



Guiding Faculty Equity Reform Strategies for Primarily Undergraduate Institutions from a Comparison of Administrator and Women STEM Faculty Perceptions

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Abstract: Systemic inequities in STEM have disproportionately impacted women faculty and have, overall, hindered their advancement through academic ranks. While these issues are well-documented in the literature for research-intensive universities, fewer studies have focused on primarily undergraduate institutions (PUIs). To understand priority areas for promoting faculty equity at PUIs, we collected survey data from administrators and faculty at institutions belonging to the Council of Public Liberal Arts Colleges (COPLAC), a consortium of 30 PUIs across the US and Canada, to study the prevalence and perceptions of equity-promoting policies and practices across the consortium. Results showed wide variation in the existence of equity-related policies and practices across institutions, as well as disagreement on the extent to which policies and practices had a positive impact. We used these differences to identify strategic areas for policy reform.

Introduction

Research examining equitable policies and reform processes at primarily undergraduate institutions (PUIs) is largely missing from the literature on women faculty in STEM (Eddy & Hart, 2012; Karukstis, 2009; Rabinowitz & Valian, 2022). However, PUI faculty represent nearly two-thirds of all faculty positions in the United States (Wolf-Wendel & Ward, 2006). In this article, we describe a research-informed process for facilitating institutional change that promotes faculty equity at PUIs. Because there is less research on women faculty at teaching institutions, we created surveys of faculty and administrators to identify baseline challenges for obtaining equity for women in STEM at PUIs. The survey results illustrate policy areas where there is a significant gap between the perceptions of women faculty and their administrators about gender equity on their campuses. Grounded in Kotter's (2012) theory of institutional change, we target high-level administrators at PUIs as champions for advancing gender equity (Nash et al., 2021). We argue that focusing on policy areas where there is the greatest difference in perceptions between faculty and administrators provides the most leverage for creating institutional change. We enact our data-driven strategy for institutional change in the 30 member institutions of the Council of Public Liberal Arts Colleges (COPLAC) consortium – public PUIs in the United States and Canada that are home to nearly 600 women faculty in STEM.

While most studies of women faculty in STEM have focused on research institutions (for example, through the National Science Foundation ADVANCE program) (Furst-Holloway & Miner, 2019; DeAro et al., 2019; ADVANCE, 2024), there

is a need to study the factors contributing to success for women faculty at PUIs.

Inequities for STEM faculty that identify as women are well-documented, and women faculty in STEM face obstacles for career advancement in many sectors of higher education (Bilimoria et al., 2008; Borland & Bates, 2014; Eddy & Hart, 2012; MIT, 1999). In general, research shows that inequities hinder career advancement (Soto, 2014) and contribute to lower job retention for women STEM educators (Pedersen & Minnotte, 2017; Xu, 2008). Women STEM faculty also face unequal teaching loads (Carrigan et al., 2011); unsupported work-life balance (Beddoes & Pawley, 2014); institutional procedures and policies for career advancement that are more favorable to men (Blackwell et al., 2009; Feeney et al., 2014; Karpman, 2015; Settles et al., 2013); pervasive cronyism that excludes women from collaboration and mentoring (Cozzens, 2008; Deemer et al., 2012; Hart, 2016); and hiring practices favorable to men (Torres, 2012; Williams, 2015).

Challenges especially pronounced for women STEM faculty at PUIs.

Women in STEM at PUIs face challenges that reflect the nature of their institutions. The National Science Foundation (2024) defines PUIs as accredited colleges and universities (including two-year community colleges) that award Associate's degrees, Bachelor's degrees, and/or Master's degrees in NSF-supported fields, but have awarded 20 or fewer Ph.D./D.Sci. degrees in all NSF-supported fields during the combined previous two academic years. Women faculty in STEM at PUIs conduct their research, teaching, and service in institutional environments that are significantly different from the contexts of larger, research-based, PhD-granting

institutions. The smaller-sized departments of many PUIs leave women in STEM feeling isolated and with fewer opportunities to connect and collaborate with other faculty on common professional interests (Stewart & LaVaque-Manty, 2008). PUIs also require higher teaching loads of three to four courses per semester, meaning inequitable teaching assignments have more serious and lasting consequences for women in STEM at these institutions. At PUIs, teaching is given more weight in personnel evaluations for tenure and promotion, meaning women in STEM are disproportionately impacted by biases in teaching evaluations (Peterson, et al., 2019). These inequities are exacerbated for women with historically marginalized identities. Women STEM faculty at PUIs also report a number of factors that limit their success and satisfaction, including: limited mentoring; sponsorship and networking opportunities; evaluation bias; unequal workloads and bias in workload expectations; gendered differences in family-care expectations; unsupportive campus climates; harassment; and lack of belonging (Eddy & Hart, 2012; Etzkowitz et al., 1994; Karukstis, 2009; Liang & Billimoria, 2007; McGrath et al., 2019). The goal of our research is to assess the extent to which PUIs have policies in place to mitigate these challenges, as well as whether women faculty in STEM at PUIs perceive those policies as effective when compared to PUI administrators.

