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A Response to the NASEM Draft Report of Equitable and Effective Teaching

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Overview

We appreciate the opportunity to offer feedback to the committee on *Equitable and Effective Teaching in Undergraduate STEM Education: A Framework for Institutions, Educators, and Disciplines* being run by the Board on Science Education at the National Academies. In this overview, we offer overall feedback on strengths of the draft and suggest areas we think could be improved. Subsequently, we provide specific feedback related to the content of each chapter offered in the draft report.

Overall Strengths of the Current Draft

The current draft has three strengths that we hope the committee will sustain as they continue to work on improvements. First, we believe that organizing the report around 10 principles is helpful for making this report accessible to novice and more experienced teachers. We encourage the committee to keep the report to 10 principles or less as we found that to be useful for how much can be "held" at one time and still be impactful. Second, focusing on how people learn is a valuable entry point into why it might matter to pursue and enact equitable and effective teaching in STEM. The focus on learning aligns with the purpose of education – to advance learning for everyone even as we also attend to nuances that make that learning more possible across the board but also specifically for students who have been most excluded historically within higher education. Third, writing the principles in ways that can be accessible for novice teachers make the report and its recommendations inclusive for all teachers (new and more experienced). With that said, it may be helpful to offer some thoughts on how this report can be used by instructors early in their career and what might be more advanced steps within each principle that lend themselves to more experienced instructors.

Overall Developmental Feedback

The current draft foregrounds effective teaching with the principles as good guideposts. The draft, however, attends to equity as a secondary focus. It may be useful for the committee to clarify in the writing of principles how the committee is holding both equity and effective teaching as equally important ideas. For instance, does the committee hold the view that effective teaching can consider aspects of equity or that equitable teaching can also be effective or that equitable teaching is effective teaching? Each of these will modify how the committee writes each principle in terms of what is foregrounded (or held side by side) in the explanation of the principle and the examples provided to showcase what it means in practice.

The current draft has key seminal sources relative to effective teaching with a few of them also being about equitable teaching. These are important to keep as foundational sources. We recommend that the committee, however, meaningfully integrate more recent scholarship that add additional nuance and complexity to the thinking around effective as well as equitable teaching. It is important to not only add in these citations, but also to carefully consider how these "voices" might reshape the principles themselves. In some places, this will mean a seamless lineage of citations. In other places, it may require the committee to rethink the details of the principles. Relatedly, we encourage the committee to critically examine the reference list prior to finalizing the draft to consider the diversity of thought and representation in the thought partners (references) the committee has consulted for this report.

As noted above, we value that the report currently emphasizes how people learn. The current draft lays out key points about how students learn and what instructors can overall do to create an environment where such learning happens. We want to encourage the committee to also emphasize that faculty are learners too. Instructors need to learn and know their disciplines

well (content knowledge), they need to know about pedagogy (how to teach overall as well as to novice learners, and they need to learn how to integrate these two types of knowledge given who their students are and the context of the teaching and learning environment. The coming together of these types of knowledge is referred to as Pedagogical Content Knowledge (PCK). Learning and developing PCK requires time, support, and a growth-mindset from instructors, as well as from the institutions where they work. In addition, not all instructors are supported in the same way around their teacherly learning. Please refer to the following works as seminal scholarship on these ideas, but also consider more recent scholarship related to PCK:

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.

Shulman, L. S. (2004). *Teaching as community property: Essays on higher education.* Jossey-Bass.

Lastly, we want to encourage the committee to be more direct in their language. For instance, there are places in the document that refer to bias (e.g., p. 5), but are not explicit about what kind of bias the committee is referencing. Does it matter for equitable and effective teaching? Consider when the language is ambiguous and whether being more explicit aligns with the commitment toward equitable and effective teaching. Also, we encourage the committee to deepen the integration of intersectionality – including its full focus on the systems of power that impinge on intersecting identities. Kimberlé Crenshaw's (2017) book *On intersectionality: Essential writings* could be helpful. As we conclude this overview, we are encouraged by the work done by the committee thus far and offer additional feedback to support specific elements within each chapter.

Chapter 1: Feedback on the Introduction

Chapter one includes some initial introductory information, emphasizes the need for change based on current conceptions of undergraduate STEM education, provides an overview of the study charge, and offers key framework terminology for the reader to consider. This chapter begins with an opening paragraph outlining the benefits of STEM education that can foster innovation, enhance national security, and promote economic growth. Although true, we encourage the committee to provide a stronger warrant for the study from the onset. Two questions to consider when grounding this study are: (1) Why is the consensus study essential at this juncture? and (2) What are some of the sociopolitical realities impacting undergraduate STEM education? Answers to these questions could potentially better align this study with the overall committee charge.

