Two Stories to Tell: Racial Equity and the Impact of Different Instructor Adaptations to COVID-19

Quentin C. Sedlacek
Southern Methodist University

Lily Amador
Emily Beasley
Krysta Malech
Viviana Vigil
California State University, Monterey Bay

Heather Haeger
Corin V. Gray
University of Arizona

Corin D. Slown
California State University, Monterey Bay

Abstract
During the COVID-19 pandemic, college faculty took many different actions to support student success during the transition to online instruction. However, the conclusions we draw about the *impact* of these adaptations and their implications for racial equity may vary depending on the outcome measures we examine. We explore this possibility through a mixed-methods study of 10 courses taught at a Hispanic-Serving Institution in the United States in Spring 2020. First, using qualitative analytical methods, we identify five types of instructional adaptations students noticed their instructors made early in the pandemic. Second, we use quantitative methods to uncover associations between these instructional adaptations and several student- and course-level outcome variables. While all five instructional adaptations were perceived as beneficial by students, only two—*ensuring access to class resources* and *ensuring access to instructor time*—were significantly correlated with racially marginalized students' self-reported motivational and personal gains from their coursework. None of the adaptations were significantly associated with more equitable course outcomes, however. We discuss the implications of these findings and the differing narratives they imply for researchers, practitioners, and policymakers.

How did instructors adapt their course policies and teaching practices as they moved online during the COVID-19 pandemic, and how did these adaptations relate to student outcomes? In this manuscript, we explore this question in the specific context of a Hispanic-Serving Institution (HSI) in the western United States. We illustrate how different outcome measures and different units of analysis can lead us to draw novel—and, in some cases, contradictory—conclusions about the impact of instructors' adaptations to their courses.

We first provide a brief overview of the importance of HSIs for advancing educational equity and the role research can play in advancing equity, particularly in the wake of a global pandemic. We then examine the important and sometimes conflicting stories that research has already told us about equity and online learning during the pandemic, both across the world and in the specific context of HSIs in the United States. Finally, we report on the current study and its implications for future teaching, research, and policymaking.

Contextualizing Hispanic-Serving Institutions

The United States has a long and ongoing history of systemic racism and discrimination against People of Color, including Hispanic or Latinx Americans (Gonzalez, 2011). Hispanic or Latinx Americans have historically faced marginalized in higher education, though many have fought this marginalization and worked to reform and diversify academia (MacDonald & García, 2003). Hundreds of U.S. colleges and universities are now designated as *Hispanic-Serving Institutions* (HSIs), meaning that at least 25% of enrolled students identify as Hispanic or Latinx (Fosnacht & Nailos, 2016). Such institutions serve approximately one-third of all Hispanic undergraduates in the U.S., and thus play a crucial role in advancing educational equity.

HSIs have crucial differences from other U.S. institutions that serve marginalized racial groups (e.g., Historically Black Colleges and Universities) or nationalities (e.g., Tribal Colleges). Most HSIs were not founded with the explicit *mission* of serving Hispanic or Latinx students (Garcia & Ramirez, 2018). Since HSIs have been defined by the *numbers* of Hispanic or Latinx students enrolled, many are institutions which *became* HSIs sometime after their founding. Therefore, these institutions were not necessarily created with Hispanic or Latinx students' needs in mind. Franco and Hernández (2018) argue that HSI faculty and staff must work to identify and collect data that could enable them to understand how specific courses, policies, or practices are succeeding or failing at serving Hispanic and Latinx students.

Understanding how HSI course policies and teaching practices succeed or fail at serving Hispanic and Latinx students took on renewed urgency[1] during the recent coronavirus pandemic. During the pandemic, many colleges—including HSIs—moved from in-person instruction to online instruction for an extended period, and students at many institutions disliked online instruction and reported facing a variety of technical and non-technical challenges (Gonzalez-Ramirez et al., 2021). These challenges may have disproportionately harmed students who were already marginalized in higher education and/or those who had only limited access to technology needed for online learning (Katz et al., 2021; Means & Neisler, 2021). Since HSIs are defined based on enrollment and not on specific policies or pedagogical practices, it is logistically difficult to make empirical claims that apply to *all* HSIs (Fosnacht & Nailos, 2016); however, Bell et al. (2021) recently found evidence to suggest that the "digital divide [in student access to technology and internet during COVID-19] may be more prevalent at HSIs than at previously

---

[1] This need has been present throughout the history of higher education in the United States, even if it historically went largely unacknowledged by White-dominated institutions and power structures (MacDonald & García, 2003).

studied institutions" (p. 115). Furthermore, in the academic years just prior to the pandemic, Cottrell (2021) used propensity score matching to compare HSI student outcomes in online and face-to-face courses and found comparable grades but higher withdrawal rates in online classes.

Given these challenges and the important role HSIs play in advancing educational equity, it is imperative to understand how the shift to online instruction played out in the specific context of HSIs. Our study sought to go beyond documenting existing inequities to ask what policies and practices best supported HSI students (including, but not limited to, Hispanic and Latinx students) during the pandemic.

Telling stories about pandemic teaching and learning

To deal with pandemic challenges, many instructors across the world made changes to their teaching practices to address students' online learning needs. A survey of faculty and administrators from over 600 U.S. colleges and universities found that nearly half of faculty lowered the volume of work expected from students during the early months of the pandemic (Johnson et al., 2020). Many faculty reported other changes as well, such as moving course content online, using Zoom to meet with classes, and changing or lowering expectations about the type or quality of work students should do (2020). On the other hand, faculty *themselves* sometimes reported devoting considerably *more* time than usual to their work—both extra time devoted to learning new technologies and extra time devoted to interacting with students. For example, in a mixed-methods study of Malaysian faculty's responses to the pandemic, Badiozaman (2021) reported that faculty were working 12- or 15-hour days and weekends to master new technological tools and create online media and materials for students; furthermore, "communication with students...became constant" for many faculty (p. 12). These extraordinary time commitments might have been a powerful support for student success during the crisis; at the same time, they may also have been a major source of stress and burnout for faculty (see, for example, Arrona-Palacios et al., 2022).

Moving forward, we can expect ongoing debates and controversies over the proper "lessons learned" from the shift to online instruction, both at HSIs and in higher education more broadly. Research involves telling stories with data (Alexander, 2022), and such stories are presently in high demand. Indeed, one of the top needs that became apparent early in the pandemic—reported by over half of faculty and nearly two-thirds of administrators—was a demand for information on how best to support students' remote learning (Johnson et al., 2020).

Researchers and policymakers will likely examine the different ways in which college faculty members adapted their instruction and use these data to advance competing visions for the future of higher education. Neoliberal perspectives might focus on identifying the efforts that were most cost-effective from an institutional standpoint and capitalizing on these efforts—for example, by preserving asynchronous course materials created during the pandemic and gradually replacing full-time faculty with adjuncts who administer these courses but receive lower pay and benefits (Le Grange, 2020; Orleck, 2021). In contrast, more critical perspectives might focus on the working conditions and constraints that made student-supporting actions feasible or infeasible for higher education faculty. For example, the time and resources available to adjunct faculty to adapt their instruction may have been, on average, very limited compared to faculty with permanent positions (Leathwood & Read, 2020). This latter framing of the issue may encourage solutions that involve *decreasing*, rather than increasing, the ratio of students to full-time faculty in higher education.

The challenge of quantifying equity during a pandemic

How did instructors' adaptations in response to the pandemic advance educational equity[2] or exacerbate inequities? Unfortunately, this question is challenging to answer. One common measure of educational equity, the "achievement gap" or "equity gap" in course grades, was particularly difficult to measure in college courses during the pandemic because educational disruptions often resulted in substantial changes to both teaching and assessment practices (Means & Neisler, 2020). Such changes may have introduced greater-than-normal sources of variability and error into course assessments. For example, Zuckerman and colleagues (2021) examined biology course grades at a large doctoral-granting institution and found that racial equity gaps *decreased* between Fall 2019 and Spring 2020. At the same time, the authors paradoxically found that students also reported *fewer* opportunities to discuss course content with their peers (a practice often associated with reduced equity gaps; see Theobald et al., 2019).

