish these goals online within the institute's activities (Table 2).

Our experience suggests that some aspects of HPL I and II are even more

important during online teaching than when teaching face-to-face, including building trust; attending carefully to sequencing; and maximizing use of synchronous time for active learning, modeling, and developing metacognitive skills.

1. When students trust their faculty and other students in a class, this creates a sense of community, which increases student engagement, as learning occurs most effectively in social contexts (Hammond, 2014). In face-to-face courses, some student–faculty and student–student trust building occurs automatically during in-class activities. Building trust and community in online courses requires more nurturing (Darby, 2020), yet students' need for

trusting relationships was even greater during the pandemic and because of the uncertainty created by social conditions at large (Davidson, 2017; Teaching Tolerance staff, 2020). In addition to introducing and modeling specific trust-building activities, we explored ways to incorporate trust-building into activities that engaged prior knowledge, built conceptual frameworks, and encouraged reflective feedback (Tucker, 2020).

2. Attention to the sequencing of concepts and organization of content is important and appreciated by students in all courses, and becomes even more important during online learning. Intentionally sequencing activities supports deeper learning by facilitating

FIGURE 1

Sequencing of content for the five-day summer institute held in 2020 in preparation for online teaching in fall 2020, shown as a slide used during the institute.

5 Day Agenda					
	Monday	Tuesday	Wednesday	Thursday	Friday
Big Ideas	Community of learners focused on designing distance learning				
	Organizing concepts and learning objectives for a course	Trust building in an online learning environment	Using asynchronous and synchronous activities to accomplish SLOs	Assessment and Academic Integrity	Bring it all together
Activities	Online teaching discussion, How people Learn I Conceptual flow	Share conceptual flows Community building Padlet Small group discussions with shared docs	Discussion groups Group list of learning tools Group google doc on learning process	Discussion groups	Small group discussions, individual reflection and feedback time



students to make connections between new content and their existing conceptual frameworks (Figure 1) and explicitly engaging students to examine relationships among concepts in the course.

3. Synchronous online time is precious (Groshell, 2020; Lieberman, 2020). These virtual class meetings provide opportunities for immediate interaction with and feedback from the instructor, and provide socially mediated learning. Maximizing use of synchronous time for those

learning experiences that most require synchronous engagement requires careful planning. Institute participants explored this by discussing the proportion of time students should spend exposing new content, processing content, application, and reflection/feedback during a course (Figure 2). We allocated synchronous time to components that students might not do on their own, require modeling, most benefit from interactivity, or benefit greatly from immediate feedback. We suggest that these include opportunities

to build trust, collectively process information, and help students develop strategies to monitor their learning. Components we can accomplish asynchronously include some trust building (e.g., through asynchronous sharing of videos students create to introduce themselves); introducing new content through recorded videos or assigned readings; and some types of student reflection, feedback, and assessment. This approach mimics a flipped classroom (Ozdamli & Asiksoy, 2016) in some ways, but need

TABLE 2
Practices and tools that were modeled.

Practices:	Modeled by:
Engage prior knowledge	Use “chat” function to probe participants’ existing knowledge about a topic, then refer to the existing knowledge as we present new concepts.
Present new content within the context of a conceptual framework	Explicitly discuss how online practices relate to How People Learn I, introduced on the first day of the institute.
Provide opportunities for metacognition	Ask participants frequently to reflect on how they use/could use principles of How People Learn I when teaching, then to share their thoughts in breakout rooms. Ask participants to reflect on what they “got” from each session and still “need” to be prepared to teach online. Collect responses using an online survey, review these after each session, and respond early in the next session.
Make careful, conscious choices about priorities for synchronous time	At the end of the session in which we introduce this content, show an outline of what we had done during the synchronous session and what we were asking them to do asynchronously. Point out how new content had been delivered mostly through asynchronous readings, followed by synchronous group activities to help process and reflect on content, and an assignment to apply the new content after the session.
Keep things organized	Provide a daily agenda with all of the links needed before (e.g., readings), during (e.g., slides, shared documents), and after the session (e.g., asynchronous activities expected after the session).
Building trust	All facilitators and participants create a short video introducing themselves prior to the first session, and view videos created by others. Start sessions with a prompt to facilitate casual conversation between participants. Develop (and revisit) community norms for behaviors that will facilitate a climate of trust. Provide participants opportunities to share in small groups their ideas about how to apply their new learning to their fall courses. Create a Slack group for each cohort to connect during and after the institute.
Synchronous engagement	Use shared documents to brainstorm ideas or respond to prompts in large and small groups (e.g., GoogleDocs, Jamboards). Use breakout rooms for small group discussions of specific prompts.
Asynchronous engagement	Provide online office hours for participants to drop into with questions or for help between sessions.

