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Special Issue: Inclusive Learning

In Search of Belonging Online: Achieving Equity Through Transformative Professional Development

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Abstract

Online classes hold the potential to expand college access to Black, Latino/a/x, Indigenous, and other students of color who must be supported to diversify the STEM workforce. Research shows that fostering belonging is key to the academic success of students from minoritized groups. However, online classes often lack interpersonal interactions and are often left out of research about the positive impacts of belonging. This paper summarizes an equity-focused STEM grant project that produced an openly-shared online professional development program, the Humanizing Online STEM Academy. Through the Academy, STEM faculty are introduced to a model of humanized online teaching that centers belonging as a way to address equity gaps. Participant survey responses present opportunities for future research about belonging in online courses.

Recommended Citation

Introduction

Increasing the diversity of STEM graduates will accelerate innovation in the workplace and advance the upward social mobility of Black, Latinx, and Indigenous people (Omotola McGee, 2021). Traditional solutions

to this problem have focused on attracting more diverse students into STEM majors, and there is evidence that they have been successful. Studies show that Black and Latino/a/x students are as likely to enter STEM majors as their White peers (Chen, 2009; Garrison, 2013; Riegle-Crumb & King, 2010; Xie et al., 2015). Despite this progress, racial, ethnic, and gender gaps persist in STEM education, and they are worse than in other discipline clusters (Riegle-Crumb et al., 2019). Racially minoritized female students are more than two times less likely to complete a STEM degree compared to a White male student of similar academic preparedness (Hatfield et al., 2022). Simply put—higher education privileges some students and creates barriers for others, a problem that is exacerbated in STEM education.

To better understand why some students are more likely to leave STEM than others, researchers have turned to the social–psychological experiences of college students (Yeager & Walton, 2011), in particular their sense of belonging. Belonging relates to the degree to which a person feels valued and included. This is important in higher education because belonging is correlated with academic achievement, retention, and persistence (Strayhorn, 2018; Smith et al., 2013; Thoman et al., 2014; Walton & Cohen, 2011). Students who leave STEM majors have a lower sense of belonging than those who persist. Women and students of color report lower levels of belonging when compared to men and White students in STEM (Good et al., 2012; Johnson, 2012; Smith et al., 2013), and women of color experience the lowest (Rainey et al., 2018).

In the quest to improve inequities in STEM education, little effort has been made to examine the opportunities provided by online education, which increases access to more students by removing the barriers of time and place. Low-income students comprise 40% of the undergraduate college population, are more likely to identify as a racial/ethnic minority (Taylor & Turk, 2019), and are more likely to begin their college journey at a community college or access-oriented university (Baylor, 2016). Online education has been a cornerstone of access-oriented institutions for decades. But online education has also been the driver of enrollment in those same institutions long before COVID. In fact, in the California Community College system, the largest system of higher education in the United States at roughly 1.8 million students, online courses comprised 11% of the total student headcount in 2005–2006 and grew to 28% of the system's headcount in 2016–2017 (California Community College Chancellor's Office, 2017). After the COVID-19 pandemic forced nearly all faculty and students online starting in spring 2020, the percentage of online courses can be expected to remain high even as on-campus courses repopulate (Freedberg, 2022).

Studies about the implications of online education on the academic persistence and degree attainment of diverse students are varied. Many studies have shown that Black, Latino/a/x, and other racially/ethnically minoritized students—the very same students who benefit from the flexibility of online courses—are less likely to succeed in them (Bendickson, 2004; Carr, 2000; Kaupp, 2012; Rovai & Weighting, 2005; Xu & Jaggars, 2011). Research often points to students as the main source of this problem, citing a lack of academic preparation, poor time management and self-regulation skills, interrupted access to technology, and/or challenges navigating a course's interface (Aman & Shirvani, 2006; Bambara et al., 2009; Eisenberg & Dowsett, 1990). On the other hand, studies also show that minoritized students benefit from taking online classes. For example, a 2022 study found that Black, Hispanic, and low-income community college students who take up to half their load online are up to 23% more likely to complete their associate's and bachelor's degrees than those who completed all their courses on campus (Ortagus, 2022).

Equitable online education is a field ripe for research and poised to disrupt the traditional "weed out" culture in higher education and STEM, in particular. Yet, much of the existing discourse about online education serving students from minoritized groups is cast in deficit-based thinking, which frames diverse students and online courses as inherently lacking. This rhetoric has translated into skepticism and reluctance among faculty and institutional leaders. The emergency move to online education in 2020 has exacerbated negative faculty and administrator mindsets about online classes. The sentiment heard on campus is often, "we need to be in person to connect and build community." To change this paradigm, research needs to focus on the

question, "what can be done to enable the success of racially minoritized students online?" This question reframes the cold, disconnected environment students often experience online as a factor that exacerbates equity gaps in online courses (Jaggars & Xu, 2016) and illuminates positive instructor–student relationships as the "connective tissue" (Pacansky-Brock et al., 2020) that will advance equity through distance education.

This paper positions online education as an opportunity to expand access to higher education to more students, make STEM education more equitable, and diversify STEM graduates. Factors central to this focus include exploring effective strategies for fostering belonging in online courses and shifting faculty mindsets about online teaching and the role their teaching plays in achieving equity. Below, we outline a grant-funded project in California that is leveraging a model of humanized online teaching, grounded in psychologically inclusive course design and culturally responsive teaching, to equitize STEM education. For decades, scholars have shown that connection, care, and validation are essential components in supporting the academic success of culturally diverse students (Gay, 2018; Kleinfeld, 1975; Ladson-Billings, 1994; Nodding, 2013; Rendón, 1994; Wood et al., 2017; Wood, 2019). This valuable scholarship, largely produced by scholars of color, has long gone under-recognized in the White-dominated field of higher education. Humanized online teaching centers this groundbreaking research and builds upon it with teaching approaches that are applicable to asynchronous online instruction.

Fostering Belonging Online

Diversity, equity, and inclusion are commonplace terms in higher education, yet they are rarely intentionally explained. Diversity relates to who is at the table (and who is not). It can be measured by data about people's identities—race, ethnicity, gender, sexual orientation, disability status, among others. Equity relates to recognizing that people are different and that those differences yield privileges for some and barriers for others. As such, being equity-minded requires one to recognize that treating everyone equally disproportionately impacts some people in negative ways. Equity ensures that all people have what they need to successfully achieve the same outcomes. Inclusion is about behaviors that create an environment in which all voices are heard, all identities are valued, and all individuals feel supported (Gay, 2018).

Centering diversity, equity, and inclusion in teaching and learning requires institutions to be committed to supporting the social and emotional aspects of learning in all modalities. Research continues to validate the idea that humans are social creatures who are wired for affinity and connection (Bowlby, 1969, 1973; Casella & Fowler, 2005; Coon, 1946; Cosmides et al.,1992; Estrada et al., 2018; Lieberman, 2013). As we go about our days interacting with other people, brains are interconnected in a continuous "neural ballet" (Goleman, 2006). A single reaction a person receives from another has far-reaching implications on one's biology, affecting everything from a person's heart to their immune system. As such, interpersonal relationships (or lack of them) have a significant impact on a person's well-being in face-to-face and online environments.

Emotional pain triggered by something as deep as a death in the family or as shallow as a snarky comment on Twitter is as real as physical pain (Lieberman, 2013). As such, social interactions that leave people feeling dismissed and invalidated are like poison. They interfere with a person's ability to perform and, over time, can impact one's physical health. Conversely, experiences that result in feeling seen, heard, and valued are like vitamins. They fuel a person's motivation, happiness, and physical well-being. When students take classes online, the positive and negative implications of interpersonal interactions with their instructors and peers are just as influential as when they are on campus.

Humans have an innate affinity to be accepted and valued by other humans, and when this need is not met, it impacts a person's ability to achieve their full potential (Immordino-Yang, 2016; Maslow, 1943). In this way, college students who experience belonging are more likely to achieve their academic goals (Strayhorn, 2018). Strayhorn (2008) defines a sense of belonging as "a feeling of connectedness, that one is important to others,

that one matters" (p. 305). Studies show that social interactions are often sparse in online courses (Cox, 2006; Jaggars & Xu, 2016), creating a psychologically chilly condition that puts some students at risk of experiencing belonging uncertainty more than others.

Like all human experiences, belonging is influenced by many factors, in particular context and identity. Belonging is more crucial at certain points in a person's life—such as transitioning from adolescence into adulthood—and at certain times in a student's college experience—such as during the first year or at the start of a new class. Research shows that the exclusion and isolation that students from minoritized groups experience also heightens the need for belonging (Hurtado & Carter, 1997; Walton & Cohen, 2007).

In short, belonging is experienced differently by different people at different times. We hypothesize that the isolation students experience at the start of an online class is another contextual factor that threatens belonging. For students who feel marginalized, that threat is exacerbated. When humans experience the threat of social rejection, they seek out validation from others (Rendón, 1994; Strayhorn, 2018; Wood et al., 2017; Wood, 2019). Students, like all people, want to know they matter. They want to feel more than invited and welcomed. They want to feel needed. They want to belong.