Zuckerman et al. argued that their finding was likely an artifact of flexible course policies and grading practices implemented in response to the pandemic: if all students tended to receive higher grades than they might have received in a pre-pandemic environment, ceiling effects would have resulted in reduced equity gaps. For some readers, this may raise the question of whether equity gaps were "really" reduced. If traditional course policies and grading practices are assumed to be a valid proxy for student learning, then changing such practices may result in a less accurate measure of learning outcomes, and reduced equity gaps in one course may simply hide disparities in student learning that could re-emerge in future courses. However, some scholars argue that traditional course policies and grading practices are relatively poor proxies for student learning, since they often include measures of student attendance, participation, or other non-cognitive outcomes (Feldman, 2018). In fact, the grades generated in courses with more flexible, pandemic-driven policies (e.g., where attendance was no longer graded) could conceivably be *better* proxies for student learning compared with pre-pandemic grades. Importantly, the very technological tools that were sometimes used to establish assessment validity (e.g., by surveilling students to prevent cheating) may themselves have contributed to equity gaps by directly or indirectly harming the performance of students with limited internet connectivity (Morris et al., 2021; Petillion & McNeil, 2020).

In this complex information landscape, we argue that it is crucial to attend to multiple data sources to examine the impact of instructors' actions during these difficult days— particularly at HSIs, given the crucial role these institutions play in serving Hispanic and Latinx students. We must attend to both institutional data (e.g., equity gaps based on course grades) and to students' *own* perspectives on pandemic instruction.

Student perspectives on online learning during the pandemic

Researchers are already telling important stories about how instructors adapted their courses to online modalities and how students perceived these adaptations. In a survey of a nationally representative sample of U.S. college students, Means and Neisler (2021) found that certain practices (drawn from a list of recommended best practices for online instruction) were

---

[2] Equity has multiple definitions and dimensions. For example, some educators and researchers define equity as equal access to resources or equal educational achievement, while others argue that equity also requires attention to identity and power (Gutierrez, 2012). We argue that all of these definitions are valid and important; in the present manuscript, however, we conceptualize equity primarily in terms of achievement (which we in turn operationalize through course grades).

strongly associated with student satisfaction, even among historically marginalized student populations. These included personal messages from faculty to students about their progress in the course and the use of activities that prompted student reflection on their learning.

Pagoto and colleagues (2021) explored student perceptions of instructional adaptations across multiple institutions using focus group methods. They found that some adaptations were often seen as ineffective (e.g., prerecorded lectures) while others were often seen as effective (e.g., instructor flexibility and instructor accessibility, as well as providing students with access to extra tools and resources). On the other hand, an open-ended survey of community college students by Prokes and Housel (2021) suggested that instructor flexibility, instructor accessibility, *and* prerecorded lectures were all seen as helpful by students.

Online learning at HSIs during the pandemic

Numerous studies have already examined the challenges HSI students faced during their transition to online learning (e.g., Black et al., 2020), and some have examined the strategies or technologies that HSI instructors used to support students during this transition (e.g., Davila-Diaz, 2022; Morales-Cruz et al., 2021). Shapiro and colleagues (2020) did both, asking students to share the challenges they faced and asking instructors to share steps they took to mitigate such challenges.

However, few studies have *paired* these analyses to examine how specific instructional adaptations contributed to specific positive outcomes for students. One important exception is Mshigeni et al. (2022), who showed that students at one HSI slightly preferred synchronous course meetings over asynchronous course meetings but felt both were inferior to in-person instruction. Students also identified frequent communication from instructors as an important recommendation for future online learning. Another important exception is the work of Vielma and Brey (2021), who surveyed engineering students in a large HSI and asked an open-ended question about "what aspect of the online course content [students felt] was the most effective," (p. 140). Qualitative analyses of their data showed that the two most common responses were "Faculty availability (office hours, responsiveness)" and "Recorded lectures," (p. 140), both of which were mentioned by at least 50 of the 352 respondents in their survey.

Vielma and Brey also asked students to offer suggestions for how to improve online course delivery in the future. Response rates for this question were far lower (no single suggestion was named by more than 5% of respondents) but included intriguing suggestions, including better-quality online resources, expressions of faculty empathy and compassion for students, more effective communication, and more one-on-one access to instructors through virtual office hours.

However, most students who completed this survey were describing instructional adaptations they had seen across multiple courses (an average of 2.1 courses per student), meaning it was not possible to match these data with course-level outcome variables. In our study, we build upon this prior research by examining how instructional adaptations at HSIs were associated with both student-level and course-level outcomes. Using multiple data sources with different units of analysis may enable us to triangulate stronger conclusions about online learning during the pandemic; just as importantly, it can tell us which conclusions *fail* to triangulate. In our study, we found that different sources of data told contradictory stories about how these adaptations did or did not advance educational equity.

The present study

      California State University, Monterey Bay (CSUMB) was uniquely positioned to help address some of these questions. The university has an ongoing faculty development program to support a major curricular reform—specifically, the implementation of course-based undergraduate research experiences across the sciences and humanities. Every semester, faculty and staff collaborate to conduct surveys of student experiences in courses where these curricular changes have recently been implemented, or in courses where such changes are planned for an upcoming semester. In Spring 2020, we used this existing data collection architecture to examine student perceptions of faculty members' instructional adaptations in the early months of the pandemic. Using a dataset from 10 different courses across the biological, physical, and social sciences as well as the humanities, we asked:

1. What types of instructional adaptations did students notice in their courses?
2. At the student level, which instructional adaptations were positively associated with self-reported motivational gains and other affective outcomes?
3. At the course level, which instructional adaptations were negatively associated with "equity gaps" in an institutionally reported learning outcome (course grades)?

      By answering these questions, we can begin to understand how different outcome metrics and different units of analysis might lead us to tell different stories with different implications for higher education policy and practice.

Methods

      We used mixed methods to investigate our research questions, conducting a qualitative content analysis to answer research question #1 and quantitative correlational analyses to answer questions #2 and #3. Using qualitative methods enabled us to identify unexpected or unforeseen categories of instructional adaptations as perceived by students; for instance, we did not initially expect a category of "demonstrated patience" to emerge from the data, yet this category became apparent during our analyses. Meanwhile, using quantitative methods enabled us to add to previous literature by specifically relating qualitatively derived categories to quantitative student outcome measures. In doing so, we were able to look for effects and patterns that might be missed in purely qualitative or purely quantitative studies.

      Some researchers have enlisted undergraduate students themselves in conducting research on student perspectives during COVID-19. For example, Barber et al. (2021) enlisted students in designing a survey to generate data about their peers' experiences during the pandemic. Such an approach is invaluable because it can generate original questions and novel insights that might be overlooked by researchers who approach the study from a different standpoint (Harding, 1992). In our study, half of the research team were undergraduate researchers while the remaining half were university staff or faculty.

Context

      Participants were undergraduate students at CSUMB, a midsize public four-year Hispanic Serving Institution in the western United States. The institution serves over 6,000 undergraduates and approximately 43% are residents of the tri-county area surrounding the university campus. During the Spring 2020 semester, approximately 53% of undergraduates were first-generation

college students. Approximately 44% identified as Hispanic or Latinx and approximately 29% as Non-Hispanic White, while an additional 4% identified as African American, 8% as Asian American, 1% as Native American or Alaska Native, 1% as Native Hawaiian or Pacific Islander, and 8% as Multiracial. Nearly one-third of CSUMB undergraduates came from low-income families (CSUMB IAR, 2020).

This project was conducted under research protocol CPHS 21-052-K122. As mentioned above, pre- and post-course surveys are regularly conducted with students in many CSUMB courses that have recently undergone curricular reforms, or in courses where such reforms are planned for future semesters. Students provide informed consent during the administration of these surveys. The pre-course survey collects a small amount of demographic information and baseline information about students' career goals; the post-course survey is more extensive and collects information about student experiences in (and perceived outcomes of) coursework. In Spring 2020, an open-ended question was added at the beginning of the post-course survey to elicit students' perceptions of the ways instructors adapted their teaching practices in response to the COVID-19 pandemic. Our analysis focuses on this post-course survey data.

The survey was administered to students via email or during synchronous online course meetings between April 20 and May 20, 2020. A total of 452 students started the survey, and there were 308 complete or mostly complete[3] responses attributed to 19 different courses.