In the ensuing paragraph, we agree with the committee's assessment regarding undergraduate STEM education not fully delivering on its promises and creating inequities for marginalized groups. Next, the draft report suggests that in undergraduate STEM education, several commonly used teaching practices and institutional policies can inadvertently contribute to a situation where membership in marginalized groups correlates with academic performance and educational attainment. The following sentence states, "these inequities have significant costs to the nation." What inequities are you referencing and what are the costs to the nation? The committee may want to make connections to earlier mentions of innovation, national security, and economic growth in addition to other contemporary issues.

We agree that content knowledge is important, and that teaching must center pedagogy. To close some of the gaps in college student success, it is paramount for instructors to place pedagogy at the center of their efforts (Gannon, 2018). With that said, we encourage the

committee to engage with the previously mentioned PCK literature and consider foregrounding this content in the introduction. Another point of agreement from the draft report is that equitable and effective teaching is dependent on changes to the system. Consider thinking about the system through a broader ecosystem approach to teaching improvement. Furthermore, we strongly urge the committee to clarify the relationship between equity and effective teaching. Are they mutually reinforcing principles? Is equity a foundational principle that underpins effective teaching? The committee could also emphasize the ongoing nature of the relationship between equity and effective teaching, highlighting the need for continuous reflection, assessment, and improvement. This approach acknowledges that achieving both equity and effective teaching requires ongoing effort and adaptation to evolving student needs and societal contexts. Ultimately, the committee's view on the relationship between equity and effective teaching should be reflected in the principles they develop, ensuring a clear and coherent framework that guides decision-making and practice in undergraduate STEM education.

We appreciated the section titled, *Need for Change* in the introduction. Within, the draft report acknowledges how undergraduate STEM teaching has moved from a didactic, unilateral, instructor-centered, and in-person lectures to one that considers deliberate active learning strategies. The report then introduces the scoping review by Stentiford and Koutsouris (2021) where they map the field of inclusive pedagogies in higher education. The draft then advocates for policy changes needed to better support individuals enacting change to improve student learning environments and the challenges associated with implementing equitable and effective teaching at a large scale. This section concludes by acknowledging some sociocultural issues impacting undergraduate STEM education that include racism and sexism, historical admissions exclusionary practices, racial and gender disparities in faculty recruitment and retention, and

narrowly defined conceptions of diversity that excludes other groups who have been historically marginalized. This content is paramount and the committee should consider reorganizing the introduction to center these issues earlier to create a stronger warrant. The introduction concludes with the explicit committee charge and the definitions of the following terms: equitable, effective, inclusive, and framework. We appreciate the ways in which the committee was thoughtful about these definitions and encourage them to continue grappling with and potentially redefining them as they embark upon the second phase of their work as outlined in the study charge.

In sum, as stated in the study charge, this draft report was designed to organize what is known about teaching and learning in undergraduate STEM contexts and the final consensus report will provide guidance on anchoring conversations to improve student learning experiences. We look forward to seeing how this important work evolves.

References and Additional Resources to Consider

Gannon, K. (2018). *The case for inclusive teaching.* Chronicle of Higher Education. Retrieved from https://www.chronicle.com/article/thecase-for-inclusive-teaching/. Accessed January 22, 2024.

Stentiford, L. & Koutsouris, G. (2021). What are inclusive pedagogies in higher education? A systematic scoping review. *Studies in Higher Education*, 46(11), 2245-2261

Chapter 2: Feedback for Principles 1-7

In this section, we offer feedback on each of the seven principles outlined in the framework for equitable and effective teaching in undergraduate STEM education.

Principle 1: Learners Need Opportunities to Actively Engage in Disciplinary Learning

We appreciate the committee centering that learners need opportunities to actively engage in disciplinary learning. With that said, while active learning and disciplinary learning are key to effective teaching, it is important to not convey these ideas as wholesale solutions for ensuring equity is also happening in the classroom. It is important to integrate a critical lens into what it means to employ student-centered approaches in the classroom that is attentive to equity. One can have student-centered approaches that are effective, but not equitable in experience or outcome. Critical questions to hold while considering integration of student-centered approaches are: How exactly will this practice be enacted? Who will benefit from it? In what way? Who may not benefit? How so? What does an instructor need to know (and know well) before enacting student-centered approaches? The committee may want to reframe the principle so it begins with elements that may be guiding the instructor such that equitable active learning is happening.