To close equity gaps, faculty and instructional designers/developers need to intentionally consider belonging in the design and teaching of their online classes, as well as be supported with professional development (PD) to hone the skills and the knowledge to do this work. A 2018 study by Jaschik and Lederman found that 55% of surveyed faculty designing an online class received no training. When institutions provide PD to prepare faculty to teach online, it often consists of developing a working knowledge of a learning management system (LMS; i.e., Canvas, Blackboard, Moodle, etc.) and implementing essential course design standards (clear navigation, backwards course design, etc.), and pedagogy (the value of constructivist learning).

Cultivating inclusion in online classes is not a typical thread in the fabric of online teaching preparation programs. Peacock et al. (2020) conducted a qualitative study about belonging in online courses and found that educator–student relationships are vital to ensuring that students feel known "as individuals rather than reference numbers" (p. 29). Nurturing relationships at a distance is not a competency most faculty members possess, nor is it one that is commonly included in faculty online teaching preparation pathways. Becoming an inclusive teacher is a journey that requires personal commitment and institutional investment. To address equity gaps, college faculty must be provided access to PD in support of inclusive teaching (Dewsbury & Brame, 2019), and, when they teach online, PD must direct these same commitments toward the asynchronous learning modality. When faculty are taught to teach asynchronously in a synchronous workshop, they do not experience the opportunities and challenges that delayed interactions bring to teaching and learning. Synchronous workshops do not let faculty experience what it feels like to be an online student. Being immersed in an asynchronous online professional learning program and connecting with colleagues and a facilitator through delayed interactions is foundational to growing into an inclusive teacher online.

Scholarly discourse about inclusion generally focuses on in-person interactions. By centering face-to-face experiences, this discourse often leaves out scholarship about online interaction. As a result, students who rely on online classes for the social mobility that a college degree provides are also left out. Developing relationships based on mutual respect and validation is at the core of inclusivity, and when students and their instructor are physically separated from one another, extra care must be given to develop an environment in which all students belong (Thomas et al., 2014).

The Humanizing Online STEM Project

To tackle the issue of racial equity gaps in STEM, an intersegmental team of educators and faculty developers representing the California Community College (CCC), California State University (CSU), and University of

California (UC) systems leveraged grant funds to create an intensive, online inclusive teaching program, the Humanizing Online STEM Academy, and conduct a research study about its impact on faculty and their students. The Humanizing Online STEM Academy is a six-week, asynchronous professional learning program designed to harness the potential of online courses in undergraduate STEM education. In the summer of 2021, STEM faculty and faculty support specialists from select CCCs and CSUs were invited to participate in the Academy. Out of the 82 participants, 79 (96%) completed it. The high completion rate is attributed to the program's quality (see survey discussion below) and the $1,800 grant-funded stipend that participants received upon completion of the requirements. The summer of 2021 was a time of intense fatigue for educators, many of whom were coming out of a year of remote, emergency instruction. Providing an incentive was a way of recognizing the workload and time commitment that PD requires.

The Academy places STEM faculty in the seat of asynchronous online learners. Through the use of psychologically inclusive course design and culturally responsive "warm demander" pedagogy (Kleinfeld, 1975; Hammond, 2015), the Academy's intensive hands-on content creation activities improve the digital fluency of faculty while illuminating the potential for online classes to foster instructor–student relationships and belonging at a distance.

Humanizing, in the context of this project, is a model for inclusive online teaching that builds upon more than a decade of grassroots teaching collaborations in California public higher education (Pacansky-Brock et al., 2020). The model applied in the Academy blends culturally responsive teaching with eight research-based inclusive course design elements developed specifically for online courses. Many of the eight elements target the week before the course starts and week one, which humanizing considers a high opportunity zone for mitigating belongingness uncertainty with "kindness cues of social inclusion" (Estrada et al., 2018).

The Academy was created and taught by faculty developers who modeled humanizing in the design and facilitation of the Academy. Important to this project are the positionalities of the designer–facilitators of the Academy (referred to hereafter as the "faculty development team"), who are also authors of this paper. While each brings different lived experiences, backgrounds, and disciplinary lenses to this project, all identify as White first-generation equity practitioners (Bensimon & Gray, 2020) who continue to develop racial and diverse-identity literacy through individual and connected journeys. This is centered on prioritizing equity and cultural humility (Hook et al., 2013) as ongoing growth processes, rather than specific outcomes; and decentering Whiteness in higher education institutions and practices. Professional development becomes the vehicle to engage colleagues in changing mindsets and practices that sustain the status quo and leave out Black, Latinx, Indigenous, and other students of color.

For the faculty development team, humanizing has meant recognizing their own privileged positionalities as White educators who cannot bring the lenses of people of color to the table or fully know how people who are different from them experience the world. Developing this continually evolving model of humanizing and sharing it openly has been part of their practice of critical self-reflection, as well as a contribution to making societal change by urging alternatives to the transactional method of STEM teaching and supporting other faculty developers with openly shared content to use at their own institutions. To that end, the authors center the human experience as a dynamic process to be understood through the social, cultural, and historical influences of one's perspectives, beliefs, values, assumptions, and lived experiences and how they influence others. To include more perspectives, a diverse panel of consultants with expertise in STEM education and equity was recruited to provide feedback on the Academy content before it was launched.

Theoretical Framework

Cultivating belonging is at the heart of humanized online teaching and involves establishing identity safety for all students. Faculty who engage in humanizing must be prepared with knowledge, attitudes, and skills to

develop equity mindsets, design inclusive online courses, engage with culturally responsive teaching, and hone digital fluency skills to develop relationships at a distance. Due to the complex nature of professional growth, it is less important to focus on these four dimensions independently as it is to recognize that each one informs and complements the others (see Figure 1).

In STEM education, where intellectual ability is often perceived to be at the center of success, Black, Latino/a/x, Indigenous, other students of color, and women of all races and ethnicities are more likely to doubt whether they belong due to past discrimination (Park et al., 2020, 2022) and exposure to negative academic stereotypes about their identity group(s) (Steele, 1997, 2010; Steele & Aronson, 1995; Steele et al., 2002). Instructor–student relationships based on trust and mutual respect are the antidote to these threats and serve as the "connective tissue" between students, engagement, and learning—in all modalities (Pacansky-Brock et al., 2020).

Figure 1. *The Four Dimensions of Humanized Online Teaching*
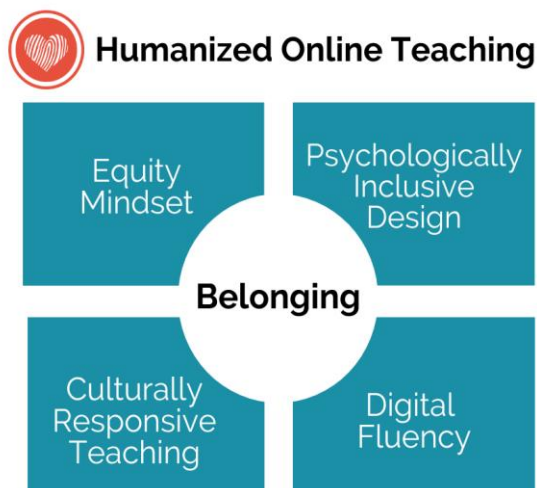
Equity Mindset

Humanizing is a big shift away from delivery-based instruction, which is commonplace in STEM. Developing connections with students involves, at the most basic level, increasing student–instructor interactions. However, merely increasing interactions does not necessarily improve the educational experience for all students because interactions can be toxic. Language is influenced by unconscious biases and may convey microaggressions, which are shown to have detrimental impacts on a person's sense of belonging, self-efficacy, and science identity (Harrison & Tanner, 2018). In one STEM study (Park et al., 2022), increased interactions only benefited the performance of White students and disadvantaged Black students the most. If faculty have not done the hard self-work that is part of equity, increasing interactions with students may perpetuate a toxic culture for students from minoritized groups. An equity journey requires developing self-awareness about one's own identity and biases. As Dewsbury and Brame (2019) explain,

> A pedagogy based on dialoguing requires a different lens. To understand students' voices, we must recognize and understand our own. This is to say, our accrued experiences from personal and social histories matter to how our relationships with our students develop. If we ignore this context, we can fail to see how we are contributing to socially disconnected classroom environments. (p. 2)

To make this shift, faculty must make the personal commitment to become equity minded. According to the Center for Urban Education, equity-minded educators

> are willing to take personal and institutional responsibility for the success of their students, and critically reassess their own practices. [They are also] … race-conscious and aware of the social and historical context of exclusionary practices in American Higher Education. (Center for Urban Education, n.d., para. 1)

In addition to making an ongoing commitment to self-awareness, equity-minded educators also use data to track inequities in courses and programs. They are committed to critically reflecting on their own practices and making changes to close gaps and ensure that all students have what they need to achieve the course goals. When teaching online, equity-minded educators remain curious in order to recognize the opportunities that online classes hold for creating equitable learning environments, as opposed to replicating the inequitable structures present in traditional face-to-face classes.