As we were interested in understanding potential variation across different courses, we chose to conduct quantitative analyses using only the responses from courses with at least 10 complete or mostly complete responses. Ultimately, we analyzed 274 responses from students in 10 different courses, out of a total of 686 students enrolled in these courses (thus our survey response rate was 40%). Most of these courses had already undergone curricular reforms converting them into course-based undergraduate research experiences, or CUREs. However, a few were courses where instructors *intended* to implement CUREs during the following academic year. To preserve instructors' confidentiality, we aggregated responses by disciplinary area in our analysis: three Social Sciences and Humanities courses, four Biological Sciences courses, and three Math and Physical Sciences courses. Course enrollment numbers and survey response rates for each disciplinary area by student ethnicity and by combined racial/ethnic identity are shown in Table 1.

We also asked students about demographic data such as Hispanic ethnicity and racial identity. In addition to comparing Hispanic and non-Hispanic student outcomes, we were interested in outcomes among the broader category of all students with historically marginalized racial identities. However, we elected not to use the category "underrepresented minority" because these students are, in fact, a majority in many higher education settings (including our own). We also wished to avoid this term because it typically excludes Asian American students, implicitly contributing to a so-called "model minority myth" while obscuring unique forms of racism faced by Asian American students and considerable heterogeneity in college enrollment and outcomes among students of various Asian ethnicities and nationalities (Museus & Kiang, 2009).

Instead, we used the category "Students of Color" to denote all students who are likely to have experienced inequities caused by systemic racism or colonialism. For this reason, we combined data on racial and ethnic identity, categorizing survey respondents as Students of

---

[3] Mostly-complete responses were those that did not complete the entire survey but did answer all ten questions about motivational gains and personal gains, the two student-level outcome variables we consider in this study.

Color if they identified as Native American[4] or Alaska Native, Asian, Black, or African American, Native Hawaiian or Pacific Islander, Multi-racial, or any other identity other than White, *and/or* if they identified as Hispanic. Thus, in our analyses the category "Students of Color" always includes all self-identified Hispanic students, even those who self-identified their racial identity as White.

We recognize the complexity of Hispanic or Latinx ethnicity and the diverse *Latinidades* encompassed by this label (Aparicio, 2017; Román et al., 2022), including but not limited to Afro-Latinx, Indigenous, Multi-racial, and White identities as well as dozens of ethnicities and nationalities (Blackwell, 2017; Dowling, 2017; Hernández, 2017). We do not wish to elide or obscure this diversity. We merely use the combined "Students of Color" category to indicate that, in our analysis, we are interested in equity gaps between *students who are typically disadvantaged by any mechanism(s) of systemic racism* in comparison to *students who are typically privileged by systemic racism*. All students who were not classified as "Students of Color" will be referred to as "non-Hispanic White students" throughout the remainder of this manuscript. Students who were missing *both* racial identity *and* ethnic identity data were excluded from our analyses.

---

[4] We also acknowledge that using terms such as Native American, Alaska Native, or Native Hawaiian to describe *racial* categories rather than membership in indigenous *nations* is problematic. Racialized concepts of indigeneity and "blood quantum" have historically formed an important part of colonizers' efforts to steal indigenous land and deny indigenous sovereignty, although some indigenous nations have also historically used these concepts to protect their land and resources from further unjust expropriation (Teves et al., 2015).

Table 1

Student Demographic Data by Discipline (Course Enrollees versus Survey Respondents)

		Ethnicity			Combined Racial/Ethnic Identity		
	N	Hispanic	Non-Hispanic	Ethnicity Missing	Students of Color*	Non-Hispanic White	Race and Ethnicity Missing
Social Sciences / Humanities (3 courses)							
Course Enrollments	182	50%	39%	11%	65%	24%	11%
Survey (55% response)	101	63%	35%	2%	79%	21%	0%
Biological Sciences (4 courses)							
Course Enrollments	260	36%	53%	11%	52%	37%	11%
Survey (47% response)	122	42%	56%	3%	59%	39%	3%
Math / Physical Sciences (3 courses)							
Course Enrollments	244	39%	49%	11%	56%	32%	11%
Survey (21% response)	51	35%	55%	10%	71%	20%	10%
Total (10 courses)							
Course Enrollments	686	43%	45%	12%	59%	28%	12%
Survey (40% response)	274	48%	48%	4%	69%	29%	3%

* Includes students who self-identified as Asian, Black, or African American, Native Hawaiian or Pacific Islander, Native American or Alaska Native, Multi-racial, and all others who did not identify as White students, as well as all students who self-identified their ethnicity as Hispanic.

Compared to the CSUMB student body, course enrollment data showed that Hispanic students were slightly over-represented in our Social Sciences and Humanities courses and slightly under-represented in our Math and Physical Sciences courses. Students of Color were slightly under-represented in both our Biological Sciences courses and our Math and Physical Sciences courses compared to the CSUMB student body as a whole.

Survey response rates were far higher in Social Sciences and Humanities courses (55%) and in Biological Sciences courses (47%) than in Math and Physical Sciences courses (21%). Ninety-six percent of survey respondents self-identified their ethnicity (as either Hispanic or Non-Hispanic) while only 87% self-identified a racial identity. Most students who answered the ethnicity question but not the race question identified their ethnicity as Hispanic; this pattern is unsurprising, since previous survey studies have found that separating questions about Hispanic or Latinx ethnicity from questions about racial identity tends to increase non-response rates to racial identity questions among persons who identify as Hispanic or Latinx (see for example Hirschman et al., 2000). In our study, since we categorized self-identified Hispanic students as Students of Color in our racial equity gap analyses, data on the combined racial/ethnic identity variable was available for 97% of all respondents.

Hispanic students, and Students of Color in general, were disproportionately likely to complete the survey in Social Sciences and Humanities courses but were slightly less likely than their Non-Hispanic White peers to complete the survey in Biological Sciences and Math and Physical Sciences courses.

Instructional adaptations

To answer research question #1, regarding the type(s) of instructional adaptations noticed by students, the following open-ended item was added to the Spring 2020 administration of our survey:

> We know that this has been a difficult semester for everyone given the ongoing public health crisis. We are interested in learning what actions your instructor(s) took to help support you and your peers during this time, and how helpful you felt these actions were.
>
> In the spaces below, please list any action(s) which your instructor took to support you **DURING THE TRANSITION TO ONLINE INSTRUCTION (before and during Spring Break).** You can list up to 5 actions. Please list each action on a separate line.

An additional item was included immediately thereafter, replacing the phrase "DURING THE TRANSITION TO ONLINE INSTRUCTION (before and during Spring Break)" with the phrase "AFTER THE TRANSITION TO ONLINE INSTRUCTION (after Spring Break)." Thus, participants were prompted to list up to 10 different adaptations their instructors had enacted. On average, each participant listed about three adaptations.

To identify the types of instructional adaptations students reported, open-ended responses were coded by the authors using an inductive approach to conventional content analysis (Carley, 1993; Hsieh & Shannon, 2005). We used this method (as opposed to alternative methods such as grounded theory) because we were interested in categorizing the data rather than engaging in comprehensive theory-building (Cho & Lee, 2014). Initially, four members of the research team were each given the set of all statements (23 text strings) submitted by the first five survey respondents. At this stage, these research team members did not have access to other attributes of the data such as the identity of the course that produced the data, participant-level demographic variables, or the helpfulness ratings participants had associated with each of the text strings. Research team members independently developed in vivo codes to summarize these responses (Saldaña, 2012), identifying broader themes which linked similar responses. A fifth member of the research team reviewed these themes and integrated them into a single codebook, which the full research team discussed and revised. This codebook is shown in Table 2.