Related to engaging students in authentic tasks such as problem-based and project-based learning, we encourage the committee to integrate more recent scholarship that offers a critique of these approaches as well as consider integrating nuances that could be helpful for balancing the perspective of these approaches. Wilson et al. (2018) for example offers a useful review for all the elements that go into creating and maintaining successful groups. For instance, if respectful group norms are not established before the implementation of group activities, groups can simply serve as small scale reinforcement of toxic default behaviors. Closer studies on group work have moved away from simply assuming that the mere implementation of group work is

key to good academic outcomes, and now pay attention to the ways in which group work can promote deliberative and difficult dialogues (Rain-Griffith et al., 2020). We also want to encourage the committee to be more critical about what authentic means. Might there be problems within what is currently considered "authentic" problems and tasks within the discipline? And, how might "authentic" problems be happening in students' lives that can be brought into the classroom in meaningful and responsible ways?

Related to providing opportunities for students to actively practice and apply disciplinary skills in courses, laboratory experiences, and via programs such as internships, we want to encourage the committee to consider integrating the value of this work outside of the formal classroom to local communities. In other words, what might it look like for instructors to create authentic and "service" oriented learning experiences that are mutually beneficial to students and local communities who can benefit from this exchange? This may be a way to provide students and instructors alike opportunities to practice and apply disciplinary skills and knowledge in real-world contexts that then can advance disciplinary learning, transfer of knowledge, while experiencing real-world challenges and impacts of such disciplinary work. In addition, we encourage the committee to consider how internal opportunities including laboratory experiences and internships can be redesigned and approached from a culturally relevant perspective.

In terms of the point about "shift to more student-centered instructional approaches, ones which engage students in developing and deepening their understanding of disciplinary ideas in context while they receive guidance from skilled instructors," we want to encourage the committee to consider a few questions. How does an instructor need to be prepared to achieve this "status" of skilled instructor? What does a skilled instructor entail when it comes to

equitable and effective teaching? What are the unique expectations because equity is a foundational expectation in terms of the process and outcomes of teaching?

Related to the point about a student-centered approach requiring carefully constructed assignments, we invite the committee to consider the following questions: What does this mean particularly in relation to equity? What is uniquely being asked here that would make it a carefully constructed assignment? In terms of "the traditional approach privileges students who already have prior knowledge and experience in a discipline and alienates many of those who do not." This could be perceived as deficit-minded? Do students not really have any prior knowledge that could be useful, even from their own lives? Oftentimes, it is not that students do not have some relevant prior knowledge, but that an instructor may not recognize, value, or surface students' prior knowledge. It is possible that within existing ways of knowing or knowledge students have some "misunderstandings" but it is nonetheless their prior knowledge. Also, since prior knowledge is addressed in the next principle should this point be moved down so all the points related to prior knowledge are within the same principle?

Another aspect of this principle is to ensure that instructors are engaging students in learning opportunities that help them develop the identity and thinking of that discipline. The committee has noted this with the following point: "They also need to understand the practices, tools, and ways of thinking in that discipline." This aspect of the principle is critically important, as developing a positive disciplinary identity is key to students' sense of belonging within a discipline. Yet, it is also important that students learn how to be critical of existing practices, tools, and ways of thinking in that discipline that may not be anchored in either equitable learning or equitable practices within that discipline. This is a core aspect of culturally relevant

pedagogy—students are exposed to the dominant canon within a discipline as well as critical perspectives to maximize their capacity to use disciplinary knowledge in their lives.

Lastly, in terms of this principle, we agree that providing students opportunities for reflection on learning and consolidation of new ideas is important for equitable and effective teaching. With that said, we encourage the committee to draw on evidence from the work on affirmation theory (Sherman & Cohen 2006) as evidence for why reflection should be an explicit part of the course and instructors' teaching practice. In terms of using Freeman et al. (2014), please refer to Dewsbury et al (2022) for more recent work and concern about bifurcating active learning and lecture, which is not actually a real dichotomy given that the most effective teachers are using both intentionally with different content and with student context in mind.

References and Additional Resources to Consider

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Chaudhary V. B., & Berhe A. A. (2020). Ten simple rules for building an antiracist lab. *PLoS Computational Biology, 16*(10): e1008210. https://doi.org/10.1371/journal.pcbi.1008210

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Rain-Griffith, L., Sheghewi, S., Shusterman, G. P., Barbera, J., & Shortlidge, E. E. (2020). Deliberative democracy: Investigating the longitudinal impacts of democratic activities in introductory biology courses. *The American Biology Teacher, 82*(7), 453-462.

Sherman, D. K., & Cohen, G. L. 2006). The psychology of self-defense: Self-affirmation theory. *Advances in Experimental Social Psychology, 38*, 183-242.

Wilson, K. J., Brickman, P., & Brame, C. J. (2018). Group work. *CBE—Life Sciences Education, 17*(1), p.fe1.

Principle 2: Connecting to and Leveraging Students' Diverse Interests and Goals, Prior Knowledge and Experiences Enhances Learning

We strongly value the emphasis of this principle of connecting to and leveraging students' diverse interests and goals and their prior knowledge and experiences as connected to enhancing their learning. We did notice that much of the literature noted in this section is K-12 based, which is important because an abundance of scholarship has focused on this area of education. There is a growing body of literature in higher education that focuses on these areas and recommends that the committee considers this work moving forward.