Cultural humility is also a component of equity-mindedness. Cultural humility is a lifelong process of self-reflection and discovery that emerged in nursing education as a means to build honest and trustworthy relationships with patients. It is defined by Yeager and Bauer-Wu (2013) as having the "ability to maintain an interpersonal stance that is other-oriented (or open to the other) in relation to aspects of cultural identity that are most important to the client" (p. 2). Unlike cultural competence, which situates the dominant culture against other cultures and can reinforce stereotypes (Kumagai & Lypson, 2009), cultural humility is a self-critique whereby the individual not only learns about other cultures but critically examines one's own beliefs and cultural identities (Yeager & Bauer-Wu, 2013; Tervalon & Murray-García, 1998). It recognizes the intersectionality of identity, highlighting that culture is dynamic and changes among family, friends, school, work, and sub-cultures within each of those domains. Being aware of our own shifting values and beliefs, as well as those of others, enables faculty to approach teaching from a more inclusive perspective and develop trustworthy relationships with students.

Culturally Responsive Teaching

Humanizing is deeply informed by the scholarship of culturally responsive teaching (Gay, 2018; Hammond, 2015; Ladson-Billings, 1994; Rendón, 1994). It supports the whole human by centering the interconnectedness of emotions and cognition (Cavanagh, 2016; Immordino-Yang, 2016; Rendón, 1994); being race-conscious as opposed to color blind; and ensuring all students feel seen, supported, validated, and intellectually challenged (Gay, 2018; Hammond, 2015; Kleinfeld, 1975; Ladson-Billings, 1994; Rendón, 1994). Humanizing is not a form of coddling; rather, it brings together care and push, shown to be successful characteristics of teachers of minoritized students in face-to-face instructional environments (Kleinfeld, 1975; Hammond, 2015). Humanizing applies this learning science to online college courses, where student demographics are becoming increasingly diverse.

Faculty who teach humanized online courses think critically about why a student may not be engaging in a course. They recognize that being an independent learner (possessing the cognitive skills needed to examine, evaluate, and complete complex tasks) is actually a form of cultural capital. Engaging in cognitive struggle is the only way a person develops from a dependent to an independent learner; however, low-income students, English language learners, and students of color are less likely to have opportunities to engage in intellectually challenging tasks in K–12 (Allington & McGill-Franzen, 1989; Darling-Hammond, 2001; Oakes, 2005). This is due to structural racism that shapes how schools are funded and unconscious biases that influence which students get challenged or disciplined by teachers (who are predominantly White) (Merolla & Jackson, 2019). Culturally responsive teaching recognizes these differences and ensures that faculty know how and why to engage all students in challenging academic work.

Psychologically Inclusive Course Design

Human presence is undeniably the most critical factor in fostering belonging online. To ensure safety needs are met, humans scan their environment consciously or unconsciously for cues in social situations (Goleman, 2006). When a person perceives their identity has not been respected, they experience a dignity violation that causes psychological discomfort (Kelman & Fisher, 2017) and undermines the foundation of trust needed to establish positive instructor–student relationships (Hicks, 2011).

In online courses, the same scanning occurs as students click through the pages of a course and interact asynchronously with their instructors. The first clicks offer the most opportunities. Research shows that first impressions matter tremendously in the development of instructor–student relationships. Videos as brief as 30 seconds can accurately predict the nature of students' end-of-semester professor evaluations (Ambady & Rosenthal, 1993).

Online, the cues that are needed to foster psychological safety and identity dignity—verbal and non-verbal cues, images, supportive language—are often absent unless they are intentionally incorporated. In their absence, students may experience feelings of nonacceptance that increase their sensitivity (Patterson et al., 2001; Patterson & Stockbridge, 1998) to cues of exclusion and that may hinder their efforts to progress through a course.

Faculty who teach humanized online courses are knowledgeable about social psychology and intentionally incorporate kindness cues of social inclusion (Estrada et al., 2018). These cues, which serve as subtle micro-affirmations, include friendly smiles and vocal intonation through brief videos; hopeful, inclusive, and supportive course materials and graphics (Kizilcec & Saltarelli, 2019); as well as warm, "wise interventions" (Cohen et al., 2014).

Digital Fluency

Teaching humanized online courses hinges upon an instructor's ability to create welcoming, culturally inclusive, and device-responsive communications through technology. This requires additional instructor digital fluencies. When teaching culturally diverse students, instructors must intentionally design online courses to be inclusive of the values of different cultures to avoid cultural mismatches—gaps between the culture of the student and the culture that is valued in the classroom (Al-Harthi, 2014; Han et al., 2014; Jung & Gunawardena, 2014). According to Hall's (1981) high-context and low-context theory, the way messages are communicated is influenced by a culture's values. Cultures that value high-context communication tend to emphasize relationships and environment when decoding meaning, while low-context cultures tend to value individuality and the message itself over the environment in which it was created.

Learning management systems (LMS) used to design and teach online courses have similar functionalities and, like higher education itself, are products of a culture that values low-context written communications, hence leaving out students from high-context cultures that value relational communication. Low-context communications de-emphasize contextual cues, such as who is delivering the message and how it is being relayed. To be culturally inclusive, courses should use both high- and low-context communications (Gunawardena, 2014; Otero-Diaz & Salazar, 2021; Plotts, 2018).

Voice and video offer warm, high-context asynchronous communication options and are key to humanizing. They also foster social presence (Borup et al., 2012, 2013)—the sense that one is communicating with a real person (Gunawardena, 1995)—which is correlated with learner satisfaction (Garrison et al., 2000; Gunawardena & Zittle, 2009) and achievement (Oyarzun et al., 2018). Offering students the option to record an assignment or send a message in voice or video accommodates learner variability and is a principle of Universal Design for Learning (CAST, 2018). When students are invited to contribute their own brief,

imperfect videos or voice comments, online learning moves out from behind a veil of anonymity into an identity-rich environment. Understanding who is *in the room* is essential to developing group trust and community.

While voice and video interactions are key to fostering belonging at a distance, LMS tools that provide these options are often clunky. And when they are available for student use, they tend to work poorly for those who are smartphone reliant—a demographic of students that is also more likely to be low income and Black or Latino/a/x (Anderson, 2015). Using an external tool with an LMS integration that enables asynchronous video discussions with a webcam or mobile app (like Flip or VoiceThread) is a digital fluency that enables faculty to design more mobile-friendly and culturally inclusive online courses. Understanding how to set up external assignments in an LMS using Learning Tools Interoperability (LTI) plug-ins is key to using third-party tools to more effectively prevent sharing student information with external tool providers (Alier et al., 2010).

An instructor's mastery of the record-host-caption-embed video workflow is also a digital fluency that is critical to humanizing. However, the videos themselves do not need to have a high production value. In fact, brief, imperfect videos offer faculty the flexibility of recording on the go and bringing in aspects of their daily lives. Creating videos in this way breaks down the hierarchy between professors and students and is also more attainable for faculty. Seeing glimpses of a professor's non-academic life is also linked with increased social presence and the sense that there is a real person on the other side of the screen who cares (Borup et al., 2012).

The Humanizing Online STEM Academy

The Humanizing Online STEM Academy is an inclusive teaching PD program for STEM faculty teaching online courses. In STEM, only about 10% of faculty at four-year universities in the United States identify with minoritized racial/ethnic groups, and women comprise only 34.6% of the population (Bennett et al., 2020). As such, the Academy is designed to raise awareness of the privilege and power at play in education and how these inequities minoritize students from historically underrepresented social identities. As explained by Harper (2012),

> Persons are not born into a minority status nor are they minoritized in every social context (e.g., their families, racially homogenous friendship groups, or places of worship). Instead, they are rendered minorities in particular situations and institutional environments that sustain an overrepresentation of Whiteness. (p. 9)

Creating a transformative PD experience for STEM faculty poses three significant challenges. First, traditional STEM courses tend to be individualistic and competitive with a "sink or swim" climate. Relationships, in general, are difficult to come by for all students (Seymour, 1995). Curved grades pit students against each other and undermine students' confidence by detaching grades as a reward for learning. Exams can be so difficult that most students fail on the raw score, before the curve is taken into account, which means that even students who ultimately receive higher grades *feel* like they have failed. First-year STEM students often feel useless, hopeless, and incompetent and question the ethics of their professors' grade manipulation (Seymour, 1995). Despite what happens to the dreams of many freshmen and sophomores—especially those on the margins—higher education tolerates this cut-throat system under the vague assumption that it filters out those who are unqualified to be doctors, scientists, and engineers.