Table 2

Types of Instructional Adaptations Reported by Students

Adaptation	Definition	Example #1	Example #2
Ensured access to class resources	The instructor took actions that increased student access to class resources, e.g., by sending the class extra instructional videos or online resources or showing students how to use tech tools such as Zoom.	Made videos on Youtube lecturing the different chapters we were learning that week.	making content for the course easily accessible
Ensured access to instructor time	The instructor took actions that increased student access to the instructor, e.g., by providing extra office hours or by providing unstructured time after class Zoom meetings for students to speak with their professor.	She would always stay after class to answer any questions we had.	Held Zoom Office Hours
Ensured communication	The instructor took actions that increased their overall communication with students, e.g., by sending frequent or regular email updates.	weekly email updates	keep in touch
Demonstrated flexibility	The instructor took actions to change course requirements, e.g., by postponing deadlines or allowing alternative format(s) for an assignment. Also includes any action the student calls "flexible," e.g., flexible meeting times.	He took the time and allowed an extension on a paper I was really struggling on.	offering extra time to finish assignments for those struggling with mental health issues
Demonstrated patience	Students perceived their instructor as "patient," "compassionate," "considerate," "empathetic," "understanding," or "wanting to understand" what students were experiencing.	Being understanding of our situations	be understanding
Other adaptations	The instructor took actions that did not fall clearly into any of the other five categories of adaptations.	following her gut for the interest of her students' sanity	Surveys to see how we were doing

Next, three members of the research team coded all text strings submitted by all respondents to the survey, including respondents who did not complete most of the survey but who answered the question about instructor responses to COVID-19. Some responses received more than one code. Finally, all coding was reviewed and discussed by at least two members of the research team to resolve disagreements.

Next, we created categorical variables at the level of the individual student to signify whether a student reported *any* instructional adaptations of a particular type. Thus, if a student

listed three instances of *ensured communication* and two instances of *demonstrated patience*, for a total of five adaptations altogether, they would receive a rating of 1 for the categorical variables *ensured communication* and *demonstrated patience* and a rating of 0 for the categorical variables *ensured access to class resources, ensured access to instructor time, demonstrated flexibility*, and *other adaptations*.

Course outcomes

Students' perceptions of motivational gains in their coursework were measured using a set of items adapted from the Science Motivation Questionnaire II (SMQ II) (Glynn et al., 2011). The term "science" was replaced in each item with the names of the department offering the relevant course. Responses used a five-point, single-construct Likert-type scale ranging from "not more likely" to "extremely more likely."

> Compared to BEFORE doing research in this course, HOW LIKELY ARE YOU NOW to agree with the statement:
> 1. Learning [Biology, Mathematics, etc.] is interesting.
> 2. I am curious about new developments in [Biology, Mathematics, etc.]
> 3. Learning about [Biology, Mathematics, etc.] is relevant to my life.
> 4. Learning about [Biology, Mathematics, etc.] makes my life more meaningful.
> 5. Learning about [Biology, Mathematics, etc.] will help me get a good job.

Self-reported personal gains, which students derived from the courses, were measured using slightly modified items from the Undergraduate Research Student Self-Assessment (URSSA) (Weston & Laursen, 2015). The URSSA is a measure of self-reported student gains in several domains; we focused on the domain of *personal gains*, which includes five items such as "confidence in my ability to contribute to science," "ability to work independently," and "confidence in my ability to do well in future science courses," rated on a five-point Likert-type scale from 1 ("No gain") to 5 ("Great gain"). We adapted these items by substituting the name of the department in which each CURE was offered, e.g., "confidence in my ability to contribute to the discipline of [Biology, Mathematics, etc.]."

We did not have access to grade data for individual survey respondents. However, we did have access to course-level institutional data that included average course grades and equity gaps. Since instructors widely reported changing their course expectations for students in response to the pandemic (Johnson et al., 2020; Zuckerman et al., 2021), we decided not to directly compare average course grades from Spring 2020 with grade data from previous semesters. Instead, we examined various equity gaps in Spring 2020 and compared these with previous semesters—asking not whether learning outcomes were *higher or lower* than in previous terms, but whether they were *more or less equitable* than in previous terms. We also chose to compare Spring 2020 to previous *Spring* semesters—Spring 2019 and Spring 2018— because several of these courses have historically been offered in Spring but not Fall semesters.

Equity gaps were computed by subtracting the mean course GPA (on a four-point scale) of an historically marginalized category of students from the mean course GPA of an historically relatively privileged comparison category. For example, if Non-Hispanic White students in a given course had an average final grade of 3.7 and Students of Color in the same course had an average final grade of 3.5, the equity gap between these two categories of students would be +0.2. This meant that equity gaps could also be negative; for instance, if non-Hispanic students

in a course had an average final grade of 3.2, and Hispanic students in the same course had an average final grade of 3.35, the equity gap between these two categories would be -0.15.

Given the widespread use of credit/no credit grading at many institutions during the first semester of the COVID-19 pandemic, it is possible that equity gaps may have been affected by students who elected to take courses credit/no credit rather than being assigned a letter grade that would factor into their GPA. We tested this possibility and found the proportion of students who elected a credit/no credit option was relatively low: on average, only 15% of the students in these 10 courses chose this option. This ratio was relatively consistent across disciplines: letter grades were ultimately awarded to 88% of students in the three Social Sciences or Humanities courses in our study, 82% of students in the four Biological Sciences courses, and 86% of students in the three Math or Physical Sciences courses. However, in the previous Spring 2018 and Spring 2019 offerings of these classes, 100% of students in all 10 courses had taken these courses for a letter grade. The increased use of credit/no credit grading is thus an important limitation of our equity gap analysis. Given the low number of courses (n = 10), we elected to share median, minimum, and maximum values for course-level outcomes rather than mean values.

Findings

Table 3 shows the proportion of survey respondents who reported each type of instructional adaptation, disaggregated by ethnicity (Hispanic vs. Non-Hispanic) and by combined racial/ethnic identity (Students of Color vs. Non-Hispanic White students). Table 3 also shows the mean motivational and personal gains reported by students in each category. Respondents who were missing both race data and ethnicity data are excluded. (Course-level median, minimum, and maximum values for these variables, including values for students missing race and ethnicity data, can be found in the "Descriptives" column of Table 5.)

Table 3

Student-Level Means of Instructional Adaptations and Student Gains, by Ethnicity and Combined Race/Ethnicity (Survey Respondents)

	Mean (SE)			
	Ethnicity		**Combined Racial/Ethnic Identity**	
Variable	**Hispanic (n = 133)**	**Non-Hispanic (n = 131)**	**Students of Color (n = 188)**	**Non-Hispanic White Students (n = 78)**
Ensured Access to Class Resources	0.50 (0.04)	0.60 (0.04)	0.54 (0.04)	0.59 (0.06)
Ensured Access to Instructor Time	0.41 (0.04)	0.33 (0.04)	0.38 (0.04)	0.33 (0.05)
Ensured Communication	0.52 (0.04)	0.55 (0.04)	0.49 (0.04)	0.64 (0.06)
Demonstrated Flexibility	0.75 (0.04)	0.80 (0.04)	0.78 (0.03)	0.77 (0.05)
Demonstrated Patience	0.30 (0.04)	0.18 (0.03)	0.27 (0.03)	0.15 (0.04)
Other Adaptations	0.23 (0.04)	0.22 (0.04)	0.21 (0.03)	0.26 (0.05)
Motivational Gains	4.09 (0.09)	3.81 (0.10)	3.98 (0.08)	3.90 (0.12)
Personal Gains	3.61 (0.08)	3.47 (0.08)	3.53 (0.07)	3.60 (0.10)

Note. Includes survey respondents with non-missing demographic data (96% of respondents reported an ethnicity, while 97% reported either an ethnicity, a race, or both). For presence of instructional adaptations, mean values represent percentage of respondents who reported the adaptation, e.g., 0.51 represents 51% of respondents.

The most widely reported type of instructional adaptation was *demonstrated flexibility*, and the proportions of students who reported this adaptation did not differ significantly between Hispanic and Non-Hispanic students ($t(262) = -0.97$, $p = .34$, two-tailed) nor between Non-Hispanic White students and Students of Color ($t(264) = -0.22$, $p = .82$, two-tailed). We also found that Hispanic students reported their instructors *demonstrated patience* at significantly rates higher than Non-Hispanic students ($t(262) = 2.40$, $p < .05$, two-tailed) and reported higher motivational gains ($t(262) = 2.07$, $p < .05$, two-tailed). In comparing Students of Color with Non-Hispanic White students, we found that Non-Hispanic White students reported their instructors *ensured communication* at higher rates than Students of Color ($t(264) = 2.27$, $p < .05$, two-tailed).

Table 4 shows the student-level correlations between each specific type of instructional adaptation and students' self-reported motivational or personal gains, disaggregated by ethnicity (Hispanic vs. Non-Hispanic) and by combined racial/ethnic identity (Students of Color vs. Non-Hispanic White students). Respondents who were missing both race data and ethnicity data are excluded.