not be entirely flipped. Online or in-person, we must carefully ensure that the total time we expect students to spend on synchronous (in-class) and asynchronous (homework) activities combined is commensurate with the units for the course. Some of us had been using most of the synchronous time presenting new content, not explicitly providing opportunities for students to process the content. When using synchronous time for processing, we could not also expect them to watch recorded lectures asynchronously and complete the homework assignments we previously required. Otherwise, increased workload increased students' stress and dissatisfaction.

One aspect of online teaching that

may require the most modification involves approaches to assessing learning. While many faculty depend on synchronous, individual exams for summative assessment and determining course grades, this introduces ethical concerns in the online environment (Lederman, 2020; Smith Budhai, 2020). Students may engage in academic misconduct during any exam, and abundant opportunities to cheat online may overwhelm even normally conscientious students. Inequitable access to technology exacerbates the problem, and many of the technical approaches to reduce cheating may increase the inequity of exam-based assessment, for example, by requiring video cameras. Institute participants discussed alternative assessment methods, balancing honesty and equity with class size, workload, and student access. Summative assessments exemplifying alternatives

include multi-stage exams allowing group work after an initial individual attempt; student presentations, case studies, simulations, or problem solving submitted as written documents or presented synchronously or in prerecorded videos; and well-designed term projects, portfolios, and reflective journals (Harrison, 2020; Schreyer Institute, n.d.).

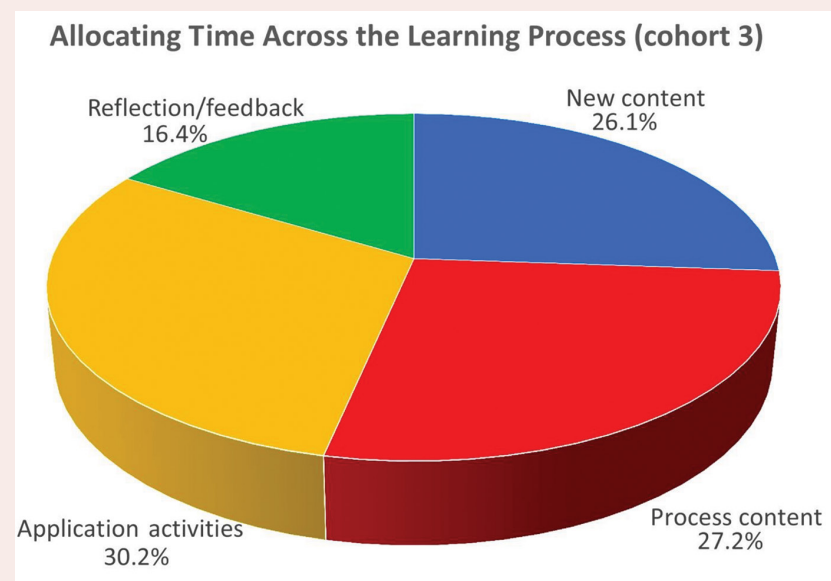
Modeling

Throughout the institute, we selected online tools that facilitated the same goals as face-to-face learning in HPL I and II. We used the chat function in our online synchronous platform to probe institute participants' existing knowledge of a topic and then, as we presented new content on that topic, explicitly connected it to the prior knowledge participants had shared. We explicitly situated presenting new content about teaching online within the conceptual framework of the principles of HPL I, which were introduced on the first day, and used live-edited shared files to provide opportunities to process information in a social context (e.g., GoogleDoc, Jamboard). We invited participants to reflect on their learning during the institute and their own teaching practices, and to share the fruits of their reflection in breakout room discussions. Near the end of sessions, we asked participants to reflect on ways we had modeled the principles of HPL that day, and sought anonymous feedback using a Google form. Asynchronous homework included posting videos (e.g., Padlet, GoReact) and participating in online group discussions (e.g., Slack, Teams) to build community, and reading about new content.