In terms of assessing students' prior knowledge and skills and building upon it, we encourage the committee to consider what an instructor might first have to do for themselves such that they are even able to notice when students have valuable prior knowledge or funds of knowledge to contribute. Currently, the draft reads as if instructors will hold an asset-based view of students' prior knowledge or even know how to recognize it when it shows up. However, one of the main issues Ladson-Billings' (2006) noted about the misuse of culturally relevant pedagogy is that instructors may not have their own sociopolitical consciousness or knowledge relevant to the lives of students. Lacking such knowledge can make it challenging for instructors to then create learning spaces that engage and support students' lives. Relatedly, we encourage the committee to attend to the culturally responsive and culturally relevant teaching tenets that include attention to power, development of students' critical consciousness, a pedagogy of relationality and an ethic of care, and more. Without these elements, it is not culturally relevant or sustaining pedagogy.

Related to the concept of funds of knowledge, we applaud the committee for including that this form of knowledge is not only important to recognize, but valuable for disciplinary

learning. With that said, we want to note that funds of knowledge as a term merits further description in the report so that readers can fully understand what it means, how to surface it, and how it can be leveraged for subject-matter learning. Toward that end, we recommend moving up the brief definition on page 9 to align to where funds of knowledge, as a concept, is first discussed in the report. In addition, it would be helpful for the committee to make explicit that you are making a distinction here that prior knowledge is from formal education and funds of knowledge is from informal education.

Lastly, in terms of this principle, we want to encourage the committee to be more explicit with certain points. For instance, the committee wrote: "Viewing certain STEM issues through a social-justice lens can help foster student agency." What does this mean? Given the audience does this need to be detailed a bit more? Some questions that came up for us are: Is it clear what a social-justice lens means and how it relates to equitable teaching and learning? Is this adding another term that is not necessary? What does such a lens entail and how does an instructor develop it? In what ways does this approach encourage student agency and what specific goals does it promote agency towards? Similarly, the committee noted that students bring diversity to the classroom. We value this perspective, but we are not altogether clear about what this means. Being more specific about this can help instructors be clear about what it is they are trying to notice, surface, and leverage for disciplinary learning and how to do so responsibly.

References and Additional Resources to Consider

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Goffney, I., & Gutiérrez, R. (2018). *Rehumanizing mathematics For Black, Indigenous, and Latinx students.* National Council of Teachers of Mathematics. https://www.nctm.org/Store/Products/Annual-Perspectives-in-Math-Ed-2018-(Download)

Gonzaléz, N. & Moll, L. (2005). *Funds of knowledge: Theorizing practices in households, communities, and classrooms*. Lawrence Erlbaum Associates, Inc.

Ladson-Billings, G. (2006). 'Yes, But How Do We Do It?': Practicing culturally relevant pedagogy. In *J. Landsman & C. W. Lewis* (Eds.), *White teachers/diverse classrooms: Creating inclusive schools, Building on students' diversity, and providing true educational equity* (pp. 29-41). Routledge. [Updated 2011: https://www.taylorfrancis.com/chapters/edit/10.4324/9781003448709-6/yes-gloria-ladson-billings]

Marquez Kiyama, J., & Rios-Aguilar, C. (2017). *Funds of knowledge in higher education honoring students' cultural experiences and resources as strengths.* Routledge.

Nasir, N. S., & Hand, V. (2008). From the court to the classroom: Opportunities for engagement, learning, and identity in basketball and classroom mathematics. *Journal of the Learning Sciences, 17*(2), 143-179. DOI: 10.1080/10508400801986108

Pallas, A. M., & Neumann, A. (2019). *Convergent teaching: Tools to spark deeper learning in College.* John Hopkins University Press.

Vélez-Ibáñez, C.G., & Greenberg, J.B. (1992). Formation and transformation of funds of knowledge among U.S. Mexican households. *Anthropology & Education Quarterly, 23*(4), 313-335.

Principle 3: STEM Learning Involves Affective and Social Dimensions

The affective and social dimensions of learning is key to equitable and effective teaching. Similar to the feedback we provide above, we want to encourage the committee to consider what principle exactly is the committee asking instructors to carry out. This is a descriptive principle about something that needs tending to, but does not more directly indicate what is the teaching-focused principle that cultivates such dimensions in the learning space. Perhaps the committee wants to create a bit more symmetry with principle 2 in that it focuses on what the instructor can do. In addition, this principle can be enhanced by also focusing on social impact and power including civic participation. We expand on this point below.

