Evaluating the Importance of Inclusive Teaching in STEM Faculty Hiring

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Abstract

This research paper describes a study designed to help inform STEM faculty hiring practices at institutions of higher education in the U.S. The purpose is to explore how incumbent faculty members evaluate the importance of STEM faculty applicants' teaching ability. The research question that guided this study is: How important to search committee members are qualifications related to inclusive teaching practices in STEM faculty hiring? We were interested in understanding how – or if – the introduction of a DEI-related construct impacted respondents' evaluation of the importance of teaching qualifications for entry level tenure track and non-tenure track STEM faculty applicants. Therefore, we examined how participants evaluated the importance of applicants' ability to implement inclusive teaching practices versus the importance of their ability to deliver high quality teaching.

This paper is derived from a larger two-phase sequential mixed methods study examining the factors current faculty members and administrators consider when hiring new STEM faculty members. During the first phase, we launched a nationwide survey to current STEM faculty members and administrators. The second phase was an interpretive qualitative study involving interviews of survey participants to explore selected quantitative findings more deeply.

Quantitative results indicated a statistically significant difference in how incumbent faculty and administrators rated the importance of high quality teaching and inclusive teaching. Specifically, the ability to deliver high quality teaching was rated as highly important while the ability to implement inclusive teaching strategies was rated as significantly less important. This held true when survey respondents were asked about both tenure track and non-tenure track STEM faculty applicants as well as when we examined the data based on institutional characteristics (i.e., Carnegie Classification, Minority-Serving Institution status). Because of the dichotomy between respondents' evaluation of high quality teaching and inclusive teaching, we conducted interviews to understand how participants viewed these constructs. Preliminary qualitative results indicate that while many STEM faculty believe that high quality teaching and inclusive teaching are one in the same and that high quality teaching requires inclusive teaching, some faculty differentiated high quality teaching from inclusive teaching by reasoning that high quality teaching is related to end of course evaluations.

Shared through traditional lecture, results from this study may help inform strategies for recruiting faculty members who are committed to inclusive teaching practices, addressing inequities in faculty hiring processes, and sharing insights from search committees with prospective faculty members to aid in their preparation for the job search.

Introduction

Diversity, equity, and inclusion (DEI) initiatives at U.S. higher education institutions have received renewed theoretical, programmatic, and public attention in recent years. From increasing racial and ethnic diversity to the inclusion of gender equity strategies, from student recruitment and success to faculty hiring and retention, many U.S. colleges and universities have committed and strived to cultivate diverse, equitable, and inclusive environments.

The process of faculty hiring serves as a gateway, and often a gatekeeper, to the professoriate. Despite many universities' claims of commitment to diversity and recognition of its benefits, the hiring of faculty members from diverse backgrounds is still hindered by various obstacles. One of these obstacles is the existence of unconscious and conscious biases in faculty search procedures, which put candidates from minoritized identities at a disadvantage (Roper, 2019; Sackett et al., 1991; Steinpreis et al., 1999; Wapman et al., 2022; Wenneras & Wold, 1997; Wu et al., 2023). Such biases may also exist when considering prospective faculty members' qualifications as to their day-to-day responsibilities – teaching, research, and service – which, in most institutions, involves engaging with people from a wide range of identities in the classroom, in laboratories, and beyond. Thus, DEI-related qualifications such as the ability to employ inclusive teaching practices is an important measure of merit for faculty members.

Purpose and Research Question

It is unclear how search committees interpret and consider many DEI-related factors in faculty hiring practices. The current research is designed to explore this matter. Specifically, the purpose of this study was to better understand how incumbent STEM faculty members and administrators evaluate the importance of teaching qualifications with and without DEI-related constructs in faculty hiring. In this paper we address the following research question: How important to search committee members are qualifications related to inclusive teaching practices in STEM faculty hiring?