Second, undergraduate STEM courses do not conventionally lend themselves to sociocultural content or classroom discussion. Unlike the humanities and social sciences where such issues weave naturally throughout the content and arise organically, STEM focuses on scientific concepts and theories. In this sense, STEM courses might be assumed to be "color blind." Professors lecture, students take notes, and then

students either pass or fail exams. Race and other social identities, according to this construct, are not a factor.

Finally, STEM faculty are themselves successful products of this system. Even those who do not fit the paradigm overcame obstacles and survived or even thrived. The system worked for them, the thinking often goes, so it should work for their students. Why jeopardize the prestige of a system with strong traditions and a well-earned reputation for rigor?

The goal of the Academy is to transform STEM educators' mindset about assumptions and traditions at play in the culture of STEM education and thereby transform their practice. To do this, the Academy is designed and facilitated to create cognitive dissonance between an educator's own understanding and the traditional beliefs of the role of an online teacher by questioning their own views and practices. Informed by Transformative Learning Theory that moves beyond a change in knowledge (Mezirow, 1991), the Academy centers on professional learning that shifts how educators see themselves online (Meyer & Murrell, 2014) and how they view and relate to students. The desired outcome is shifting their perspective through empathy with others and reflection that results in changes in practice.

Creating a PD experience for STEM faculty against this backdrop required careful, intentional planning. The faculty developers creating the PD treatment course (the Academy) knew that STEM faculty would need strong evidence in the form of data-driven research before agreeing to alter traditional methods and implement new ones. The research needed to be extensive, persuasive, and specific to STEM.

The developers also knew that participants needed opportunities to experiment with hands-on tools in order to put theory into practice. From experience, they understood the phenomenon of "PD melt" (Pacansky-Brock et al., 2020), where educators engage in and are energized by a PD experience only to lose momentum and not have time or energy to implement lessons learned in real courses with real students later on. By turning deliverables into tangible takeaways, the developers felt that the Academy would have a more immediate impact not only on educators but also on the students taking their courses.

The Eight Humanizing Elements

The faculty developers carefully chose which tools and approaches to show participants, how many would be required, and in what order they would be presented. It's easy to overload people with so much information and work that they tune out, stop engaging, and disappear, especially with COVID influencing high rates of educator burnout. The developers settled on eight humanizing elements to be introduced over six weekly modules, with each module requiring about 10 hours of work, including assignments and discussions with due dates. Many of the humanizing elements target weeks zero to two of an online course, the *high opportunity zone* for establishing a safe, trusting environment for belonging to develop.

Each of the eight elements serves as a "kindness cue" (Estrada et al., 2018), which fulfills the basic human need for affiliation and attachment (Coon, 1946; Cosmides et al., 1992). The inclusion of these situational cues in an online course is intended to diffuse identity threat experienced by students from stereotyped groups in higher education and create a comfortable learning environment for all students (Murphy & Taylor, 2012). When a student feels confident that they will be seen and valued for their true authentic self, as opposed to being treated as a stereotype, they are more likely to lean in and engage.

The eight elements, described in detail in 2020 by Pacansky-Brock et al. and in a publicly available infographic (Pacansky-Brock, 2020), are summarized in Table 1.

Table 1: *The Eight Humanized Online Teaching Elements*

Element	Description
Liquid Syllabus	A public, mobile-friendly website that is sent to students before the course begins to eliminate uncertainties and prepare students for success in week one. The Liquid Syllabus (Pacansky-Brock, 2021, 2020, 2017, 2014) sends the cue that the instructor is a learning partner and other identity safety cues (Kruk & Matisick, 2021). It contains a brief, imperfect welcome video from the instructor; a learning pact detailing what students can expect from the course and what is expected of them; and demystifies how to be successful in week one. The welcoming and supportive tone of the pre-course Liquid Syllabus forms a positive first impression of the instructor and the course (Harnish & Bridges, 2011) and sets students up for success.
Humanized Course Card & Homepage	Images can send cues of inclusion to students from non-dominant groups (Kizilcec & Saltarelli, 2019) and brief videos can establish positive first impressions in student–instructor relationships (Ambady & Rosenthal, 1993). A course card is an inclusive image that students see prior to accessing the course. A humanized homepage greets students upon logging in. It includes a visual banner; a brief video of the instructor welcoming students; and a clear "start here" button that links students to the first module.
Getting to Know You Survey	A confidential survey that students complete in week one. It provides microdata about learners' individualized needs and real-life situations. Instructors use this data to adapt their teaching to support students throughout the course.
Warm, Wise Feedback	Feedback that follows the "wise" feedback model is shown to mitigate the negative cognitive effects of identity threat (Cohen & Steele, 2002; Cohen & Garcia, 2014). Delivering the feedback with a voice or video recording minimizes misinterpretations (Ice et al., 2010), increases social presence (Borup et al., 2013), may support students' emotional well-being (Kaplan-Rakowski, 2021), and includes students from high-context cultures (Gunawardena, 2014). The components of wise feedback are: - A reminder of high standards ("this is a tough problem.") so students are cued that mistakes are reflective of the course's objectives, as opposed to their identity. - A personal assurance that informs the student that they are capable and will improve with effort ("Look how much you've improved already, keep going. You've got this."). - Specific actionable steps to work on ("Next, I want you to work on …").
Self-affirming Ice Breaker	Values affirmation is a social belonging intervention that has been shown to improve students' learning, particularly students from minoritized groups (Yeager & Walton, 2011; Kizilcec et al., 2017). The self-affirming ice breaker adapts this intervention into an asynchronous format. In the ice

	breaker, students reflect in asynchronous videos on their values and share an example of one or more important values at play in their life.
Wisdom Wall	A Wisdom Wall (Pacansky-Brock, 2017; Pacansky-Brock et al., 2020) uses an asynchronous video tool at the end of a class to ask students to reflect back to the start of the course and identify something they know now that they wish they had known then. Students share that idea in the form of advice for future students. At the start of the next class, the recordings are shared with incoming students. Exposing students to role models with like identities bolsters self-confidence and minimizes stereotype threat (Steele & Aronson, 1995) by changing the narratives students lean on to anticipate challenges (Spitzer & Aronson, 2017).
Bumper Videos	A bumper video is a 2–3 minute, visually oriented clip that includes background music. It introduces a new module or clarifies a sticky concept. They differentiate learning and empower students to quickly and independently revisit key ideas.
Microlectures	Microlectures are short (5–10 minute), laser-focused videos with accurate captions that guide students through the comprehension of complex concepts. Students find brief instructional videos helpful in online classes (Berlin & Weavera, 2022) and they may increase student participation in class discussions (Lin et al., 2019). Videos also give each student a front row seat to instruction and support different learning rhythms.

Acquiring and implementing the eight elements over 6 weeks invigorates, but also may tax the cognitive bandwidth and digital fluency of Academy participants. To support educators throughout the Academy, the facilitation team uses a "high-touch," highly humanized instruction style. This involves quick, supportive, and actionable feedback—sometimes in friendly video—as well as frequent announcements and encouraging reminders. As "warm demanders" (Kleinfeld, 1975), facilitators model a humanized teaching philosophy centered on relentless positivity and flexibility, while holding all participants to the same high standards.

In addition, traditional grading, which is shown to demotivate learning and unfairly privilege students with free time and other forms of cultural capital (Blum, 2020), is not used to evaluate Academy participants. Each activity includes a scoring rubric with *Bravo* or *Almost There* as replacement descriptors for pass and fail, and any submission that does not pass can be revised until it meets the standard. In fact, all parts of all required submissions must receive a "Bravo" in order to receive a completion for the Academy. The alternative grading format holds all participants to the same high standards while emphasizing flexibility and support through completion. Experiencing the influence of equitable grading on one's own motivation and learning may cause some participants to rethink traditional models in their own courses.

Program Implementation and Feedback

In the summer of 2021, 79 participants (86% STEM faculty; 14% faculty support specialists) from eight institutions (five community colleges and three universities) completed the Academy. The Academy was attempted by 81 participants, a 97% completion rate. Participation was open to all STEM faculty at select institutions, both part-time and full-time, who had taught at least one online course from start to finish. These criteria were intended to rule out faculty who had only taught online during remote emergency instruction in 2020, many of whom utilized a synchronous online teaching modality. Faculty also identified the online course they would humanize and were provided with a course shell in their college's Canvas instance to

complete content creation assignments throughout the Academy. To recruit participants, some institutions took a broad approach by sending an email to all STEM faculty, while others were more selective by recruiting from departments with higher rates of online course offerings.

The unique design of the Academy provided an opportunity for three facilitators to each lead a cohort of approximately 12–15 participants (set up using the section cross-listing feature in Canvas). At the end of the program, each participant created a Humanizing Showcase, an ePortfolio made with Google Sites[1], containing reflections and examples of their eight humanizing elements. They also completed an anonymous survey (with the option to self-identify) designed to assess participant satisfaction, key takeaways, and effectiveness of the course design. Seventy-six participants responded to the survey (96% response rate). Demographic information was not collected about the participants because a detailed research study was being conducted simultaneously.