Across all examples of practice, this principle centers solely on students' learning, without adequately highlighting the potential societal value that some of these activities may offer. In other words, LLCs and cooperative learning in the community are not just so students can get better science grades, but also because they need clear formative exposure to know what it means to live for others and in community with difference. Also, it is necessary to name that equitable experiences within these active or cooperative strategies are not automatic. Instructors must be sensitive to power dynamics, racism, gender oppression, and other related issues, as they often manifest in the classroom, negatively affecting minoritized students.

We also want to acknowledge that there appears to be a lack of distinct separation between Principle 3 and Principle 4, suggesting that perhaps these two principles require further reflection and clarification. For example, it is difficult to discuss the affective and social dimensions of STEM learning without bringing up the psychosocial externalities discussed in Principle 4. A case can be made for collapsing these two. Line 284 brings up the phrase ‘negotiate conflicts.’ We believe that placing this point here in the report hides a potentially

impactful idea. This can be an opportunity to make explicit the need for formative experiences in deliberative democracy even in STEM classrooms and there is a large body of literature to support its practice.

References and Additional Resources to Consider

Rain-Griffith, L., Sheghewi, S., Shusterman, G. P., Barbera, J., & Shortlidge, E. E. (2020). Deliberative democracy: Investigating the longitudinal impacts of democratic activities in introductory biology courses. *The American Biology Teacher, 82*(7), 453-462.

Yeager, D. S. and Walton, G. M. (2011). Social-psychological interventions in education: They're not magic. *Review of Educational Research, 81*(2), 267-301.

Principle 4: Identity and Sense of Belonging Shape STEM Learning

This principle is key to equitable and effective teaching. Very often, in traditionally designed graduate programs, any professional development on pedagogy either ignores this reality completely, or only lightly touches on its significance. We believe that identifying this as a key principle is a crucial step in shifting our collective understanding of effective and equitable teaching from a subject-matter based paradigm to one that is grounded in relationships.

The impacts of students' identity are often subliminal however, and the scholarship on its associated contingencies point out that those contingencies can arise without the students (or instructor) recognizing the ways in which they are preventing the student from being fully cognitively present. A couple crucial steps need to be made explicit here. It is critical for pedagogical preparatory professional development to include a learning journey on the ways in which human psychology impacts the learning process. This cannot be a surface level effort in that instructors are simply provided with a checklist of best practices, where the implementation of which magically brings about a sense of community in the classroom. An intellectual grounding of strategies pertaining to belonging allows instructors to better understand what approaches are useful and appropriate for their context.

Secondly, suggestions of specific strategies with detailed explanations would be useful to foreground what instructors can do to create a sense of belonging and validate students' identities. For example, a suggestion was made for instructors to consider cooperative learning as a mechanism to help increase belonging. What feature(s) of cooperative learning would specifically make its participants feel an increased sense of belonging? Such a suggestion assumes that cooperative learning is implemented 'successfully', but for the purposes of belonging and identity validation, what constitutes success should be defined. Cooperative

learning works well when there is respectful dialogue, active listening, willingness to give and receive constructive feedback, and a mechanism to resolve conflict. All of these subcomponents are crucial not just in students feeling like they belong to the academic experience, but that their presence and cognitive contributions matter towards the outcomes. They also are particular in that they need to be formally introduced and formatively practiced if they are to be done well. Consider in this principle describing in detail how identity as a construct is construed in the educational psychology literature, how it plays out psychologically in the classroom, and the behaviors on the part of both students and instructors that allows it to be a barrier or a mechanism to drive students forward.

To elaborate a bit more on the first point above (the need for an explicit learning journey around the psychology of identity and belonging), this section can be an opportunity to point readers in the direction of the scholarship where this is deeply discussed. Much of the discussion here seems to rely on the work of Claude Steele. While stereotype threat is a phenomenon that can significantly impact the experience of a student in the classroom, it is one of many other similar factors which are collectively called 'identity contingencies.' The literature on identity contingencies includes research on mindset, social belonging, John Henryism, affirmation theory, and proven interventions that allow students to re-arrest their agency over their reality. A formidable review of these interventions can be found in Yeager and Walton (2011), a summary of which can be useful for readers wishing to get deeper into that literature.

References and Additional Resources to Consider

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Principle 5: Assessments of Learning and Other Forms of Data Allow for Continuous Improvement

Principle 6: Flexibility and Responsiveness to Situational and Contextual Factors is Important

Please note that while we address principle 5 mostly, we think that the feedback here largely can also inform principle 6, so we have merged our feedback for these two principles. This is not to suggest that these two principles ***have*** *to be merged in the committee's report, but rather that our feedback here is relevant for both. It is up to the committee to decide if these two principles benefit from being merged or separated in a different way than currently presented in the draft.*

Principles 5 and 6 represent two important components of effective and equitable teaching. The design of individual assessments, the entire structure of within-term assessments, and the stakes associated with assessments impact the overall social and learning experience. Similarly, how context and situations inform design choices allows teaching to be conditional to students as key stakeholders. Our feedback is to more clearly center equity in how each of these principles are conceptualized. We identify a few specific areas below and elaborate on ways in which equity can be centered more explicitly.