Inclusive Teaching

Central to the idea of inclusive teaching is how learners' needs or requirements are viewed and taken into consideration. Inclusive teaching may focus on the commonality of a majority of learners and ensure that a broad range of students' needs are met with minimal additional support. Universal design for learning (UDL) is a widely accepted pedagogical practice for this approach. UDL originated in the field of architecture (universal design) with a focus on making physical spaces accessible to people with disabilities by designing for a wide range of user needs. In the context of higher education, UDL emphasizes that general teaching should be appropriately implemented to cover the needs of all students (Behling & Tobin, 2018) – not only disabled students – despite differences in the "what", "how", and "why" of learning (Meyer et al., 2014). Inclusive teaching might also entail responding to individual differences among learners and take the form of culturally relevant pedagogy. Ladson-Billings (1995) defines culturally relevant pedagogy as:

> …a pedagogy of oppression not unlike critical pedagogy but specifically committed to collective, not merely individual, empowerment. Culturally relevant pedagogy rests on three criteria or propositions: (a) students must experience academic success; (b) students must develop and/or maintain cultural competence; and (c) students must develop a critical consciousness through which they challenge the current status quo of the social order (p. 160).

That is, culturally relevant pedagogy acknowledges the home-community culture of the students and integrates these cultural nuances and experiences into teaching and learning. Although UDL and culturally relevant pedagogy differ in how difference should be recognized and treated, the end goal is the same – to achieve inclusion. Therefore, both have value and are widely recognized in practice.

Methods

This study is derived from a larger two-phase sequential mixed-methods study examining the factors current faculty members consider important when hiring new STEM faculty. During the first phase, we deployed a nationwide survey in which participants answered a series of multiple choice, short answer, and ranked preference questions regarding the comparative importance of a variety of potential applicant characteristics and qualifications for both entry-level tenure track and non-tenure track STEM faculty positions. For the second phase, we invited survey participants who indicated interest in answering follow up questions to participate in individual interviews.

Data Collection

In this study, we focused on survey questions pertaining to applicant qualifications with and without DEI-related constructs. We were interested in examining those that centered around important aspects of faculty job responsibilities – teaching, research, and service. We asked participants: *How would you rank the relative importance of each of the following applicant qualifications for an entry-level faculty position in your department? Consider 1 as most important and 7 as least important, relative only to the items listed.* We asked this question separately for when respondents consider tenure track faculty applicants and non-tenure track faculty applicants. Items we included in the survey for respondents to rank for each group were:

- ability to contribute to an inclusive climate in the department;
- ability to advise and mentor students;
- ability to recruit historically underrepresented racial and ethnic minority students into undergraduate and/or graduate programs;
- ability to deliver high quality teaching;
- ability to implement inclusive teaching strategies (e.g., universal design for learning, culturally relevant pedagogy) in their courses;
- ability to secure external funding; and
- ability to secure external funding to support the inclusion of people from historically underrepresented groups (e.g., women, people with disabilities, historically underrepresented racial and ethnic minorities).

All these items, except for the "ability to contribute to an inclusive climate in the department" were developed in pairs. They were intentionally designed to help us understand whether respondents valued key faculty job-related qualifications differently when DEI-related constructs were introduced. Thus, we developed these paired items of applicant qualifications focused on teaching, securing funding (i.e., research), and advising and recruiting (i.e., service). This paper addresses how search committee members evaluate STEM faculty applicants' ability to deliver high quality teaching (qualification without DEI-related construct) versus the ability to implement inclusive teaching strategies (qualification with DEI-related construct) in their courses. We did not ask respondents to describe where in the application package they would expect to see information to inform their evaluation of these constructs; however, we expect they would be evident to varying degrees in many common application documents, most notably the teaching statement and cover letter, and perhaps, in the curriculum vitae with evidence of professional development in the area of inclusive teaching and/or awards received (e.g., teaching assistants who receive teaching awards).

Quantitative data cleaning and statistical analysis were carried out using Jamovi (2021), an open-source statistics software based on R programming language (2021). We computed descriptive statistics (i.e., mean, median, and standard deviation) for the study variables. Because the data did not meet normality assumptions for parametric testing, we analyzed comparisons within the same participants using Wilcoxon ranked sum test. According to de Winter and Dodou (2010), the Mann-Whitney-Wilcoxon test and t test have equivalent power on Likert items, but Mann-Whitney-Wilcoxon has a power advantage when sampled from a skewed or peaked distribution. Therefore, Mann-Whitney-Wilcoxon test was deemed more appropriate in our study to produce reliable results.