Using these technologies allowed us to integrate synchronous and asynchronous teaching moves to create a carefully planned learning experience that provided variety, short periods of input followed by group dialogue, and development of sense-making

FIGURE 2

One activity during the Summer 2020 Institute was to ask participants how much time they think should be allocated to each stage in the learning process. The percentages shown are the averages across participants, and indicate that our participants thought that approximately equal time should be allocated to introducing new content, processing content, and application activities, while reflection and feedback require less time.



products. Teaching the use of online tools was accomplished primarily by modeling, with effective pedagogy being the primary driver. We provided workshops and synchronous “office hours” to answer specific questions, as they arose, on implementing these technologies in STEM classes.

Outcomes

The Friday Open Houses and three summer workshops provided valuable support for faculty. All seven of our facilitators who are CSUSB faculty attended some sessions, ranging from five to 26 of the 30 sessions. Friday Open Houses were attended by 31 different faculty, most of whom attended multiple sessions, staying for more than five minutes of a session (up to the full hour), and a few attending over 20 sessions total (Figure 3a). Attendance was highest in spring 2020 and fall 2020; by spring 2021, as Zoom fatigue set in, attendance was down to a few participants per session (Figure 3b).

Our Summer Online Pedagogy Institutes were attended by 55 participants, in addition to all nine ISSUES-X facilitators. This represents about 20% of all CNS faculty for fall semester 2020. Of these participants, three were graduate teaching assistants, 13 were lecturers, and 37 were tenure-line faculty ranging from new assistant professors to seasoned full professors. Only 17 of the 55 attendees had previously participated in an ISSUES-X FLC. Participants and facilitators in our Summer Institutes taught 413 online course sections during the 2020–21 AY, enrolling a total of 12,588 students who benefited from their experiences (Table 3). Twenty-four of the summer participants also participated or have signed up to participate in subsequent FLCs.

Discussion

Pandemic-mandated campus closures began during the third year of our five-year ISSUES-X project. By that time, we had attained a critical

TABLE 3

Impact of Summer 2020 Institute. Shows number of online courses taught and number of students taught in online classes by the 55 participants and seven faculty facilitators from the three Summer Institute cohorts. Percentages shown compare the number of classes or students taught online by summer institute participants and facilitators with all CNS classes with online components.

Term	Number of online classes taught	Number of students taught
Fall 2020	198 (19.8%)	6001 (20.5%)
Winter 2021 (intersession)	7 (26.9%)	134 (32.4%)
Spring 2021	188 (20.1%)	5900 (22.6%)
Summer 2021	20 (16.9%)	553 (18.2%)
Total in 20–21 AY	413 (19.9%)	12,588 (21.4%)

mass of experienced facilitators and project expertise necessary to implement our Summer Institutes and Friday Open Houses, in addition to ongoing FLCs.

We approached the Summer Online Pedagogy Institutes as an opportunity to further build our community of practice (Wenger & Snyder, 2000) to prompt institutional change (Kezar, 2013), while being responsive to the needs of the community’s members (Wenger et al., 2002). While developing our summer institute curriculum, the team incorporated the same fundamental building blocks that we used in all our communities. First, the experiences were grounded on the principles of HPL, both in content and in workshop pedagogy. We strived to build trust within the summer workshop communities as we modelled a variety of active teaching and learning strategies that work in online courses. Each workshop participant was responsible for a “product” they could use during the subsequent semester, by developing a conceptual flow framework for a course, and sequencing for a lesson. Daily feedback and reflection by participants and facilitators helped build a robust and responsive experience.

Two of three overall goals of

the ISSUES-X project have been highlighted in our pandemic-season programming. First, the summer institutes and Friday Open Houses have “increase[d] the knowledge, understanding, and effective use of inclusive EBTPs and course-design among new and experienced, part-time and full-time faculty in the STEM disciplines” (Hood, 2017). Second, the pandemic-era demonstrated how we continue to “build the capacity and sustainability for offering faculty professional development that is responsive to our student population, student learning and assessment data, faculty needs and interest, and the institute’s evolving context” (Hood, 2017).

The successes of our approach are obvious from increased faculty participation. Many CNS faculty not previously engaged in ISSUES-X attended our Summer Institutes and Friday sessions. This participation uptick likely occurred for a variety of reasons: the shock of emergency online teaching during the spring quarter of 2020; anticipation of additional distance learning/teaching; and our long-planned calendar conversion from quarters to semesters. These circumstances provided significant

The Rapid Pivot to Online Teaching and Learning

motivation to faculty who were previously reluctant to examine or change their teaching approaches. Following the institutes, a significant portion of faculty participants continued with subsequent ISSUES-X activities, including longer FLCs.