Table 4

Student-Level Correlations of Instructional Adaptations and Student Gains, by Ethnicity and Combined Race/Ethnicity (Survey Respondents)

Variable	Correlations: Hispanic		Correlations: Non-Hispanic		Correlations: Students of Color		Correlations: Non-Hispanic White	
	Motivational Gains	Personal Gains	Motivational Gains	Personal Gains	Motivational Gains	Personal Gains	Motivational Gains	Personal Gains
Ensured Access to Class Resources	0.26**	0.18*	- 0.01	0.00	0.15*	0.14	- 0.01	- 0.02
Ensured Access to Instructor Time	0.25**	0.24**	0.19*	0.18*	0.29**	0.25**	0.06	0.09
Ensured Communication	0.09	0.09	0.11	0.09	0.13	0.11	0.06	0.03
Demonstrated Flexibility	0.08	0.04	- 0.08	0.10	0.00	0.05	- 0.04	0.10
Demonstrated Patience	- 0.04	0.10	- 0.03	0.07	- 0.05	0.09	0.08	0.12
Other Adaptations	- 0.20*	- 0.04	- 0.13	0.08	- 0.15*	0.01	- 0.18	0.02
Motivational Gains	-	0.63**	-	0.64**	-	0.63**	-	0.64**
Personal Gains	-	-	-	-	-	-	-	-

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). Correlations are calculated using Spearman's rho.

Table 4 shows that two specific types of instructional adaptations, *ensured access to class resources* and *ensured access to instructor time*, were positively and significantly associated with motivational gains and personal gains for Hispanic students, and *ensured access to instructor* time was also positively and significantly associated with motivational gains and personal gains for non-Hispanic students. When looking at Students of Color as a broader category, however, the association with *ensured access to class resources* appeared somewhat diminished, whereas the association with *ensured access to instructor time* appeared to be even stronger. Meanwhile, neither of these types of adaptations was associated with motivational or personal gains reported by Non-Hispanic White students.

Table 5 shows course-level median, minimum, and maximum values for the percentage of students who reported each type of instructional adaptation and for motivational and personal gains. It also shows median, minimum, and maximum equity gaps across all 10 courses in the Spring 2018, Spring 2019, and Spring 2020 semesters. Finally, the last two columns show how each of these variables is correlated with equity gaps between Hispanic and Non-Hispanic students and between Students of Color and White Non-Hispanic students in Spring 2020.

Table 5

Course-Level Medians and Correlations of Instructional Adaptations, Student Gains, and Equity Gaps

Course-Level Variable	Descriptives	Correlations with Equity Gaps in Spring 2020	
	Median (Min, Max)	Hispanic vs. Non-Hispanic	Students of Color vs. White Non-Hispanic
% Respondents Reporting Adaptation in Spring 2020			
Ensured Access to Class Resources	57% (43%, 75%)	- 0.33	- 0.37
Ensured Access to Instructor Time	33%% (0%, 75%)	0.15	0.47
Ensured Communication	53% (31%, 90%)	- 0.10	- 0.10
Demonstrated Flexibility	78% (64%, 94%)	- 0.09	- 0.38
Demonstrated Patience	16% (4%, 60%)	- 0.19	- 0.16
Other Adaptations	25% (8%, 39%)	0.40	0.23
Gain Scores in Spring 2020			
Motivational Gains	4.15 (2.63, 4.45)	- 0.38	0.06
Personal Gains	3.52 (2.64, 4.34)	- 0.33	0.20
Equity Gap (Hispanic vs. Non-Hispanic)			
Spring 2018	0.16 (0.02, 0.50)	0.36	0.75*
Spring 2019	0.35 (- 0.38, 1.06)	0.59	0.65*
Spring 2020	0.06 (- 0.44, 0.53)	-	0.69*
Equity Gap (Students of Color vs. Non-Hispanic White)			
Spring 2018	0.43 (- 0.01, 0.88)	- 0.15	0.19
Spring 2019	0.55 (- 0.07, 0.91)	0.13	0.42
Spring 2020	0.14 (- 0.26, 0.31)	0.69*	-

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). Course-level values (N = 10) calculated based on survey respondents (% respondents within this course reporting adaptation; average gain score among respondents in this course) or enrollees (course-level equity gaps) within each course. Correlations are calculated using Spearman's rho. Comparisons exclude students for whom neither race nor ethnicity data were available.

None of the relationships between instructional adaptations and Spring 2020 equity gaps are statistically significant. This does not necessarily mean these variables are wholly unrelated; our survey response rates were relatively low in most courses, making it difficult to make compelling claims based on these correlations. We merely *failed* to find statistically significant evidence that these variables *are* related. Yet we argue it is still important to examine these data, since they complicate our interpretation of the student-level survey results.

Finally, Table 5 also shows that *ethnic* equity gaps in all three years were correlated with the size of *racial* equity gaps in 2020. In other words, courses with larger gaps in GPA between Hispanic students and non-Hispanic students in earlier years tended to show larger gaps between Students of Color and Non-Hispanic White students in 2020. Interestingly, though, the size of Hispanic/Non-Hispanic equity gaps in earlier years did not predict the size of the Hispanic/Non-Hispanic equity gap in 2020, nor did the size of the Students of Color/Non-Hispanic White student equity gaps in earlier years predict the size of this gap in 2020. This suggests that there were substantial fluctuations in the equity gaps over time, raising the possibility that some of this fluctuation is obscuring relationships that might otherwise be visible in our data.

Discussion

We were concerned that, given the systemic inequities exacerbated by the pandemic, we might find increases in various types of equity gaps in course grades during Spring 2020. We were also concerned that historically marginalized students (e.g., Hispanic or Latinx students or Students of Color more broadly) may have had less access to instructional adaptations or weaker motivational and personal gains during these difficult months. Happily, we found that this did not appear to be the case. Many equity gaps shrank in comparison to the same courses taught in previous years (although this pattern could be partially explained by the increased use of credit/no credit grading during the pandemic). Furthermore, we found that Hispanic or Latina/o/x students reported their instructors *demonstrated patience* with them at even higher rates than non-Hispanic students, and on average, Hispanic or Latinx students in our survey reported even greater motivational gains from these courses compared with their non-Hispanic peers. We found this encouraging.

However, these results must be interpreted with caution. For example, it was often difficult to infer from students' responses what specific actions instructors had taken which constituted *demonstrat[ing] patience*. Causal relationships involving this variable could conceivably flow in either direction: some instructors may have taken actions which demonstrated patience and thereby supported students' well-being, but it is also possible that students who felt for any reason that instructors cared about their well-being may simply have been more likely to ascribe the quality of patience to these instructors.

In general, our qualitative findings strongly echoed those of Vielma and Brey (2021) mentioned above, who found that HSI engineering students identified instructor availability, high-quality online resources, clear communication, and expressions of compassion as instructional adaptations that they either experienced or wished they had experienced. One additional adaptation that students described, *demonstrat[ing] flexibility*, echoed the findings of studies in non-HSI contexts such as Prokes and Housel (2021) or Pagoto et al. (2021). Our dataset enabled us to extend such findings by matching them to multiple specific courses and to both institutional and student-reported outcome data.

Students across many different courses reported several additional types of adaptations their instructors made in response to the pandemic. In parallel with the findings of faculty surveys (Johnson et al., 2020), many of our students reported that instructors *demonstrated flexibility* in terms of due dates and requirements for course assignments. This was the most commonly and consistently reported type of adaptation. Meanwhile, in parallel with the findings of other student surveys (Means & Neisler, 2021), many of our students reported that instructors also helpfully *ensured communication* during and following the transition to online learning. For instance, faculty responded quickly to academic or school-related queries or reached out

frequently to the whole class via email. Students mentioned weekly email updates or "walk-through" emails that gave overviews of course requirements or content, clarifying instructor expectations for students during a time of uncertainty and transition. These findings are in keeping with past research on U.S. higher education in times of crisis, which has shown that many (but not all) faculty have historically made similar adaptations (DiPietro, 2003; Huston & DiPietro, 2007; Linsenmeyer & Lucas, 2017).