Summative assessments are suggested here as mechanisms to evaluate effectiveness of course design and determine what needs to be adjusted in the future. This should not be the job solely of summative assessments. A course that is designed in accordance with the science of learning, would have multiple assessment mechanisms that are formative and summative, existing throughout the experience, and inclusive of non-cognitive measures. Collectively, these paint a more comprehensive picture of the course experience that extends beyond the degree to

which students understand the subject matter. Using a single tool or assessment event is thus a missed opportunity to understand more fully how students and instructors experience the course. Furthermore, it fails to specifically capture how students engaged with equity-based strategies throughout the semester.

Leveraging connections among members of the instructor community to support continuous improvement of teaching is a crucial way to build community and sustain a paradigm of continuous learning for instructors to maintain the humility needed for equity-based teaching. It is helpful to name what instructors can do in terms of using learning communities of peers to share data on their students and courses and have open and supportive discussions about where change is needed to improve equity and effectiveness. This is relevant for full-time and contingent faculty. Yet, it is also important to note that the responsibility needs to be with the institution to provide the environment, time, and other resources to make this possible. In addition, instructors gain valuable insights from their students. How might you encourage a mindset that predisposes instructors to engage in such learning, encourage institutions to support such faculty learning or even consider faculty as learners, and underscore the importance of ensuring that students are not exploited? While there is currently a strong focus on how students learn, given the emphasis on instructor teaching in this work, how might you emphasize a bit more the idea that faculty are learners, and discuss a bit more about how and when they learn and how to leverage that to support their development as teachers? The point of faculty as being part of a community needs further development or clarification. As written, it can simply mean a commiseration group, where members share frustrations and reify the fact that they are not alone (which is important), or a group that talks about the specifics of practice improvement. They can

conceivably be both, but as an important principle, details on what this looks like would be helpful for a reader to visualize its impact.

In the discussion on assessments, the importance of providing students with information they can use to gauge their own learning and how to adjust their study methods was discussed. This messaging suggests that the only barrier to students improving study habits is whether they got information about their performance or not. It may not necessarily be that simple. Some students may be studying exactly how they have been since it worked for them in previous academic contexts. They may need more than assessment feedback to make an adjustment in how they approach learning. In addition, many students are constrained in their time or approach to learning given the life circumstances they are managing (e.g., full-time work or multiple jobs, family caring responsibilities, food insecurity, etc.). How might the notions of "how we learn. and within this discipline" be taken up more thoughtfully by instructors as part of their instruction instead of an assumption that students already know how to do that? This may present a design challenge, in that in a subject-based course, time may not be available to include extensive instruction on the practice of studying. Here, the report can delve into curriculum literature that highlight examples such as embedding study strategy workshops within first-year experience courses, or including modules on how to improve study approaches (e.g,. Stephen Chew [How to get the most out of studying, *How to Get the Most Out of Studying: Part 1 of 5, "Beliefs That Make You Fail... Or Succeed"*])

It is important to include the concept of intersectionality in this report, as it is well studied, but perhaps still a slightly misunderstood construct in the general discussion of equity and education. While doing so, it is critical to cite Crenshaw's (e.g., 1989, 2013) work, and other notable Black woman scholars whose work has formed the basis for this area of research.

Furthermore, it is important to pay close attention to what intersectionality means in terms of intersectional individuals' lived experiences, and how those experiences have unique relationships to power and inequity. Similar to the statistical understanding of intersectionality, the uniqueness of this experience lies in the fact that the individuals who harbor those identities have a negative experience that is unique to the intersection. In other words, Black women (the identity from which Crenshaw coined the term) lived the American experience differently to how they might if they were 'women' or just 'Black'. The identities are not simply additive, they form a unique combination whose intersection deserves its own understanding and analysis. Most notably, those unique issues quickly point to power differentials. Thus, any discussion of intersectionality is incomplete without a discussion of the role of power.

Lastly, while it is important to discuss assessment, there seems to be a missed opportunity to broaden how assessment is conceptualized within effective and equitable teaching. Traditionally, and in this draft, assessment is only being used to discuss learning gains. If the creation of an equity-minded experience means paying attention to both intellectual and social growth, shouldn't credible attention be paid to assessing the social component of the experience as well? Several validated measures of belonging and community are available in order to determine the impact of equity-minded strategies, and these constructs need not be measured solely to determine its relationship to academic outcomes. More importantly, the inclusion of these measures creates an opportunity for the institution of higher education to move beyond a paradigm of course assessment, and more toward the comprehensive analysis of an experience. The latter implies more than student effort (and requisite grades) to determine if outcomes were met, and by definition forces a self-reflection of the other key stakeholders including instructors and beyond to interrogate their role in how the experience transpired.