Conclusions

- The ISSUES-X team at CSUSB was in the process of creating a Community of Practice to support evidence-based teaching and learning, primarily through FLCs, before the COVID-19 pandemic began. We were poised to respond to needs of CNS faculty by providing professional development experiences that facilitated the pandemic-mandated rapid pivot to online classes.
- Activities included moving ongoing and planned activities online; providing additional support to faculty through open, informal weekly sessions; and offering weeklong institutes to help faculty quickly move classes online.
- Our activities continued to em-

phasize principles of how people learn as the foundation of effective teaching, shifting specific methods to the online learning context.

- Elements of effective teaching that become more important online include organization and sequencing, building trust, and maximizing use of synchronous time.
- Concerns about fairness and equity in online exams may necessitate new thinking about summative assessment.
- Many CNS faculty participated in ISSUES-X pandemic-response activities, presumably because of a need for both pragmatic support in shifting to online teaching and for comaraderie and emotional support during this stressful time.
- Faculty participated in ISSUES-X activities at a higher rate after our pandemic-response workshops and support activities.

Acknowledgments

Financial support from the National Sci-

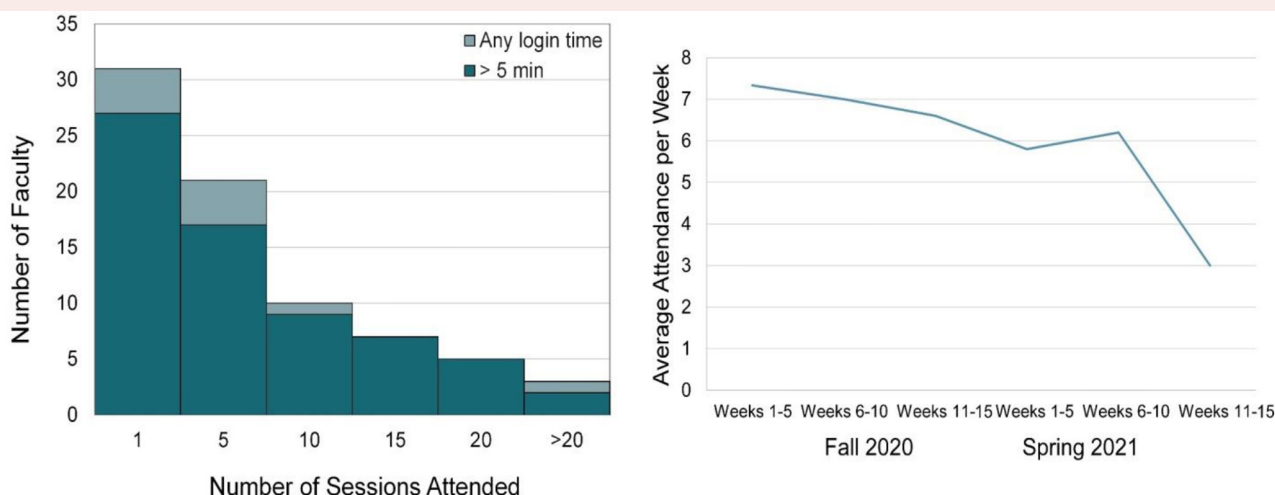
ence Foundation, NSF-DUE # 1727086 and the College of Natural Sciences at CSUSB are gratefully acknowledged. We also thank Dr. Kirsty Fleming, Associate Vice President for Academic Affairs at CSU Long Beach, and Dr. Kim Costino, Dean of Undergraduate Studies at CSU Dominguez Hills, who initiated the ISSUES-X project and guided our inception-year activities.

References

- Cox, M. D. (2004). Introduction to faculty learning communities. *New Directions for Teaching and Learning*, 2004(97), 5–23.
- Darby, F. (2019). How to be a better online teacher. *The Chronicle of Higher Education*, April 17, 2019. www.chronicle.com/article/how-to-be-a-better-online-teacher
- Darby, F. (2020). 5 ways to connect with online students. *The Chronicle of Higher Education*, June 26, 2020.
- Davidson, S. (2017). Trauma-informed practices for postsecondary education: A guide. *Education Northwest*. <https://educationnorthwest.org/sites/default/>

FIGURE 3

Attendance at weekly Friday Open House sessions. (a) Number of faculty who attended at least the given number of sessions at all (light blue) or for at least 5 minutes (dark blue). In total, 31 unique faculty attended. (b) Average number of faculty who attended each week by five-week blocks throughout the 2020–2021 academic year.