Two other important types of instructional adaptations that students reported were *ensur[ing] access to class resources* and *ensur[ing] access to instructor time*. *Ensuring access to class resources* manifested in several ways; for example, sharing instructional videos and other resources on online platforms, or showing students how to use new tech tools. Some students mentioned they found recorded lecture videos, YouTube videos, or online labs to be particularly helpful, as well as digital access to course readings. Students also mentioned occasions when their instructors showed them how to use tech tools such as Zoom. It seems unsurprising that this type of adaptation would benefit students. The popular framework of Universal Design for Learning (UDL) draws on principles from architecture and disability studies to argue that teaching is likely to be most equitable when it represents information in multiple ways, provides students with multiple means of engagement, and provides students with multiple ways to express and communicate their thinking (CAST, 2018; King-Sears, 2009). Although online-only instruction during the pandemic may have limited students' means of engagement or communication, access to class resources in a wide variety of formats may have provided multiple forms of representation and may even have provided several new means of engagement. Thus, increased access to class resources could have supported positive outcomes for Hispanic students and for Students of Color more broadly.

Ensuring access to instructor time involved instructors providing extra office hours or unstructured time to interact with students in one-on-one or small group video conference conversations. Increased access to the instructor (e.g., through extra office hours) may have provided increased opportunities for students to learn about connections between the course content and their everyday lives, as well as opportunities to have their interests validated and reinforced. One-on-one interaction might also have helped instructors and students get to know each other and build positive relationships, which could have increased students' social motivations to engage with their coursework and perceive it as meaningful and interesting. Such interactions could differentially benefit Students of Color by mitigating some of the harmful impacts of "belonging uncertainty"—a common phenomenon in which systemic racism and insufficiently supportive campus environments generate self-doubt and impede the formation of positive relationships (Fink et al., 2020; Thiem & Dasgupta, 2022). Pre-pandemic research suggested that students often lack clarity about the purpose of office hours and feel they are not worth the effort to attend in person (Smith et al., 2017). However, during the pandemic, with in person interactions reduced to zero, students may have felt an increased desire to seek out interaction with faculty.

We found that both *access to class resources* and *access to instructor time* were positively and significantly correlated with the student-level gains reported by Hispanic students. When looking at Students of Color more broadly, *access to class resources* showed a smaller correlation with motivational gains and only a non-significant correlation with personal gains. Meanwhile, *access to instructor time* showed correlations with motivational and personal gains for Students of Color. These patterns do not necessarily imply causal relationships; for example, perhaps students in certain courses were (for unknown reasons) more likely to *notice and later*

recall resources available for online learning, and these same unknown reasons might have driven more equitable outcomes in these courses. On the other hand, this pattern *could* represent a causal relationship. With this ambiguity in mind, one story we could tell based on our findings is that *providing students with substantial and deliberate access to instructor time (e.g., extra office hours) may be an especially valuable way to support Hispanic students and other Students of Color during a crisis, and providing access to class resources (e.g., high-quality online course videos) may be valuable for these students as well*.

However, a different story began to emerge when we looked at institutional, course-level outcome data. In these data, no type of instructional adaptation was significantly correlated with equity gaps—but the non-significant relationships among variables were suggestive. While four of the five specific adaptations students reported were negatively associated with equity gaps, there was one exception: the proportion who said their instructor *ensured access to instructor time* was positively associated with equity gaps. Thus, if our study had relied on course-level outcome data, we might have told a very different story: *providing students with access to class resources, consistent communication, etc. may be valuable ways to support equity during a crisis, but providing students extra access to instructor time is associated with* less *equitable course outcomes*.

How are we to resolve these seemingly very different stories about access to instructor time? We might begin by noting that this adaptation was relatively rare. There was only one course in which more than 50% of students mentioned *access to instructor time*, and in another course, no students reported this type of adaptation at all. There are several possible explanations for this finding. Faculty members may have offered extra office hours or stayed after class to meet with students during the pandemic, but if students themselves did not have sufficient time to take advantage of these opportunities, such adaptations may not have been salient or memorable enough to be reported in response to our survey question. Alternatively, it is possible that some faculty members were unable to offer considerable extra time to make themselves available to students; while several of the reported adaptations were likely time-consuming for faculty, *ensuring access to class resources* would likely benefit all students in a classroom at once, while *ensuring access to instructor time* adaptation was more likely to benefit only one or a few students at a time. Faculty may therefore have prioritized adaptations that seemed more time efficient.

We do not mean this as a criticism of faculty members; many instructors may have wanted to devote the necessary time to provide office hours or one-on-one meetings with students but may simply have been unable to do so given the time constraints generated by intensive teaching loads, large class sizes, and the casualization of teaching roles (Leathwood & Read, 2020). The logistical limitations on students' access to instructor time might help explain why this adaptation was not associated with reduced equity gaps; unless extra time with instructors was *available to, utilized by, and beneficial for* most or all students who are struggling in a course, this adaptation would not be expected to reduce equity gaps. Furthermore, the relationships we found are not necessarily causal; perhaps students who simply enjoyed the course were more likely to take advantage of office hours *and* more likely to feel like they had gained something valuable from their experiences. Individual students' enjoyment might not necessarily influence course equity gaps in a statistically significant way.

There are strong theory-driven reasons to suspect that students probably benefited from *both* the new instructional resources provided by faculty *and* the extra time faculty provided to meet with students. Readers might infer that both new resources and the provision of extra office

hours are beneficial interventions in a crisis, and they might recommend that faculty use these in future crises. However, we do not necessarily make these recommendations—at least, not in a vacuum separated from the context of higher education policies and labor practices. There are a finite number of hours in a day, and we are acutely aware that many instructors may be unable to develop new resources or meet individually with many students if their class sizes are too large, if their teaching loads are too intense, or if they are adjuncts who must deal with responsibilities and time commitments spread across multiple institutions. With this in mind, we advocate for the use of evidence-based practices to support student success within the constraints of what is reasonable and feasible for faculty. Even more importantly, we argue that higher education administrators and policymakers must proactively allocate sufficient resources so that course sizes, teaching loads, and instructor roles ensure faculty have adequate time and resources to implement such practices, both now and in future crises.

Limitations

An important methodological limitation of the study is the use of content analysis to code very short text strings into researcher-derived categories for quantitative analysis. Jackson and Trochim (2002) have critiqued the reliability and validity of such methods, pointing out the lack of context often present in such short responses as well as other methodological concerns. To help address this concern, all responses in our study were coded by at least two undergraduate student researchers who had themselves recently experienced CSUMB instructors' adaptations to COVID-19, increasing the likelihood that coders would be familiar with the context of survey responses. However, conclusions drawn from our analysis should still be interpreted cautiously.

Equity gaps are an important but imperfect outcome measure, in part because they focus on only a single conception of equity while other comparably important conceptions go unmeasured (for a discussion of alternative conceptions of equity, see Gutiérrez, 2012). It is also possible–indeed, likely–that the decision of approximately 15% of students to take their courses credit/no credit may have reduced equity gaps in comparison to previous years. Furthermore, instructors or instructional teams in several courses changed from 2018 to 2019 or from 2019 to 2020 (although teaching teams remained consistent in most of the courses in our study). Thus, some of the variation in equity gaps may have been influenced by year-to-year variation in instructors or in grading policies. Such effects are—with our limited dataset—impossible to distinguish from effects driven by changes in instructional practices.

Finally, many quantitative outcome measures may be suspect during the pandemic. Readers may wonder whether reduced equity gaps "really" represent more equitable outcomes in terms of student learning, or whether they are instead an artifact of increased measurement error as some instructors became more flexible and created multiple paths for students to meet the grading requirements of their courses. In response, we might argue that instructor flexibility and multiple paths to success are often fundamental features of high-quality instruction that tend to promote equitable outcomes (see, for example, Cohen & Lotan, 1997). In other words, while it is certainly possible—indeed, likely—that the disruptions caused by the pandemic introduced greater-than-usual uncertainty into measures of student learning and achievement, it is also possible and even likely that many such instructional adaptations may have contributed to more equitable and effective student learning.

We also wish to emphasize the situated-ness of our data in a particular geographic and sociocultural context. Students in the study came from only 10 courses at one public university in the United States that serves a relatively high proportion of first-generation, Pell-eligible,

commuter, and Hispanic students. This context could have played a meaningful but as-yet-unstudied role in shaping students' affective experiences of campus closure and adaptations to COVID-19. Our findings may differ from those which may be found at non-HSIs and at institutions with a lower proportion of first-generation, Pell-eligible, and commuter students.