While the above feedback is relevant for principle 6, we want to add two points specifically for the sixth principle. First, in terms of teaching courses in various formats, it is important to recognize that a very real issue impacting equitable and effective learning is the access to materials and the cost of books—how are the financial aspects of courses being accounted here as a real constraint that needs to be addressed? How does tending to that reality and other issues of lived inequities align with this principle? Second, the committee can enhance the guidance offered here by highlighting how faculty can learn to be flexible and responsive, as well as attend to contextual factors (e.g., intersectionality).

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Principle 7: Intentionality and Transparency Support More Equitable Opportunities

While we think the following point applies across all the principles, its salience became most evident in principle 7. There is a blurring of the lines in some of these principles with respect to things that are specific to equitable teaching and things that are assumed in the extant literature to be simply effective teaching. We are sympathetic to this challenge. Certainly, this committee and EBTC believe in the aspirational notion of effective teaching being defined as equity-based, but we also realize that many strategies currently touted as 'effective' are not only not necessarily equity-based, but can result in non-inclusive environments. Therefore, the challenge of defining equitable and effective teaching is also partly a journey in helping the higher education community redefine what teaching means, and in so doing identifying the equity-based behaviors currently missing from our current notion of effective teaching. Resolving that tension perhaps is the solution to the challenge of not falling into the trap of generalized suggestions that are not considerate of the humans at their center.

Transparency and intentionality are critical features of creating a classroom based on trust. This principle underscores not only the need to create an atmosphere of trustworthiness, but the importance of sustaining it throughout the teaching experience. Consider Winkelmes' (2019) work on the TILT (Transparency In Learning and Teaching) framework, where she espouses not just an ethos of explaining to students the 'why' behind assignments, but ensuring that this spirit of openness is present in all pedagogies.

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Chapter 3: Coordination Across Actors

Chapter three centers the role of multiple actors and policies in how effective and equitable teaching can be enacted in higher education. Without this chapter, readers would be left to think that the roadmap that chapter two provides on effective and equitable college teaching would be sufficient for making teaching improvements. However, college teaching improvement requires an ecosystem of change (Dewsbury, Campbell, McGowan, 2024; Paulsen & Feldman, 1995).

Chapter three works to address the ecosystem. For example, page 40 states, "successful implementation of the principles of the Framework cannot be the sole responsibility of instructors. In the current environment, adopting these principles requires instructors to make decisions counter to the prevailing incentive structure by devoting large amounts of time to their own professional learning about teaching." The chapter discusses institution leaders, department chairs, curriculum committees, and instructors as key actors. There is no doubt that these are key actors in scaffolding teaching improvement. However, missing in this chapter are faculty senate and governance actors, the University board, and more specifics about "institution leaders." The Provost, Deans, Associate Deans, Directors of Centers for Teaching and Learning, Diversity Officer, and Vice President of Student Affairs are among the institutional leaders that are key actors within institutions.

Beyond institutions, the chapter discusses groups that are important stakeholders, such as education reform groups, disciplinary associations, service providers, and oversight bodies. Likewise, norms play a role in how these organizations work together to scale improvements in college teaching. For example, certain STEM disciplines that have disciplinary associations focused on teaching have a powerful effect on what motivates classroom teaching

(Kezar & Bernstein-Sierra, 2019). Nevertheless, missing from this list of external actors in the chapters are national higher education associations (e.g., AAC&U, AASCU, ACE, ACUE, NASH, UERU) and other nonprofit and for-profit organizations (e.g., POD, ACUE) that provide critical leadership trainings and networks of faculty focused on teaching development. For example, the Association for Undergraduate Education at Research Universities (UERU) worked closely with the Boyer 2030 commission to produce a report that directly spoke to the ecosystem of teaching improvement (Boyer 2030 Commission, 2022). Other related organizations inside academia (e.g., National Survey of Student Engagement, Community College Research Center) provide useful research and data to support teaching improvement. Finally nonprofit and for-profit organizations (e.g., US News Rankings, Carnegie Classifications) play important roles in scaffolding incentivizing structures for institutions that intersect with, but often disincentivize teaching improvement. Institutions that want to do teaching improvement must often do so in spite of perverse incentives (Campbell, 2023; O'Meara, 2007).