The survey confirmed the faculty developers' perception that time is a highly variable element in faculty development, just as it is with students. Prior to registering in the Academy, participants were informed that the course would require about 10 hours per week. Previous experience, however, suggests that the time spent on PD varies widely by participant based on a number of factors including technology skills, availability, and a person's individual expectation level. The survey validated this perception. As shown in figure two, when participants were asked, "approximately how much time did you spend on each week?," 41% reported 11–15 hours, 27% indicated 6–10 hours, 16% noted 16–20 hours, 9% spent 1–5 hours, and 7% reported spending more than 20 hours. This data may be useful to faculty developers when administrators call for a specific time commitment for professional learning.

Figure 2. *Amount of Hours Participants Spent Per Week*
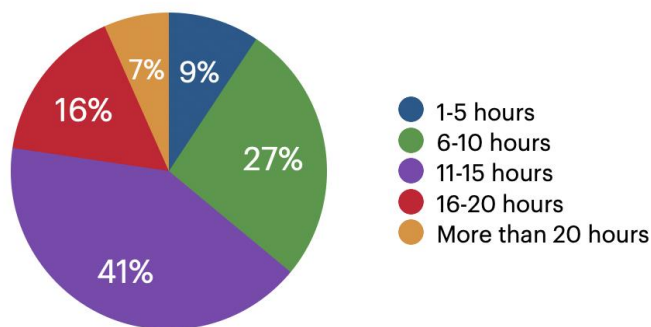
The survey results showed high satisfaction, rating the quality of their professional learning experience an average of 4.58 out of 5 stars. Four main themes emerged from the open-ended feedback responses and the reflections: a) positive interactions with a facilitator, b) increased digital fluency and practical applications of digital tools to teaching; c) appreciation of research-based PD; and d) increased self-awareness.

First, the frequent, positive interactions with a facilitator was an essential part of participants' recognition of the impact of warm demander pedagogy. One participant noted, "my facilitator taught me how to be a Humanized instructor by her own behavior in the class." This theme reinforces the value of facilitated asynchronous PD in higher education because learning is inseparable from doing; therefore, context matters (Brown et al., 1989). College faculty who have not experienced how it feels to have a mentor on the other side

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[1] To view a collection of Humanizing Showcases go to: https://humanizeol.org/showcases

of the screen who cares about their learning and is there to support their success may not be able to model these behaviors themselves. A math faculty participant shared,

> One of my most valuable takeaways … is the notion of a compassionate demander. The two concepts are not mutually exclusive…. By accepting late work and allowing second chances and corrections I put the emphasis on the quality of my students' work.

This quote is especially telling because the Academy's content did not explicitly provide instruction about changing late policies. This shift was influenced by the interactions between the participant and their lead facilitator. Another participant, a physics professor, shared,

> One of my key takeaways is that without the high level of instructor presence in this course, I would not be on my way to completing the course. I did receive more instructor support, warm feedback and encouragement than I remember ever having in any previous class I have had online. Best professional development activity I have participated in in 11 years in higher ed teaching!

Facilitated asynchronous online PD is time and resource intensive, but it offers an array of opportunities for preparing faculty to grow into equitable online instructors.

The second theme from the participant feedback is that faculty were satisfied with their increase in digital fluency and practical applications of digital tools to their teaching. The faculty developers designed and facilitated the Academy with the intent of creating an inclusive climate in which vulnerability is valued as courage and as the birthplace of creativity and innovation (Brown, 2012). This was essential to ensure participants experienced a humanized online course but, based on past experiences, it was also integral to supporting growth in the area of equity and the use of new technologies. Creating digital content, like websites and video recordings of oneself, and sharing it with peers is a vulnerable experience for college faculty, in particular those in STEM. To be willing to be seen by peers as a learner requires faculty to feel safe and supported. To help establish an inclusive climate, the facilitators actively modeled their own imperfect presence, acknowledging mistakes, and sharing struggles. The faculty developers hypothesized, based on past experiences, that this behavior is critical to foster growth in the area of equity and digital fluency in college faculty. The survey results affirm this hypothesis. One participant said, "think of arriving with an empty tool belt … you'll leave with it full AND the knowledge that goes along with utilizing those tools for our students' benefit!" When asked, "what was your greatest takeaway?" another participant shared, "be willing to experiment with new tools to help increase student's [sic] outcomes!" Professional development that supports equitable online teaching must bring theory and practice together. If faculty leave a professional learning experience with new knowledge and mindsets about equity but without practical skills to put them into action in their courses, online students will continue to be left out and equity gaps will persist.

The third theme that emerged from the survey is the importance of grounding PD in research. One participant shared, "organized, research-based training like this is pure gold." Participant feedback suggests that research-grounded professional learning influences faculty willingness to try new approaches, as well. This notion is reflected in the following participant quote:

> I've been told before that short, imperfect videos can be great tools in online courses. Many times actually. But I haven't used them widely. Why? Because no one took the time to explain WHY they work and WHAT they do.

For STEM faculty especially, data-driven research provides the impetus for questioning assumptions and affecting change. The survey feedback indicates that in a PD setting, faculty respond more willingly when new activities and behaviors are supported by well-summarized and documented evidence.

Finally, the fourth theme that emerged from participant feedback and reflections was growth in the area of self-awareness, which is noted by Dewsbury and Brame (2019) as a key competency for inclusive teaching. STEM faculty participants showed growth in several different areas of their professional identities. For some, this growth was simply a recognition of their need to improve. As one STEM faculty noted, "I thought I was an excellent online instructor before I took this course. But I was wrong. This training taught me that I was missing big pieces about equity, engagement, and empathy in my instruction." Other participants made more significant growth including shifts in their perception of the nature of instructor-student relationships. These changes were influenced by reflecting on their past experiences in education, as students, and/or instructors. The following quote from a participant offers an example:

> I carried many traumas and pains from my own undergraduate STEM experience.... It was not the course material that was challenging for me, it was the feeling of not being cared for and simply being a number on my ID card. I felt that I was a dollar commodity for the department and not a person.... Now... I have a deeper understanding of myself and how I can improve my own courses.... In many ways, I have held myself back from my true nature and have tried to work within what I thought were the "rigid expectations" for a professor. However, I now have a deeper understanding of how important emotions are in learning.

The importance of the affective domain in learning has gained attention in recent years (Cavanaugh, 2016; Eyler, 2018), and as feedback like this indicates, teachers can become liberated to break the cycle of distant, dispassionate teaching when provided evidence for alternatives and opportunities to reflect on their own experiences. Many teachers may sense the need for change but are hampered by tradition and the vague notion that becoming more inclusive and adopting more humanized practices might cause them to be professionally ostracized or even put their careers at risk. In a facilitated PD cohort, peers establish community through shared experiences and acquire the critical mass necessary to challenge traditionally cold notions of acceptable teaching styles and behaviors.

The survey results indicated that participants found the eight humanizing elements to be highly relevant to equitizing their online course. As shown in Table 2 below, when participants were asked, "how relevant is each element in equitizing your online course?" nearly all of the 75 participants (89%–97%) rated all of the elements as relevant or very relevant. The humanizing element rated most relevant (97.2%) to equitizing an online STEM course is the self-affirming ice breaker and the liquid syllabus received the lowest overall relevance rating at 89.4%. Going into the Academy, the faculty development team was cognizant that the eight humanizing elements can be applied to any discipline. There was an interest in determining whether STEM faculty would perceive the elements as relevant to their own disciplines. These findings suggest that the elements are relevant to equitizing STEM online courses.

Table 2: *Perceived Relevance of Each Humanizing Element*

Humanizing Element	Not Relevant	Relevant or Very Relevant
Self-affirming Ice Breaker	2.6% (2)	97.2% (73)
Wisdom Wall	5.3% (4)	94.6% (71)
Getting to Know You Survey	6.6% (5)	93.3% (70)
Humanized Course Card & Homepage	6.6% (5)	93.3% (70)
Bumper Video	9.3% (7)	90.6% (68)
Microlecture	9.3% (7)	90.6% (68)
Wise, Warm Feedback	9.3% (7)	90.6% (68)
Liquid Syllabus	10.6% (8)	89.5% (67)

The survey provided valuable insights about the participants' satisfaction with various elements of the Academy. Faculty development, just like teaching, is an iterative process that should be continuously improved by leveraging feedback from participants. While the survey showed very high satisfaction ratings across all aspects of the Academy, results revealed opportunities for improvement. As illustrated in Table 3, out of all of the elements included in the survey, at least 90% of participants rated their satisfaction with the following elements either a 4 or 5 on a 1 to 5 scale: facilitator responsiveness, facilitator feedback, quality of content, opportunities to learn new technologies. Clarity of instructions received an 86.7% overall satisfaction rating (the sum of all 4 and 5 scores) and 84% of participants were satisfied with the course design. The element that received the lowest ratings was opportunities to interact with peers (76%). This data will be used to incorporate more peer-to-peer interaction through equity-related discussions in the Academy, which will also provide more opportunities to grow in the area of equity, the element that received the second lowest rating (83.9%).