Leveraging COPLAC to understand and support women faculty at PUIs.

We conducted our research on women faculty in STEM at the 30 member institutions of the Council of Public Liberal Arts Colleges (COPLAC), which are public PUIs that focus on providing a high quality, affordable liberal arts education. By working within

the COPLAC consortium, we gain access to administrators and faculty at PUIs that are geographically diverse and demographically diverse in the students served, but similar in mission and administrative structures (COPLAC, 2025a). Member institutions include colleges that serve Native American (COPLAC, 2025b), Black (COPLAC, 2025b), and Hispanic (Sonoma State, N.d.) students as well as women students in STEM. Focusing on COPLAC schools limits us to studying public institutions, mitigating some of the effects that institutional variation – such as differences in funding capacities at private versus public PUIs – may have on faculty equity in STEM. A main goal of our project is to utilize data to empower administrators to champion equity for women in STEM on their campuses. Working with COPLAC allows us to use existing consortium organizational structures – such as the Board of Directors that consists of all COPLAC presidents and their designees (COPLAC 2025c) – to more easily engage with administrators and encourage steps toward institutional change. While this study focuses on COPLAC PUI institutions, it is of broad interest and transferable to other PUI institutions.

Administrators as Change Agents

A primary goal of this research is to learn more about women faculty in STEM at PUIs, but an equally important goal is to use that data to foster strategic policy changes that advance gender equity at PUIs. Institutional change around gender equity is especially difficult because it requires radical and transformative action that fundamentally alters power relations in organizations (Meyerson & Kolb, 2000).

Gender change interventions can be inherently contradictory; they redistribute power and rewards, often undermining the privilege and advantage of the very individuals who hold the power to enact the change in the first place (Acker, 2000; Acker, 2006). Recent studies of change interventions for gender equity recognize the need to have institutional “champions” (Nash et al., 2021), defined as executive leadership that has “enhanced credibility and positional power to confer approval and behave in ways that actively promote ...gender equity” (de Vries, 2015). Our research, therefore, focuses not only on women faculty in STEM, but also on the administrative leaders at PUIs – namely, presidents and provosts (and their institutional equivalents) – who have the positional power to enact policy reform.

The COPLAC consortium provided us with regular opportunities to interact with two primary categories of administrators: Chief Executive Officers (CEOs) and Chief Academic Officers (CAOs). Chief Executive Officers, often referred to as presidents, are responsible for the overall management and leadership of their institution. Chief Academic Officers (CAOs), often referred to as provosts, are responsible for the teaching, research and service functions of faculty on campuses, and are often second-in-command, reporting directly to the president (Berliner et al, 2009). All COPLAC schools have CEOs and CAOs, though the specific titles of these positions vary across institutions (e.g. the CEO at University of Minnesota-Morris is called a chancellor). Due to the small size of PUIs, the provost is highly involved in, and leads the creation and implementation of, institutional policy that impacts all academic divisions and departments. Unlike at larger institutions, academic policy

reform at PUIs occurs primarily at the institutional level and is applicable to all academic departments, rather than tailored to individual colleges or lower-level academic divisions.

In this study, we examine two important aspects of administrators' capacity to serve as institutional change agents for gender equity. First, we assessed the extent to which the administrators view themselves as champions of gender equity by asking them to express confidence in their own abilities to pursue equitable reforms. Second, we assessed a key component of being an effective champion – namely, credibility related to the change agenda. In this case, credibility is related to gender equity reform. To assess administrator credibility, we asked women faculty to provide their perceptions of administrative capacity to enact gender equity reform across policy areas. Taken together, we analyzed, first, whether administrators view themselves as capable champions of gender equity reform, and second, whether administrators have credibility to serve as change agents for gender equity among those most impacted by equity reform – namely, women faculty in STEM.

Targeting administrators as change agents is instrumental for enacting institutional change. According to Kotter's (2012) change theory, there are 8 steps for creating institutional change: (#1) create a sense of urgency, (#2) build a guiding coalition, (#3) form a strategic vision, (#4) enlist a volunteer army, (#5) enable action by removing barriers, (#6) generate short-term wins, (#7) sustain acceleration, and (#8) institute change. The campus culture and policy change required to create more equitable workplaces for women STEM faculty at 30 different peer institutions

involves separate parallel work at each institution. Presidents and provosts at PUIs are the administrators with the most authority to enact institutional change around gender equity reform on their individual campuses. Yet, many of them may lack the knowledge or capacity to undertake the steps identified by Kotter's (2012) theory. Our goal was to form a partnership with COPLAC administrators and get them started on gender equity reform by facilitating Kotter's steps #1-3 – urgency, coalitions, and vision.