Summary and Future Directions

Our study sought to understand some of the ways that HSI faculty adapted their instruction to support students during an unprecedented crisis, and how student-level and course-level outcomes were associated with these supports. We were pleased to find that several of these adaptations to instructional practices appeared to correlate with better individual student outcomes, especially *ensuring access to class resources* and *ensuring access to instructor time*, but the interpretation of these results was complicated by our analysis of course-level outcomes. We hope future research will expand on such analyses to better investigate the relationship between supports for individual students and classroom-level equity. We also hope that future research will explore how the effects of these instructional practices during the pandemic might relate to students' long-term success and persistence in college. In the meantime, we hope these insights can be useful for instructors, university administrators, and higher education policymakers—not only in preparing for future crises, but also in working to make higher education more just, equitable, and humanizing today.

We hoped to identify strategies that we could recommend faculty implement to support students during future crises. However, our findings also reminded us that teaching and learning do not unfold in a vacuum. Ensuring student access to instructors' time was significantly associated with motivational and personal gains for individual racially marginalized students, but it did not appear associated with racial equity at the classroom level. Ensuring access to class resources was also associated with motivational and personal gains for individual racially marginalized students, but more weakly, and it too was not significantly associated with racial equity at the classroom level. Both adaptations are likely valuable but are also difficult to implement for faculty with heavy teaching loads or adjunct positions. Thus, while we recommend that faculty work to ensure students' access to class resources and instructor time during future crises, we cannot make this recommendation without also arguing that higher education leaders and policymakers must collaborate to create working conditions in which faculty are *able* to make such adaptations. By understanding teaching and learning as situated in context, we can ease transitions in times of crises and ensure more positive, equitable outcomes for our students.

References

Alexander, R. (2022). *Telling stories with data.* CRC Press.

Aparicio, F. R. (2017). Latinidad/es. In D. R. Vargas, N. R. Mirabal, & L. La Fountain-Stokes (Eds.), *Keywords for Latina/o studies* (pp. 113–117). NYU Press. https://www.jstor.org/stable/j.ctt1pwtbpj.35

Arrona-Palacios, A., Rebolledo-Mendez, G., Escamilla, J., Hosseini, S., & Duffy, J. (2022). Effects of COVID-19 lockdown on sleep duration, sleep quality and burnout in faculty members of higher education in Mexico. *Ciência & Saúde Coletiva, 27*, 2985–2993. https://doi.org/10.1590/1413-81232022278.04322021

Badiozaman, I. F. A. (2021). Exploring online readiness in the context of the COVID 19 pandemic. *Teaching in Higher Education*, 1–19. https://doi.org/10.1080/13562517.2021.1943654

Barber, P. H., Shapiro, C., Jacobs, M. S., Avilez, L., Brenner, K. I., Cabral, C., ... & Levis-Fitzgerald, M. (2021). Disparities in remote learning faced by first-generation and underrepresented minority students during COVID-19: Insights and opportunities from a remote research experience. *Journal of Microbiology & Biology Education*, *22*(1), 1–25. https://doi.org/10.1128/jmbe.v22i1.2457

Bell, T., Aubele, J. W., & Perruso, C. (2022). Digital divide issues affecting undergraduates at a Hispanic-Serving Institution during the pandemic: A mixed-methods approach. *Education Sciences, 12*(2), 115–131. https://doi.org/10.3390/educsci12020115

Black, V. G., Martinez-Ramos, G. P., & Gonzales, S. T. (2020). Assessing the needs and experiences of first-generation students' transition to remote learning due to COVID-19 pandemic at a Hispanic Serving Institution. *Hispanic Educational Technology Services Online Journal, 11*, 34–59. https://hets.org/ejournal/2020/11/16/assessing-the-needs-and-experiences-of-first-generation-students-transition-to-remote-learning-due-to-covid-19-pandemic-at-a-hispanic-serving-institution/

Blackwell, M. (2017). Indigeneity. In D. R. Vargas, N. R. Mirabal, & L. La Fountain-Stokes (Eds.), *Keywords for Latina/o studies* (pp. 100–105). NYU Press. https://www.jstor.org/stable/j.ctt1pwtbpj.32

California State University Monterey Bay Institutional Assessment and Research Office (CSUMB IAR). (2020). *Enrollment fast facts 2020 spring*. https://csumb.edu/iar/enrollment-fast-facts-2020-spring

Carley, K. (1993). Coding choices for textual analysis: A comparison of content analysis and map analysis. *Sociological Methodology*, *23*, 75–126. https://doi.org/10.2307/271007

CAST (2018). *Universal design for learning guidelines version 2.2.* http://udlguidelines.cast.org.

Cho, J. Y., & Lee, E.-H. (2014). Reducing confusion about grounded theory and qualitative content analysis: Similarities and differences. *The Qualitative Report*, *19*(32), 1–20. http://nsuworks.nova.edu/tqr/vol19/iss32/2

Cohen, E. G., & Lotan, R. A. (1997). *Working for equity in heterogeneous classrooms: Sociological theory in practice. Sociology of Education Series.* ERIC. http://eric.ed.gov/?id=ED412328

Cottrell, R. S. (2021). Student performance in online classes at a Hispanic-serving institution: A study of the impact of student characteristics in online learning. *Online Learning*, *25*(3), 18–35. https://doi.org/10.24059/olj.v25i3.2853

Davila-Diaz, K. (2022). From an emergency pandemic course to an online course: A general chemistry case study in a resource-constrained Hispanic serving institution. *Journal of Chemical Education*, *99*(8), 2913–2918. https://doi.org/10.1021/acs.jchemed.2c00111

DiPietro, M. (2003). The day after: Faculty behavior in post-September 11, 2001 classes. *To Improve the Academy*, *21*(1), 21–39. https://doi.org/10.1002/j.2334-4822.2003.tb00379.x

Dowling, J. A. (2017). White. In D. R. Vargas, N. R. Mirabal, & L. La Fountain-Stokes (Eds.), *Keywords for Latina/o studies* (pp. 239–242). NYU Press. https://www.jstor.org/stable/j.ctt1pwtbpj.67

Feldman, J. (2018). *Grading for equity: What it is, why it matters, and how it can transform schools and classrooms*. Corwin Press.

Fink, A., Frey, R. F., & Solomon, E. D. (2020). Belonging in general chemistry predicts first-year undergraduates' performance and attrition. *Chemistry Education Research & Practice, 21*(4), 1042–1062. https://doi.org/10.1039/D0RP00053A

Fosnacht, K., & Nailos, J. N. (2016). Impact of the environment: How does attending a Hispanic-serving institution influence the engagement of baccalaureate-seeking Latina/o students? *Journal of Hispanic Higher Education, 15*(3), 187–204. https://doi.org/10.1177/1538192715597739

Franco, M. A., & Hernández, S. (2018). Assessing the capacity of Hispanic serving institutions to serve Latinx students: Moving beyond compositional diversity. *New Directions for Institutional Research*, *2018*(177), 57–71. https://doi.org/10.1002/ir.20256

Garcia, G. A., & Ramirez, J. J. (2018). Institutional agents at a Hispanic serving institution: Using social capital to empower students. *Urban Education, 53*(3), 355– 381. https://doi.org/10.1177/0042085915623341

Glynn, S. M., Brickman, P., Armstrong, N., & Taasoobshirazi, G. (2011). Science motivation questionnaire II: Validation with science majors and nonscience majors. *Journal of Research in Science Teaching*, *48*(10), 1159–1176. https://doi.org/10.1002/tea.20442

Gonzalez, J. (2011). *Harvest of empire: A history of Latinos in America*. Penguin.

Gonzalez-Ramirez, J., Mulqueen, K., Zealand, R., Silverstein, S., Mulqueen, C., & BuShell, S. (2021). Emergency online learning: College students' perceptions during the COVID-19 pandemic. *College Student Journal*, *55*(1), 29–46. https://www.ingentaconnect.com/content/prin/csj/2021/00000055/00000001/art00005

Gutiérrez, R. (2012). Context matters: How should we conceptualize equity in mathematics education? In B. Herbel-Eisenmann, J. Choppin, D. Wagner, & D. Pimm (Eds.), *Equity in discourse for mathematics education: Theories, practices, and policies* (pp. 17–33). Springer. https://doi.org/10.1007/978-94-007-2813-4_2

Harding, S. (1992). Rethinking standpoint epistemology: What is "strong objectivity?" *The Centennial Review, 36,* 437–470.