Table 3: *Participant Satisfaction with Academy Elements*

Academy Element	Overall Satisfaction Rate*
Facilitator responsiveness	94.6% (71)
Facilitator feedback	93.3% (70)
Quality of content	90.6% (68)
Opportunities to learn new technologies	90.6% (68)
Clarity of instructions	86.7% (65)
Course design	84% (63)
Opportunities to grow in the area of equity	83.9% (63)
Opportunities to interact with peers	76% (57)

*A 1–5 point Likert scale was used. Overall satisfaction rate is the sum of all 4 and 5 scores for each element.

Implications and Next Steps

The moment is ripe for change. After the pandemic, more students recognize that online courses enable them to take more units with less disruption to their work and family. And online classes make college a possibility for students who have otherwise been shut out of the face-to-face paradigm. Student demand for online courses has influenced the prediction that nearly all college students will blend both online and face-to-face courses into their schedules by 2025 (Garrett, 2022). Higher education leaders identify PD for online teaching as a high priority (Garrett, 2022) to make this change. To support diverse students and close equity gaps, PD must center inclusion and belonging—regardless of course modality.

Participant feedback from the Humanizing Online STEM Academy sheds light on how the eight humanized online teaching elements paired with warm demander pedagogy can transform mindsets and practice in STEM. Achieving equity requires STEM faculty to possess particular attitudes, knowledge, and skills that cannot be learned through a mere checklist. Rather, this is an ongoing, iterative journey that has no distinct end point. Given that PD is an important vehicle for change, institutions and faculty developers can leverage this model to shift STEM from a "weed out" culture to a culture of care.

Professional development has the capacity to shift existing mindsets and practices in ways that equitize learning experiences. Institutions have a commitment and moral/social obligation to invest in meaningful, high-quality PD as equity infrastructure that centers inclusive teaching and learning across modalities (Fox et al., 2021). This equates to providing access to PD, incentivizing, rewarding, and recognizing faculty efforts to shift culture. Faculty developers can adopt and facilitate the Humanizing Online STEM Academy[1] with warm demander pedagogy—pairing care and challenge—but doing so requires institutions to have available and prepared staff to facilitate the program. That too is an investment in equity.

Research about the Humanizing Online STEM Academy is forthcoming. The findings will examine the impact of the Academy on faculty perceptions and teaching behaviors, as well as the experiences of students in humanized online courses with a particular focus on students from racially minoritized groups. It is our hope that it will make a meaningful contribution to research about belonging in online classes and help guide educators and institutional leaders as they strive towards achieving equity. Opportunities exist to explore further research about how each of the eight elements influence student experiences, as well as explore the institutional factors that influence or deter the adoption of humanized online teaching.

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[1] The Academy is available in the Canvas Commons by searching for #HumanizingSTEM.

References

Alier, M., Casañ Guerrero, M. J., Amo, D., Severance, C., & Fonseca, D. (2021). Privacy and e-learning: A pending task. *Sustainability, 13*(16), 9206. https://doi.org/10.3390/su13169206

Al-Harthi, A. S. (2014). An analysis of culture-focused articles in open, distance, and online education journals. In I. Jung & C. N. Gunawardena (Eds.), *Culture and online learning: Global perspectives and research* (pp. 161–173). Stylus.

Allington, R., & McGill-Franzen, A. (1989). School response to reading failure: Chapter 1 and special education students in grades two, four, and eight. *Elementary School Journal*, *89*(5), 529–542. https://doi.org/10.1086/461590

Aman, J. R., & Shirvani, S. (2006). Dick and Jane online: Considering online coursework. *Journal of Computing Sciences in Colleges, 21*(3), 131–138.

Ambady, N., & Rosenthal, R. (1993). Half a minute: Predicting teacher evaluations from thin slices of nonverbal behavior and physical attractiveness. *Journal of Personality and Social Psychology, 64*(3), 431–441. https://doi.org/10.1037/0022-3514.64.3.431

Anderson, M. (2015, April 30). *Racial and ethnic differences in how people use mobile technology*. Pew Research Center.

Bambara, C. S., Harbour, C. P., Davies, T. G., & Athey, S. (2009). Delicate engagement: The lived experience of community college students enrolled in high-risk online courses. *Community College Review, 36*(3), 219–238. https://doi.org/10.1177/0091552108327187

Baylor, E. (2016, Oct 13). *Closed doors: Black and Latino students are excluded from top public universities*. American Progress. https://www.americanprogress.org/article/closed-doors-black-and-latino-students-are-excluded-from-top-public-universities/

Bendickson, M. M. (2004). *The impact of technology on community college students' success in remedial/developmental mathematics*. [Doctoral dissertation, University of South Florida]. Scholar Commons. https://scholarcommons.usf.edu/etd/956

Bennett, J. C., Lattuca, L., Redd, K., & York, T. (2020). *Strengthening pathways to faculty careers in STEM: Recommendations for systemic change to support underrepresented groups*. Association of Public and Land-grant Universities. https://doi.org/10.31219/osf.io/69mec

Bensimon, M. B., & Gray, J. (2020, Jun 04). First-generation equity practitioners: Are they part of the problem? *Change: The Magazine of Higher Learning, 52*(2), 69–73. https://doi.org/10.1080/00091383.2020.1732790

Berlin, K., & Weavera, K. V. (2022). Teaching strategies students find helpful in online learning courses. *College Teaching, 70*(3), 319-327. https://doi.org/10.1080/87567555.2021.1940814

Blum, S. (2020). *Ungrading: Why rating students undermines learning and what to do instead*. West Virginia University Press.

Borup, J., West, R., & Graham, C. R. (2012). Improving online social presence through asynchronous video. *The Internet and Higher Education, 15*(3), 195–203. https://doi.org/10.1016/j.iheduc.2011.11.001

Borup, J., West, R. E., & Graham, C. R. (2013). The influence of asynchronous video communication on learner social presence: A narrative analysis of four cases. *Distance Education, 34*(1), 48–63. http://dx.doi.org/10.1080/01587919.2013.770427

Bowlby, J. (1969). *Attachment and loss: Vol. 1. Loss*. Basic Books.

Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation*. Basic Books.

Brown, B. (2012). *Daring greatly: How the courage to be vulnerable transforms the way we live, love, parent and lead*. Gotham.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*(1), 32–42. https://doi.org/10.3102/0013189X018001032

California Community College Chancellor's Office (2017). *Distance Education Report*. https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Reports/Files/2017-DE-Report-Final-ADA.pdf

Carr, S. (2000, February 11). As distance education comes of age, the challenge is keeping the students. *Chronicle of Higher Education*. https://www.chronicle.com/article/as-distance-education-comes-of-age-the-challenge-is-keeping-the-students/

Casella, E., & Fowler C. (2005). *The archaeology of plural and changing identities: Beyond identification*. Springer.

CAST (2018). *Universal design for learning guidelines version 2.2* [graphic organizer]. https://udlguidelines.cast.org/

Cavanagh, S. R. (2016). *The spark of learning: Energizing the college classroom with the science of emotion*. West Virginia University Press.

Center for Urban Education, (n.d.). What is equity-mindedness? https://cue.usc.edu/equity/equity-mindedness/

Chen, X. (2009). *Students Who study science, technology, engineering, and mathematics (STEM) in postsecondary education*. Stats in Brief. NCES 2009-161. National Center for Education Statistics. https://nces.ed.gov/pubs2009/2009161.pdf

Cohen, G. L., & Garcia, J. (2014). Educational theory, practice, and policy and the wisdom of social psychology. *Policy Insights From the Behavioral and the Brain Sciences, 1*(1), 13–20. https://doi.org/10.1177/2372732214551559

Cohen, G., & Steele, C. M. (2002). A barrier of mistrust: How negative stereotypes affect cross-race mentoring. In J. Aronson (Ed.), *Improving Academic Achievement* (pp. 303–327). Academic Press. https://doi.org/10.1016/B978-012064455-1/50018-X

Coon, C. S. (1946). The universality of natural groupings in human societies. *The Journal of Educational Sociology. 20*(3), 163–168. https://doi.org/10.2307/2263780

Cosmides, L., Tooby, J., & Barkow, J. H. (1992). Introduction: Evolutionary psychology and conceptual integration. In: J. Barkow, L. Cosmides, J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture (3–15)*. Oxford University Press.

Cox, R. D. (2006). Virtual Access. In T. Bailey & V. S. Morest (Eds.), *Defending the community college equity agenda* (pp. 110–131). Johns Hopkins. https://muse.jhu.edu/book/3282

Darling-Hammond, L. (2001). *The right to learn: A blueprint for creating schools that work*. Jossey Bass.