The Rapid Pivot to Online Teaching and Learning

- files/resources/trauma-informed-practices-postsecondary-508.pdf
- Edsource (2020). First in nation, California State University to close campuses for in-person instruction this fall. *Edsource*, May 12, 2020. <https://edsource.org/2020/california-state-university-classes-to-continue-mostly-online-in-fall/631381>
- Groshell, Z. (2020). The unproductive debate of synchronous vs. asynchronous learning. *Education Rickshaw*. March 30, 2020. <https://educationrickshaw.com/2020/03/30/the-unproductive-debate-of-synchronous-vs-asynchronous-learning>
- Hammond, Z. (2014). *Culturally responsive teaching and the brain: Promoting authentic engagement and rigor among culturally and linguistically diverse students*. Corwin Press.
- Harrison, D. (2020). Online education and authentic assessment. *Inside Higher Ed*. April 29, 2020. www.insidehighered.com/advice/2020/04/29/how-discourage-student-cheating-online-exams-opinion
- Hood, C. (PI) (2017). *Improving student success in STEM by improving faculty teaching, award abstract*, National Science Foundation # 1727086.
- Kezar A. (2013). Understanding sensemaking/sensegiving in transformational change processes from the bottom up. *Higher Education*, 65(6):761–80.
- Lederman, D. (2020). Best way to stop cheating in online courses? ‘Teach better.’ *Inside Higher Ed.*, July 22, 2020.
- Lieberman, M. (2020). Virtual education dilemma: Scheduled classroom instruction vs. anytime learning. *Education Week*, March 30, 2020. www.edweek.org/teaching-learning/virtual-education-dilemma-scheduled-classroom-instruction-vs-anytime-learning/2020/03
- National Research Council (NRC) (1999). *How people learn: Bridging research and practice*. National Academies Press.
- National Research Council (NRC) (2015). *Reaching students: What research says about effective instruction in undergraduate science and engineering*. National Academies Press.
- National Academies of Sciences, Engineering, and Medicine (NASEM) (2018). *How people learn II: Learners, contexts, and cultures*. National Academies Press.
- Ozdamli, F., & Asiksoy, G. (2016). Flipped classroom approach. *World Journal on Educational Technology: Current Issues*, 8(2), 98–105.
- Schreyer Institute (n.d.). *Types of online assessment*. Penn State University. <https://sites.psu.edu/onlineassessment/gather-evidence>
- Smith Budhai, S. (2020). Fourteen simple strategies to reduce cheating on online examinations. *Magna Publications*. May 11, 2020. <https://www.facultyfocus.com/articles/educational-assessment/fourteen-simple-strategies-to-reduce-cheating-on-online-examinations>
- Teaching Tolerance staff (2020). A trauma-informed approach to teaching through Coronavirus. *Learning for Justice Magazine*, March 23, 2020. www.learningforjustice.org/magazine/a-trauma-informed-approach-to-teaching-through-coronavirus
- Tucker, C. (2020, May 4). *7 strategies designed to increase student engagement in synchronous online discussions using video conferencing*. <https://catlintucker.com/2020/05/7-strategies-to-engage-students-in-synchronous-online-discussions>
- Wenger, E. C., & Snyder, W. M. (2000). Communities of practice: The organizational frontier. *Harvard Business Review*, 78(1), 139–146.
- Wenger, E., McDermott, R. A., & Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Harvard Business Press.

Becky Talyn (btalyn@csusb.edu) is a lecturer in the Department of Biology and College of Natural Sciences at California State University San Bernardino (CSUSB). **Sara J. Callori** is an associate professor in the Department of Physics at CSUSB. **Karen Cerwin** is regional director, STEM Division, at WestEd in San Francisco, California. **Mike Chao** is a professor and chair in the Department of Biology at CSUSB. **Kimberley R. Cousins** is a professor and chair in the Department of Chemistry and Biochemistry at CSUSB. **Carol Hood** is a professor in the Department of Physics at CSUSB. **Sally F. McGill** is associate dean of the College of Natural Sciences at CSUSB. **Anthony E. Metcalf** is a professor in the Department of Biology at CSUSB. **Laura Woodney** is a professor in the Department of Physics at CSUSB.