Hernández, T. K. (2017). Afro-Latinas/os. In D. R. Vargas, N. R. Mirabal, & L. La Fountain-Stokes (Eds.), *Keywords for Latina/o studies* (pp. 7–9). NYU Press. https://www.jstor.org/stable/j.ctt1pwtbpj.5

Hirschman, C., Alba, R., & Farley, R. (2000). The meaning and measurement of race in the US census: Glimpses into the future. *Demography*, *37*(3), 381–393. https://doi.org/10.2307/2648049

Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288. https://doi.org/10.1177/1049732305276687

Huston, T. A., & DiPietro, M. (2007). In the eye of the storm: Students' perceptions of helpful faculty actions following a collective tragedy. *To Improve the Academy*, *25*(1), 207–224. https://doi.org/10.1002/j.2334-4822.2007.tb00483.x

Jackson, K. M., & Trochim, W. M. K. (2002). Concept mapping as an alternative approach for the analysis of open-ended survey responses. *Organizational Research Methods*, *5*(4), 307–336. https://doi.org/10.1177/109442802237114

Johnson, N., Veletsianos, G., & Seaman, J. (2020). US faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning*, *24*(2), 6–21. https://doi.org/10.24059/olj.v24i2.2285

Katz, V. S., Jordan, A. B., & Ognyanova, K. (2021). Digital inequality, faculty communication, and remote learning experiences during the COVID-19 pandemic: A survey of U.S. undergraduates. *PLOS ONE*, *16*(2), e0246641. https://doi.org/10.1371/journal.pone.0246641

King-Sears, M. (2009). Universal design for learning: Technology and pedagogy. *Learning Disability Quarterly, 32*(4), 199–201. https://doi.org/10.2307/27740372

Leathwood, C., & Read, B. (2020). Short-term, short-changed? A temporal perspective on the implications of academic casualisation for teaching in higher education. *Teaching in Higher Education*, 1–16. https://doi.org/10.1080/13562517.2020.1742681

Le Grange, L. (2020). Could the COVID-19 pandemic accelerate the uberfication of the university? *South African Journal of Higher Education, 34*(4), 1–10. https://dx.doi.org/10.20853/34-4-4071

Linsenmeyer, W., & Lucas, T. (2017). Student perceptions of the faculty response during the civil unrest in Ferguson, Missouri. *International Journal of Teaching and Learning in Higher Education*, *29*(3), 524–533. https://eric.ed.gov/?id=EJ1150795

MacDonald, V. M., & Garcia, T. (2003). Historical perspectives on Latino access to higher education. In J. Castellanos & L. Jones (Eds.), *The majority in the minority: Expanding the representation of faculty, administrators and students in higher education* (pp. 15–43). Stylus.

Means, B., & Neisler, J. (2021). Teaching and learning in the time of COVID: The student perspective. *Online Learning Journal*, *25*(1), 8–27. https://doi.org/10.24059/olj.v25i1.2496

Morales-Cruz, Á. L., Ortiz-Andrade, B. M., Pilar-Albaladejo, D., Díaz-Vázquez, L. M., Rivera-González, U., & López-Mejías, V. (2021). Remote pandemic teaching in quantitative and instrumental chemical analysis courses at a Hispanic serving institution. *Analytical and Bioanalytical Chemistry*, *413*(11), 2845–2853. https://doi.org/10.1007/s00216-021-03243-5

Morris, M., Myers, B., Hawkins, K., Moulton, M., & Moulton, P. (2021). Lessons learned from online course delivery during the onset of COVID-19. *Society for Information Technology & Teacher Education International Conference*, 227–232. https://www.learntechlib.org/primary/p/219137/

Mshigeni, S., Arroyo-Romano, J., & Becerra, M. (2022). "We don't all have the privilege of having our own quiet place": College students in a Hispanic serving institution during the COVID-19 pandemic. *Journal of Latinos and Education, 21*(3), 251–265. https://doi.org/10.1080/15348431.2022.2056463

Museus, S. D., & Kiang, P. N. (2009). Deconstructing the model minority myth and how it contributes to the invisible minority reality in higher education research. *New Directions for Institutional Research*, *2009*(142), 5–15. https://doi.org/10.1002/ir.292

Orleck, A. (2021). And the virus rages on: "Contingent" and "Essential" workers in the time of COVID-19. *International Labor and Working-Class History*, *99*, 1–14. https://doi.org/10.1017/S0147547920000174

Pagoto, S., Lewis, K. A., Groshon, L., Palmer, L., Waring, M. E., Workman, D., ... & Brown, N. P. (2021). STEM undergraduates' perspectives of instructor and university responses to the COVID-19 pandemic in Spring 2020. *PloS One, 16*(8), e0256213. https://doi.org/10.1371/journal.pone.0256213

Petillion, R. J., & McNeil, W. S. (2020). Student experiences of emergency remote teaching: Impacts of instructor practice on student learning, engagement, and well-being. *Journal of Chemical Education*, *97*(9), 2486–2493. https://doi.org/10.1021/acs.jchemed.0c00733

Prokes, C., & Housel, J. (2021). Community college student perceptions of remote learning shifts due to COVID-19. *TechTrends, 65*(4), 576–588. https://doi.org/10.1007/s11528-021-00587-8

Román, D., Arias, J. M., Sedlacek, Q. C., & Pérez, G. (2022). Exploring conceptions of creativity and Latinidad in environmental education through the lens of culturally sustaining pedagogy. *Review of Research in Education*, *46*(1), 32–63. https://doi.org/10.3102/0091732X221084332

Saldaña, J. (2012). *The coding manual for qualitative researchers*. SAGE Publications.

Shapiro, M., Solano, D. M., Bergkamp, J. J., Gebauer, A., Gillian, E., Lopez, K. M., ... & Talbert, L. E. (2020). Impacts of converting courses to virtual instruction midsemester at a Hispanic-serving institution. *Journal of Chemical Education*, *97*(9), 2526–2533. https://doi.org/10.1021/acs.jchemed.0c00788

Smith, M., Chen, Y., Berndtson, R., Burson, K. M., & Griffin, W. (2017). "Office hours are kind of weird": Reclaiming a resource to foster student-faculty interaction. *InSight: A Journal of Scholarly Teaching*, *12*, 14–29. https://eric.ed.gov/?id=EJ1152098

Teves, S. N., Smith, A., & Raheja, M. (2015). Blood. In S. N. Teves, A. Smith, & M. Raheja (Eds.), *Native studies keywords* (pp. 199–208). University of Arizona Press.

Theobald, E. J., Hill, M. J., Tran, E., Agrawal, S., Arroyo, E. N., Behling, S., ... & Freeman, S. (2020). Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math. *Proceedings of the National Academy of Sciences*, *117*(12), 6476–6483. https://doi.org/10.1073/pnas.1916903117

Thiem, K. C., & Dasgupta, N. (2022). From precollege to career: Barriers facing historically marginalized students and evidence-based solutions. *Social Issues and Policy Review, 16*(1), 212–251. https://doi.org/10.1111/sipr.12085

Vielma, K., & Brey, E. M. (2021). Using evaluative data to assess virtual learning experiences for students during COVID-19. *Biomedical Engineering Education*, *1*(1), 139–144. https://doi.org/10.1007/s43683-020-00027-8

Weston, T. J., & Laursen, S. L. (2015). The undergraduate research student self-assessment (URSSA): Validation for use in program evaluation. *CBE Life Sciences Education*, *14*(3), ar33. https://doi.org/10.1187/cbe.14-11-0206

Zuckerman, A. L., Hardesty, R. A., Denaro, K., Lo, S. M., & Owens, M. T. (2021). Effects of remote teaching in a crisis on equity gaps and the constructivist learning environment in an introductory biology course series. *Journal of Microbiology & Biology Education, 22*(1), ev22i1-2293. https://doi.org/10.1128/jmbe.v22i1.2293