Dewsbury, B., & Brame, C. (2019). Inclusive teaching. *CBE—Life Sciences Education, 18(*2), 1–5. https://doi.org/10.1187/cbe.19-01-0021

Eisenberg, E., & Dowsett, T. (1990). Student drop-out from a distance education project course: A new method of analysis. *Distance Education, 11*(2), 231–253. https://doi.org/10.1080/0158791900110205

Estrada, M., Eroy-Reveles, A., & Matsui, J. (2018). The influence of affirming kindness and community on broadening participation in STEM career pathways. *Social Issues and Policy Review, 12*(1), 258–297. https://doi.org/10.1111/sipr.12046

Eyler, J. (2018). *How humans learn: The science and stories behind effective college teaching*. West Virginia University Press.

Fox, K., Vignare, K., Yuan, L., Tesene, M., Beltran, K., Schweizer, H., Brokos, M., & Seaborn, R. (2021, December 14). *Strategies for implementing digital learning infrastructure to support equitable outcomes: A case-based guidebook for institutional leaders*. Every Learner Everywhere.

Freedberg, L. (2022, April 4). *Post-pandemic, will community college students keep choosing online instruction?* EdSource. https://edsource.org/2022/post-pandemic-will-community-college-students-keep-choosing-online-instruction/669761

Garrett, R., Simunich, B., Legon, R., & Fredericksen, E. E. (2022). CHLOE 7: *Tracking online learning from mainstream acceptance to universal adoption*: *The changing landscape of online education*. Quality Matters. https://www.qualitymatters.org/qa-resources/resource-center/articles-resources/CHLOE-7-report-2022

Garrison, H. (2013). Underrepresentation by race–ethnicity across stages of US science and engineering education. *CBE—Life Sciences Education, 12*(3), 357–363. https://doi.org/10.1187/cbe.12-12-0207

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2–3), 87–105. https://doi.org/10.1016/S1096-7516(00)00016-6

Gay, G. (2018). *Culturally responsive teaching: Theories, research, and practice*. Teachers College Press.

Goleman, D. (2006). *Social intelligence: The new science of human relationships.* Bantam.

Good, C., Rattan, A., & Dweck, C. S. (2012). Why do women opt out? Sense of belonging and women's representation in mathematics. *Journal of Personality and Social Psychology, 102*(4), 700–717. https://doi.org/10.1037/a0026659

Gunawardena, C. N. (2014). Supporting diverse online learners. In I. Jung & C. N. Gunawardena (Eds.), *Culture and online learning: Global perspectives and research* (pp. 79–90). Stylus.

Gunawardena, C. N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications, 1*(2), 147–166.

Gunawardena, C. N., & Zittle, F. J. (2009). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education, 11*(3), 8–26. https://doi.org/10.1080/08923649709526970

Hall, E. T. (1981). *Beyond culture*. Doubleday.

Hammond, Z. L. (2015). *Culturally responsive teaching and the brain: Promoting authentic engagement and rigor among culturally and linguistically diverse students.* Corwin.

Han, H. S. , Vomvoridi-Ivanovic´, E., Jacogs, J., Karanxha, Z., Topdemir, C., & Feldman, A. (2014). Culturally responsive pedagogy in higher education: A collaborative self-study. *Studying Teacher Education: A Journal of Self-study of Teacher Education Practices, 10*(3), 290–312. http://dx.doi.org/10.1080/17425964.2014.958072

Harnish, R. J., & Bridges, K. R. (2011). Effect of syllabus tone: Students' perceptions of instructor and course. *Social Psychology of Education, 14*(3), 319–330. https://doi.org/10.1007/s11218-011-9152-4

Harper, S. R. (2012). How higher education researchers minimize racist institutional norms. *The Review of Higher Education, 36*(1), 9–29. https://doi.org/10.1353/rhe.2012.0047

Harrison, C., & Tanner, K. D. (2018). Language matters: Considering microaggressions in science. *CBE—Life Sciences Education, 17*(1), fe4. https://doi.org/10.1187/cbe.18-01-0011

Hatfield, N., Brown, N., & Topaz, C. M. (2022). Do introductory courses disproportionately drive minoritized students out of STEM pathways? *PNAS Nexus, 1*(4), 167. https://doi.org/10.1093/pnasnexus/pgac167

Hicks D. (2011). *Dignity: The essential role it plays in resolving conflict*. Yale University Press.

Hook, J. N., Davis, D. E., Owen, J., Worthington, E. L., Jr., & Utsey, S. O. (2013). Cultural humility: Measuring openness to culturally diverse clients. *Journal of Counseling Psychology, 60*(3), 353–366. https://doi.org/10.1037/a0032595

Hurtado, S., & Carter, D. F. (1997). Effects of college transition and perceptions of the campus racial climate on Latino college students' sense of belonging. *Sociology of Education, 70*(4), 324–345. https://doi.org/10.2307/2673270

Ice, P., Swan, K., Diaz, S., Kupczynski, L., & Swan-Dagen, A. (2010). An analysis of students' perceptions of the value and efficacy of instructors' auditory and text-based feedback modalities across multiple conceptual levels. *Journal of Educational Computing Research*, *43*(1), 113–134. https://doi.org/10.2190/EC.43.1.g

Immordino-Yang, M. H. (2016). *Emotions, learning, and the brain: Exploring the educational implications of affective neuroscience*. W.W. Norton & Company.

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

Jaschik, S., & Lederman, D. (2018). *The 2018 Inside Higher Ed survey of faculty attitudes on technology*. Inside Higher Ed. https://mediasite.com/wp-content/uploads/2018/11/2018-Faculty-Survey-Mediasite.pdf

Johnson, D. R. (2012). Campus racial climate perceptions and overall sense of belonging among racially diverse women in STEM majors. *Journal of College Student Development, 53*(2), 336–346. https://doi.org/10.1353/csd.2012.0028

Jung, I., & Gunawardena, C. N. (2014). A cultural approach to research and practice in online learning. In I. Jung & C. N. Gunawardena, (Eds.), *Culture and online learning: Global perspectives and research* (pp. 186–195). Stylus.

Kaplan-Rakowski, R. (2021). Addressing students' emotional needs during the COVID-19 pandemic: A perspective on text versus video feedback in online environments. *Educational Technology Research and Development, 69*(1), 133–136. https://doi.org/10.1007/s11423-020-09897-9

Kaupp, R. (2012). Online penalty: The impact of online instruction on the Latino-White achievement gap. *Journal of Applied Research in the Community College, 19*(2), 3–11.

Kelman, H. C., & Fisher, R. (2017). A pioneer in the social psychology of conflict analysis and resolution. Springer.

Kizilcec, R. F., & Saltarelli, A. J. (2019). *Psychologically inclusive design: Cues impact women's participation in STEM education*. CHI '19: Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, Paper 474, 1–10. https://doi.org/10.1145/3290605.3300704

Kizilcec, R. F., Saltarelli, A. J., Reich, J., & Cohen, G. L. (2017). Closing global achievement gaps in MOOCs. *Science, 355*(6322), 251–252. https://doi.org/10.1126/science.aag2063

Kleinfeld, J. (1975). Effective teachers of Eskimo and Indian students. *School Review, 83*, 301–304. https://doi.org/10.1086/443191

Kruk, M., & Matsick, J. L. (2021). A taxonomy of identity safety cues based on gender and race: From a promising past to an intersectional and translational future. *Translational Issues in Psychological Science, 7*(4), 487–510. https://doi.org/10.1037/tps0000304

Kumagai, A. K., & Lypson, M. L. (2009). Beyond cultural competence: Critical consciousness, social justice, and multicultural education. *Academic Medicine*, *84*(6), 782–787. https://doi.org/10.1097/ACM.0b013e3181a42398

Ladson-Billings, G. (1994). *The dreamkeepers: Successful teachers of African-American children*. Jossey Bass.

Lieberman, M. D. (2013). *Social: Why our brains are wired to connect*. Crown.

Lin, L. C., Hung, I., & Chen, N. S. (2019). The impact of student engagement on learning outcomes in a cyber-flipped course. *Educational Technology Research and Development*, *67*(6), 1573–1591. https://doi.org/10.1007/s11423-019-09698-9

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370–396. https://doi.org/10.1037/h0054346

Merolla, D. M., & Jackson, O. (2019). Structural racism as the fundamental cause of the academic achievement gap. *Sociology Compass, 13*(6), e12696. https://doi.org/10.1111/soc4.12696

Meyer, K. A., & Murrell, V. S. (2014). A national study of theories and their importance for faculty development for online teaching. *Online Journal of Distance Learning Administration, 17*(2), 1–25. https://ojdla.com/archive/summer172/Meyer_Murrell172.pdf

Mezirow, J. (1991). *Transformative dimension of adult learning*. Jossey-Bass.

Murphy, M. C., & Taylor, V. J. (2012). The role of situational cues in signaling and maintaining stereotype threat. In M. Inzlicht & T. Schmader (Eds.), *Stereotype threat: Theory, process, and application* (pp. 17–33). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199732449.003.0002

Nodding, N. (2013). *Caring: A relational approach to ethics and moral education*. University of California Press.