This research aims to promote effective systemic change across the consortium by facilitating and guiding institutions through the initial stages of Kotter's institutional change framework. To achieve this goal, our project team provided research, resources, and professional development support focused specifically on faculty equity issues at COPLAC institutions, to COPLAC presidents and provosts. Given how entrenched inequities are in institutions of higher education, the action for change is intended to be "comprehensive, systematic, and involving the institutional level" (Bystydzienski & Bird, 2006; Etzkowitz et al., 2000; West & Curtis, 2006).

Advancing Kotter's steps to (#1) create a sense of urgency, (#2) build a guiding coalition, and (#3) form a strategic vision in facilitating institutional change, our first actions were to investigate and understand administrative and faculty attitudes, as well as institutional policies that advance equity within public PUI institutional contexts. Our rationale for this approach is that researching and sharing differences in faculty and administrator perceptions would create urgency (#1, per Kotter) and identify areas of priority (#3, per Kotter) for institutional policy change to

promote equity for women STEM faculty in the PUI setting. This article demonstrates how we use survey data to evaluate and understand the attitudes of faculty and administrators across COPLAC, which then guides our development of materials and strategies for administrative action to remove barriers for institutions to engage in action (#5, per Kotter). By sharing the priority areas with multiple levels of administrators at each PUI – especially presidents and provosts – we lay the groundwork for guiding coalitions (#2, per Kotter) to execute the strategic vision for change (#3, per Kotter) that we identify from the data.

Methods

We designed a survey for both administrators and faculty to identify the priority areas for promoting faculty equity at COPLAC PUIs. Our survey questions focus on policy areas that women faculty in STEM at PUIs identified as obstacles to their advancement during focus groups that we held in 2017, as well as policy areas identified in the literature on women in STEM. We examine the confidence of administrative leaders and women STEM faculty at COPLAC member institutions in their leadership's ability to carry out the various equity-promoting policies and practices. We then analyze the survey results to identify the policy areas where there is the greatest discrepancy between faculty and administrator perceptions in policy effectiveness. Areas with the greatest discrepancy are areas where administrators face a gap in perceptions of their role as champions of gender equity. We target

these areas as the backbone of our strategic vision for institutional change across PUIs.

Institutions, Participants, and Survey Instruments. In the summer of 2020, we distributed the surveys to CEOs and CAOs from the 30 COPLAC member institutions. It is important to note that the number of member institutions changed over the course of the project. Also important to note is the fact that administrative titles and duties vary across institutions. Therefore, we utilized existing COPLAC definitions of CEOs and CAOs to target the appropriate administrators across institutions. This timeframe preceded any initiatives and interventions of our research and was designed to serve as baseline data as well as guide future strategies in the change theory framework. In January 2021, we distributed surveys to women faculty of COPLAC member institutions in a subset of STEM disciplines (Biology, Chemistry, Economics, Geology, Geography, Mathematics, Physics, Political Science, and Psychology).

Pandemic Years as a Baseline. Barriers to gender equity existed prior to the COVID-19 pandemic, yet the pandemic exacerbated many of these challenges (Malisch et al., 2020; Myers et al., 2020; Staniscuaski et al., 2020; Fulweiler et al., 2021; Beidas et al., 2022). The pandemic had both urgent and long-term impacts on STEM equity, with negative impacts on the multiple identities women in STEM share such as mother, faculty, and scientist. These multiple identities, as well as the increasing racial tensions from summer 2020, emphasized the importance of intersectionality as an often-overlooked factor that can widen the equity gap.

Staniscuaski et al. (2020) reported on survey responses from 3,345 academics in Brazil during the pandemic, and found female academics, especially Black women and mothers, were the group most impacted by the pandemic. This paper was particularly important in not only underscoring the effect of intersectionality on black women in STEM, but it also highlighted the long-term impacts of the pandemic. Our survey design allowed us to gather baseline data during the pandemic, which captured the urgent impacts of the pandemic on gender equity in STEM at PUIs. We also included survey questions tailored to the intersectional identities of women in STEM at PUIs.