After conducting a preliminary analysis of the quantitative data, we recognized that some items warranted follow-up to gain further insights for interpreting those findings. To that end, we developed a protocol for semi-structured interviews to probe more deeply into survey responses. One of the interview questions was:

> *The data from the survey indicated that in assessing characteristics for new tenure track faculty, the ability to deliver high quality teaching was ranked most important, while the ability to implement inclusive teaching strategies was ranked as less important. What is the difference to you between high quality teaching and inclusive teaching? Which characteristic do you think is more important and why?*

Interviews were conducted via Zoom and each participant either selected or was assigned a pseudonym. Audio was transcribed using NVivo Transcription. After transcripts were reviewed and cleaned, we read through each interview. We then used initial coding by highlighting, underlining, and note-taking; then used focused coding to organize data around salient categories (Saldaña, 2013).

Population

A total of 216 STEM faculty members and administrators responded to the survey; slightly less than half of them (103) responded to the paired items questions for both tenure track and non-tenure track faculty applicants. Demographics of the 103 respondents are summarized in Table 1. The table only includes identities that were selected by respondents in each of the listed categories (i.e., if no respondents selected a given identity in one of these categories, it was excluded from Table 1). Respondents could select all applicable racial, ethnic, and gender identities; therefore, some totals exceed 100%. We asked respondents to optionally share the name and location of their current institution and used this information to look up its Minority Serving Institution (MSI) status and Carnegie Classification. We did not further disaggregate MSIs and non-MSIs by Carnegie Classification for this study.

Table 1. Respondent Demographics

Demographic Item (N=103)	%
Gender	
Man	58.3
Woman	41.7
Race and Ethnicity	
White	63.1
Black/African American	21.4
Hispanic/Latino/a/e	9.7
Asian	9.7
A Race/Ethnicity Not Listed or Prefer Not to Answer	5.8
Minority-Serving Institution (MSI) Status	
MSI	50.5
Non-MSI	49.5
Carnegie Classification	
R1 Institutions (Doctoral Institutions: Very High Research Activity	44.7
Non-R1 Institutions	55.3
Primary Role	
Administrator (Dean, Associate Dean, Department Chair, etc.)	22.3
Non-tenure Track Faculty	9.7
Tenured/Tenure Track Faculty	68.0

Results

Quantitative Findings

We performed Wilcoxon rank sum tests to determine whether the addition of DEI constructs made a difference in how applicants are evaluated regarding teaching. For both tenure-track and non-tenure-track applicant evaluations, qualifications with DEI constructs added were rated as significantly less important than their paired items without DEI constructs. Specifically, “ability to deliver high quality teaching” was rated as highly important (2.69) while “ability to implement inclusive teaching strategies in their courses” was rated as significantly less important (4.37). Figure 1 shows the distribution of responses for “ability to deliver high quality teaching” (Q12_3) and “ability to implement inclusive teaching strategies in their courses” (Q12_6). Nearly 40% of respondents ranked high quality teaching as most important, while less than 10%

ranked inclusive teaching as most important. Similarly, nearly 20% of respondents ranked inclusive teaching as least important, while less than 10% ranked high quality teaching as least important.