Oakes, J. (2005). *Keeping track: How schools structure inequality*. Yale University Press.

Omotola McGee, E. (2021). *Black, brown, bruised: How racialized STEM education stifles education.* Harvard Education.

Ortagus, J. C. (2022). *Digitally divided: The varying impacts of online enrollment on degree completion*. University of Florida, Institute of Higher Education. https://ihe.education.ufl.edu/wp-content/uploads/2022/08/IHE-Working-Paper-2201_Digitally-Divided.pdf

Otero-Diaz, M., & Salazar, M. (2021). *Impact of MESH teaching strategies on Latinx and URM students' self-reported engagement in online environmental engineering courses in a Hispanic Serving Institution*. American Society for Engineering Education Pacific Southwest Conference—"Pushing Past Pandemic Pedagogy: Learning from Disruption," April 23–April 25, 2021, virtual conference. https://peer.asee.org/38235

Oyarzun, B., Barreto, D., & Conklin, S. (2018). Instructor social presence effects on learner social presence, achievement, and satisfaction. *TechTrends, 62*(6), 625–634. https://doi.org/10.1007/s11528-018-0299-0

Pacansky-Brock, M. (2021). The liquid syllabus: an antiracist teaching element. *C2C Digital Magazine, 1*(15), 2.

Pacansky-Brock, M. (2020). How to humanize your online class, version 2.0 [Infographic]. https://humanizeol.org/infographic/

Pacansky-Brock, M. (2017). Best practices for teaching with emerging technologies (2nd ed.). Routledge. https://doi.org/10.4324/9781315629292

Pacansky-Brock, M. (2014, August 13). The liquid syllabus: Are you ready? [blog post]. https://brocansky.com/2014/08/the-liquid-syllabus-are-you-ready.html

Pacansky-Brock, M., Smedshammer, M., & Vincent-Layton, K. (2020). Humanizing online teaching to equitize higher education. *Current Issues in Education, 21*(2), 1–21. https://cie.asu.edu/ojs/index.php/cieatasu/article/view/1905

Park, J. J., Kim, Y. K., Salazar, C., & Hayes, S. (2020). Student-faculty interaction and discrimination from faculty in STEM: The link with retention. *Research in Higher Education, 61*, 330–356. https://doi.org/10.1007/s11162-019-09564-w

Park, J. J., Kim, Y. K., Salazar, C., & Eagan, M. K. (2022). Racial discrimination and student–faculty interaction in STEM: Probing the mechanisms influencing inequality. *Journal of Diversity in Higher Education, 15*(2), 218–229. https://doi.org/10.1037/dhe0000224

Patterson, M. L., Foster, J. L., & Bellmer, C. D. (2001). Another look at accuracy and confidence in social judgments. *Journal of Nonverbal Behavior, 25*(3), 207–219. https://doi.org/10.1023/A:1010675210696

Patterson, M. L., & Stockbridge E. (1998). Effects of cognitive demand and judgment strategy on person perception accuracy. *Journal of Nonverbal Behavior, 22*(4), 253–263. https://doi.org/10.1023/A:1022996522793

Peacock, S., Cowan, J., Irvine, L., & Williams, J. (2020). An exploration into the importance of a sense of belonging for online learners. *International Review of Research in Open and Distributed Learning, 21*(2), 18–35. https://doi.org/10.19173/irrodl.v20i5.4539

Plotts, C. (2018). Latino/a cultural perspectives of social presence: A case study. *International Journal of Educational Technology, 5*(1), 29–36. https://files.eric.ed.gov/fulltext/EJ1182236.pdf

Rainey, K., Dancy, M., Mickelson, R., Stearns, E., & Moller, S. (2018). Race and gender differences in how sense of belonging influences decisions to major in STEM. *International Journal of STEM Education, 5*(1), 1–14. https://doi.org/10.1186/s40594-018-0115-6

Rendón, L. (1994). Validating culturally diverse students: Toward a new model of learning and student development. *Innovative Higher Education, 19,* 33–51. https://doi.org/10.1007/BF01191156

Riegle-Crumb C., & King, B. (2010). Questioning a White male advantage in STEM: Examining disparities in college major. *Educational Researcher, 39*(9), 656–664. https://doi.org/10.3102/0013189X10391657

Riegle-Crumb, C., King, B., & Irizarry, Y. (2019). Does STEM stand out? Examining racial/ethnic gaps in persistence across postsecondary fields. *Educational Researcher, 48*(3), 133–144. https://doi.org/10.3102/0013189X1983100

Rovai, A. P., & Wighting, M. J. (2005). Feelings of alienation and community among higher education students in a virtual classroom. *The Internet and Higher Education, 8*(2), 97–110. https://doi.org/10.1016/j.iheduc.2005.03.001

Seymour, E. (1995). The loss of women from science, mathematics, and engineering undergraduate majors: An explanatory account. *Science Education, 79*(4), 437–473. https://doi.org/10.1002/sce.3730790406

Smith, J. L., Lewis, K. L., Hawthorne, L., & Hodges, S. D. (2013). When trying hard isn't natural: Women's belonging with and motivation for male-dominated STEM fields as a function of effort expenditure concerns. *Personality and Social Psychology Bulletin, 39*(2), 131–143. https://doi.org/10.1177/0146167212468332

Spitzer, B., & Aronson, J. (2015). Minding and mending the gap: Social psychological interventions to reduce educational disparities. *The British Psychological Society, 85,* 1–18. https://doi.org/10.1111/bjep.12067

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist, 52*(6), 613–629. https://doi.org/10.1037/0003-066X.52.6.613

Steele, C. M. (2010). *Whistling Vivaldi: How stereotypes affect us and what we can do*. W.W. Norton & Company.

Steele, C. M., & Aronson, J. (1995). *Stereotype threat and intellectual test performance of African Americans. Journal of Personality and Social Psychology, 69*, 797–811. https://doi.org/10.1037/0022-3514.69.5.797

Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and identity threat. *Advances in Experimental Social Psychology, 34*, 379–440. https://doi.org/10.1016/S0065-2601(02)80009-0

Strayhorn, T. L. (2008). Sentido de pertenencia: A hierarchical analysis predicting sense of belonging among Latino college students. *Journal of Hispanic Higher Education, 7*(4), 301–320. https://doi.org/10.1177/1538192708320474

Strayhorn, T. L. (2018). *College students' sense of belonging: A key to educational success for all students*. Routledge.

Taylor, M., & Turk, J. M. (2019). *Race and ethnicity in higher education: A look at low-income undergraduates*. American Council on Education and The Andrew W. Mellon Foundation. https://www.equityinhighered.org/wp-content/uploads/2019/11/Low-Income-Students-Brief-final.pdf

Tervalon M., & Murray-Garcia, J. (1998). Cultural humility versus cultural competence: A critical distinction in defining physician training outcomes in multicultural education. *Journal of Health Care for the Poor and Underserved*, *9*(2), 117–125. https://doi.org/10.1353/hpu.2010.0233

Thoman, D. B., Arizaga, J. A., Smith, J. L., Story, T. S., & Soncuya, G. (2014). The grass is greener in non-science, technology, engineering, and math classes: Examining the role of competing belonging to undergraduate women's vulnerability to being pulled away from science. *Psychology of Women Quarterly, 38*(2), 246–258. https://doi.org/10.1177/0361684313499899

Thomas, L., Herbert, J., & Teras, M. (2014). A sense of belonging to enhance participation, success and retention in online programs. *The International Journal of the First Year in Higher Education, 5*(2), 69–80. https://doi.org/10.5204/intjfyhe.v5i2.233

Walton, G. M., & Cohen, G. L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. *Science, 331*(6023), 1447–1451. https://doi.org/10.1126/science.1198364

Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology, 92*(1), 82. https://doi.org/10.1037/0022-3514.92.1.82

Xie, Y., Fang M., & Shauman K. (2015). *Annual Review of Sociology, 41*(1), 331–357. https://doi.org/10.1146/annurev-soc-071312-145659

Xu, D., & Jaggars, S. (2011). *Online and hybrid course enrollment and performance in Washington State community and technical colleges*. Community College Research Center, Teachers College, Columbia University. https://doi.org/10.7916/D8862QJ6

Wood, J. L. (2019). *Black minds matter: Realizing the brilliance, dignity, and morality of black males in education*. Montezuma.

Wood, J. L., Harris, F., III, & White, K. (2017). *Teaching men of color in the community college: A guidebook*. Lawndale Hill. https://doi.org/10.36851/jtlps.v6i1.490

Yeager, K. A., & Bauer-Wu, S. (2013) Cultural humility: Essential foundation for clinical researchers. *Applied Nursing Research, 26*(4), 251–256. https://doi.org/10.1016/j.apnr.2013.06.008

Yeager, D. S., & Walton, G. M. (2011). Social-psychological interventions in education: They're not magic. *Review of Educational Research, 81*(2), 267–301. https://doi.org/10.3102/00346543114059