The chapter discusses coordination across the levels of actors and a "scale of resources" that are required to make the framework happen. The coordination of actors and the necessary resources are both critically important statements that could use expansion in the chapter. For example, the chapter could play an important role in giving access to teaching improvement by answering questions such as: "What are the barriers to coordination across levels of actors? How could those barriers be removed?" For instance, how can department chairs, faculty review committees, curriculum committees, the chief diversity officer, and the provosts' office all coordinate about teaching improvement efforts? Do they all share the same definition of equitable and effective teaching? How is teaching evaluated across these? If a "scale of

resources" is needed to make college teaching improvement happen, could actors coordinate to pool resources for teaching improvement?

There are critical questions that the chapter could pose and consider possible answers about the resources necessary for enacting equitable and effective teaching. For example, the chapter could ask, "Where should the resources come from? What is the role of funding agencies and grant infrastructures? What are the resource constraints, specifically?" The chapter should speak to the resources needed to allow for teaching innovations, incentives, and development. Spending time on teaching is associated with lower resources (Hattie & Marsh, 1996). This must be changed if teaching excellence is to be part of the fabric of faculty careers. Co-teaching across units, reduced class sizes, teaching development funds, programming to support faculty learning communities, coaching, and increased salaries for faculty focused on teaching are just a few examples where resources will be needed. Additionally, the chapter describes the importance of resource allocation and discusses resources as "trade offs." How could this discussion of trade-offs be connected to the section on valuing teaching?

The chapter also gives example topics for policies that are critical in shaping teaching improvement. The section "The Value of Teaching" describes that hiring and promotion policies demonstrate "value." This section also describes that the measures for evaluating teaching communicate specific values. These examples are important. However, missing are the symbolic, cultural, and normative approaches to valuing that are critical for teaching improvement (Pallas, Neumann, Campbell, 2018). Interestingly, institutions (even research institutions) typically have relatively strong symbolic valuing of teaching. There are typically teaching awards and the center for teaching and learning (CTLs). Also important in symbolic framing of value is whether the CTL is centrally located and integrated into campus processes. Furthermore, cultural and

normative approaches are key to connecting the value of teaching to teaching improvement (Braxton, Aimers, & Bayer, 1996). Peer influence on faculty is also critical. Thus, conversations across faculty, in department meetings, in governance structures, and in the "hallways" about teaching are important in teaching improvement initiatives (Campbell, 2023). Is there normative pressure across faculty to improve teaching and enact equitable and effective teaching?

There are also several sections of the chapter that briefly mention ecosystem aspects of teaching improvement, but do not describe them in sufficient depth. For example, the data collection section describes the importance of disaggregated data to institution, school, and department levels. However, it is not clear–data about what? Likewise, another section describes that course design and logistics are based on "long standing policies"? What policies are there? In another section that speaks to degree requirements and pathways, student services are included but may deserve more depth and expansion. The section describing the implementation of policies mentions that different stakeholders at various organizational levels enact different policies. There likely is more to say here about implementation beside the diversity of actors.

Finally, this chapter does not largely center equity. There is no discussion of equitable leadership or power dynamics surrounding teaching in academia. Leaders guide resource allocation, set norms, communicate value, and develop and align strategic priorities. Ensuring an equity-orientation that supports teaching improvement among leaders across all the stakeholders would be paramount in teaching improvement (Kezar, Holcombe, Vigil, & Dizon, 2021).

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Conclusion

Equitable and effective college teaching has not received the broad-scale attention it is due. It has a strong influence on a wide variety of both individual and societal outcomes of higher education—from retention to job placement to leadership development to civic engagement. Yet, much of the attention that has been placed on college teaching has been individual studies situated in one or a few institutions, focused on one or a few disciplines. The time is right for this consensus report. College teaching has been spotlighted in a growing national movement by scholars (e.g., the American Academy of Arts and Sciences) and practitioners alike (e.g., the 2030 Boyer report). Higher education is changing at a pace unlike the past through COVID, rankings that are questioned, Carnegie classification system being reconsidered, and Artificial Intelligence newly made more accessible to students and faculty. All of these robust shifts make the time nigh for staking a claim on equitable and effective college teaching.

This consensus report has the potential to be meaningful in moving forward a shared conceptualization of equitable and effective college teaching that can be the basis of future studies, innovations, and practice-based improvements. We detailed throughout this paper certain substantive revisions that could make this draft report more effective in moving the field forward. In broad strokes, this includes centering equity as a through-line in each chapter and principle, drawing in more recent references particularly from minoritized scholars, deepening each principal with relevance to higher education in those that draw mainly on k-12 works, and painting a stronger picture of the challenges and opportunities for improvement. Without these revisions, certain practices in college teaching that have the potential to be harmful could be reinforced. However, if attended to, this report could be an important conceptual map deepening

a growing national movement on college teaching. We imagine a future in higher education where equitable and effective college teaching is the norm. A future where there is improved and more equitable student learning and graduation, increasing the individual and societal benefits of higher education.