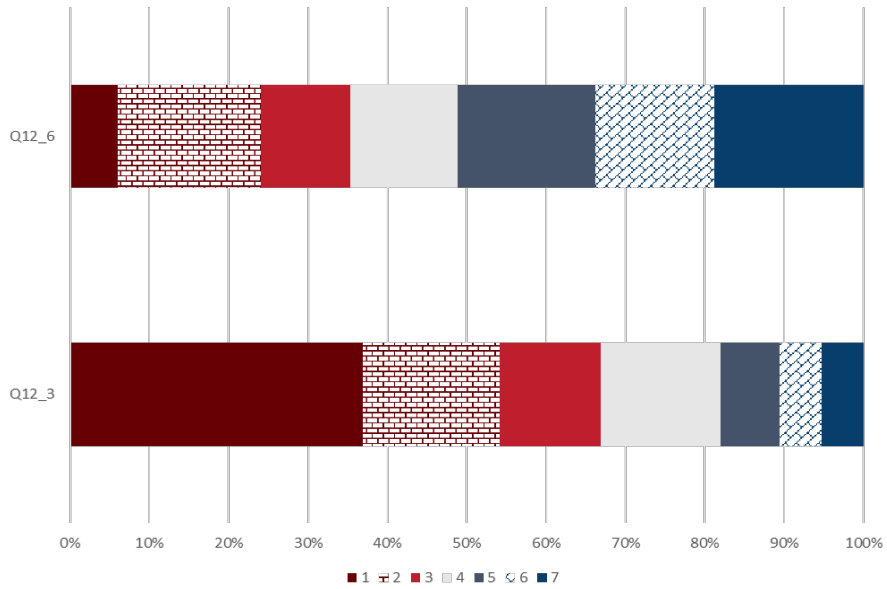

Figure 1. Response Distributions for Importance of Teaching Qualifications (1= most important, 7=least important)

Table 2 summarizes the descriptive statistics for this analysis. Respondents ranked high quality teaching as significantly more important than inclusive teaching for both entry-level tenure track and non-tenure track positions.

Table 2. Descriptive Statistics of Paired Applicant Teaching Qualifications

	High Quality Teaching	Inclusive Teaching	Wilcoxon W	p
	M (SD)	*M (SD)*		
Tenure track applicants	2.69 (1.79)	4.37 (1.93)	812	***
Non-tenure track applicants	3.18 (1.44)	4.83 (1.56)	758	***

SD: standard deviation; *** $p \leqslant .001$ – statistically significant

Analyses Based on Institution Types. We hypothesized that perceptions of importance of the teaching constructs might vary depending on the respondents' institution types, and thus, impact their evaluation of applicants' qualifications. To analyze this, we examined our data for differences among respondents from various institution types (R1 vs non-R1, MSI vs non-MSI).

Table 3 and Table 4 present results for R1 respondents and non-R1 respondents, respectively. Although the trends are consistent across both groups and are similar with the overall sample, we observed larger differences between the importance of teaching qualifications with and without the DEI construct when evaluating tenure track faculty applicants among respondents from R1 institutions compared to non-R1 institutions. Means and differences were similar for R1 and non-

R1 respondents when evaluating non-tenure track applicants. All differences were statistically significant ($p \leqslant .001$).

Table 3. Descriptive Statistics of Paired Applicant Teaching Qualifications among R1 Respondents

	High Quality Teaching	Inclusive Teaching	Wilcoxon W	p
	M (SD)	*M (SD)*		
Tenure track applicants	2.80 (1.67)	5.37 (1.55)	61	***
Non-tenure track applicants	3.26 (1.47)	4.85 (1.52)	173.5	***

SD: standard deviation; *** $p \leqslant .001$ – statistically significant

Table 4. Descriptive Statistics of Paired Applicant Teaching Qualifications among non-R1 Respondents

	High Quality Teaching	Inclusive Teaching	Wilcoxon W	p
	M (SD)	*M (SD)*		
Tenure track applicants	3.12 (1.70)	4.88 (1.99)	209	***
Non-tenure track applicants	3.12 (1.43)	4.81 (1.60)	203	***

SD: standard deviation; *** $p \leqslant .001$ – statistically significant

Results among respondents from MSIs and non-MSIs are presented in Table 5 and Table 6, respectively. Again, we observed similar trends across respondents from both institutions, and in line with the overall results.

Table 5. Descriptive Statistics of Paired Applicant Teaching Qualifications among MSI Respondents

	High Quality Teaching	Inclusive Teaching	Wilcoxon W	p
	M (SD)	*M (SD)*		
Tenure track applicants	2.88 (1.70)	5.13 (1.74)	95	***
Non-tenure track applicants	3.44 (1.61)	4.69 (1.64)	294	***

SD: standard deviation; *** $p \leqslant .001$ – statistically significant

Table 6. Descriptive Statistics of Paired Applicant Teaching Qualifications among non-MSI Respondents

	High Quality Teaching	Inclusive Teaching	Wilcoxon W	p
	M (SD)	*M (SD)*		
Tenure track applicants	3.08 (1.68)	5.06 (1.91)	153	***
Non-tenure track applicants	2.92 (1.20)	4.96 (1.47)	99.5	***

SD: standard deviation; *** $p \leqslant .001$ – statistically significant

Preliminary Qualitative Findings

The survey item, which asked respondents to rank the teaching-focused paired items in terms of their importance in evaluating STEM faculty applicants, showed statistically significant differences in how incumbent faculty members and administrators viewed the importance of teaching qualifications with and without DEI-related constructs present. Inclusive teaching was rated significantly less important than high quality teaching. We sought to understand how inclusive teaching and high quality teaching are different and conducted interviews with volunteers from our survey respondent population to explore this finding more deeply.

Qualitative analyses are ongoing; preliminary results indicate that many of the STEM faculty members and administrators we interviewed believe that high quality teaching and inclusive teaching are one in the same, and that high quality teaching requires inclusive teaching. We questioned whether some of the responses were influenced by selection bias (i.e., those opting into follow-up interviews may have more favorable attitudes toward diversity, equity, and inclusion) or social desirability bias, and perhaps, exacerbated by the identities of the researcher leading the interviews (i.e., a Black woman, often accompanied by another Black woman or a White woman). Participants made statements like, "You can't have high quality teaching without being inclusive", "I don't think there is a difference," and "They go hand-in-hand."

A few faculty members mentioned that they want to integrate inclusive practices into their courses but struggle to do so. This supports what some faculty noted, which was that all faculty need more training on what inclusive practices are and how to implement them in the classroom. Pam, an assistant professor of engineering education noted, "I don't think many people know what we mean by inclusive teaching or what strategies you might use to be an inclusive instructor or run an inclusive class." This led to us asking some participants if their institution, college, or department has a center for teaching and learning or a center for teaching excellence. Many participants indicated that their institutions have a center or office that helps faculty to implement effective and inclusive teaching practices and that the issue is either a) faculty do not attend the workshops, or b) faculty do not know about the workshops and as a result, do not attend.

A few faculty differentiated high quality teaching from inclusive teaching by reasoning (either for themselves or for their institution) that high quality teaching is related to end of course evaluations. To that point, Maria, professor of chemical engineering noted, "for my institution, high quality teaching means good scores from student[s], which I don't necessarily think is high quality or inclusive…student ratings do not include aspects of access and inclusion."

Of note, Tanya, an associate professor of chemistry, expressed that some faculty feel that high quality teaching means more work and inclusive teaching is less rigorous. Specifically, she said: "I don't know what people think when they say the word inclusive, but I suppose they just think [it] means 'dumbed down' or something. And shame on them…Inclusive excellence is teaching excellence."

Finally, participants at HSIs explained that inclusivity looks different for them as most of their students are Latino/a/e. Juan, a professor of engineering noted that just because the institution is an HSI, does not mean that they are "doing" inclusivity well. They still need to learn more about inclusivity in regard to other identities, such as gender identity and sexual orientation. Similarly, Javier, a professor of physical sciences noted that his department is doing more to increase the numbers of women faculty. The issues Juan and Javier bring to light affect students' experiences in the classroom.

Conclusion

This study was an attempt to examine how teaching qualifications of applicants for STEM faculty positions are considered and evaluated in the hiring process. In particular, we were interested in learning how, or if, incumbent faculty members and administrators viewed inclusive teaching on par with high quality teaching. Our analyses showed statistically significant differences in the level of importance survey respondents ascribed to high quality teaching and inclusive teaching. Specifically, they recognized inclusive teaching as significantly less important than high quality teaching. On the other hand, most of our interviewees indicated that the two go hand in hand; in essence, high quality teaching is inclusive. We question whether social desirability or self-selection bias influenced the interview responses.

Our research adds to our understanding of how search committees approach faculty hiring and evaluation of the faculty applicants by uncovering potential biases related to inclusive teaching practices. Thus, it also has the potential to lead to policies and practices that address these biases in hiring. Doing so may help to inform strategies for recruiting marginalized faculty in STEM disciplines, which may lead to improved opportunities to create cultures of inclusion and support for minoritized students and postdoctoral scholars. Finally, our research can help inform prospective faculty members of what search committees are looking for in their applications.

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