Question 1: Assessing confidence in and among administrators. We surveyed administrators (in summer 2020) and women STEM faculty (in January 2021) on their own confidence or their confidence in their administrative leadership, respectively, on various aspects of faculty equity policy reform on their campus. We asked questions about administrator confidence and faculty confidence in administrators around the following themes: 1) identifying gender bias, 2) rectifying gender bias, 3) addressing discrimination, and 4) being an advocate. Responses were a Likert scale: strongly disagree, disagree, neutral, agree, strongly agree. The Faculty Survey included three additional items, which were added to address the intersectionality of equity policies impacting women of color.

Question 2: Assessing perceptions of positive impact of existing policies. From a list of 14 policies and practices for equity, a second question prompted administrators and faculty to evaluate their perceptions of the impact of a

specific policy or practice if it were in place at their institution. These 14 policies and practices were chosen primarily from equity policies or areas of concern identified from initial faculty focus groups at COPLAC institutions (that informed our project design, conducted in 2017) and from others prevalent in the literature. We focused on policies related to discrimination and equity in the areas of recruitment, retention, and promotion of women in STEM. Administrators and faculty indicated their agreement to the question, “For each policy that you already have in place, to what extent do you agree that it is having a positive impact?” using the Likert scale noted above. The options of “uncertain about impact” and “N/A” were added for instances where no policy is in place. We examined the extent of policy adoption across COPLAC campuses from administrator responses of “N/A.”

Both administrators and faculty were given the opportunity to provide qualitative responses and additional comments or feedback following Questions 1 and 2, and were asked an additional free response question, “What obstacles are your campus facing in implementing impactful policies or practices for equity?”

Data Analysis

In order to ensure protection of both faculty and administrators to respond openly, especially given the small number of institutions and women STEM faculty across the COPLAC consortium, our survey consent agreement noted that only consortium-wide aggregated data would be evaluated and disseminated. This was also explicit in our Institutional Research Board (IRB) protocol. Therefore, we restrict

our analysis to consortium-level only. We also intentionally structured our questions to be optional, allowing each respondent to skip questions and only respond to those they selected.

We received 19 administrator responses from 15 of 29 COPLAC campuses, representing a 51% campus response rate, and 108 faculty responses from 344 women STEM faculty who were sent the survey. Faculty responses represent 89% of the COPLAC campuses and range from 1 to 19 responses per institution (with a mean and median of 4.1 and 4, respectively). Because the majority of COPLAC institutions are represented in both administrator and faculty surveys and because no single campus dominates the responses, we consider our sample to be representative of the COPLAC consortium.

Even though responses were optional, 100% of administrator and 96% of faculty survey respondents provided a response for all parts of both questions. With these response rates, our sample size is 19 administrator responses and 104-108 faculty responses for all question items.

We approached our survey results with an exploratory analysis in order to understand similarities and differences between administrator and faculty perceptions at COPLAC PUIs to inform the focus of our project work. For Confidence Question 1, we compared Likert responses for administrators (n=19) and faculty (n=106) using MANOVA (,1995) statistical tests [using IBM SPSS Statistics © (2022)]. We chose this analysis method in order to evaluate administrator and faculty response differences for all question items simultaneously.

The structure of the responses for Positive Impact Question 2 complicates the statistical analysis of survey results, as the respondents could either select from a Likert of agreement of impact ratings or choose “N/A” if the policy did not exist on their campus. With this question structure, we were able to easily discern the lack of institutional policy among respondents from the number of N/A responses. But for respondents at institutions without a policy in place, the “N/A” response creates a missing data point in the Likert scale of agreement with policy effectiveness. Therefore, we indicate the number of Likert responses and N/A (no policy) responses for each item of Positive Impact Question 2 in our results, which ranges from 8-19 administrator Likert responses and 44-105 faculty Likert responses.

We also chose a MANOVA statistical test to evaluate differences in administrator and faculty responses for Positive Impact Question 2. This enables evaluation of the effect for all 14 items simultaneously, which are likely correlated as policies or practices known to impact equity in faculty work environments instead of individual tests that require adjustment of p-values. Yet, the structure of Question 2 (and missing data for N/A responses) results in a smaller sample size in the MANOVA analysis comparing administrator and faculty Likert agreements of policy effectiveness, which requires a complete data set across all dependent variables. Only 4 administrator surveys and 23 faculty surveys had complete Likert agreement responses for all 14 items of Positive Impact Question 2 (i.e., respondents reported all policies in place at their institution and, therefore, all Likert responses). Therefore, the MANOVA analysis for Question 2 only compares the effect of administrator and

faculty response differences for respondents at institutions with all policies in place.¹ Despite this limitation, information gleaned from the MANOVA comparison of the Likert responses is useful in understanding the differences in faculty and administrator perceptions of policy effectiveness across the full set of policy items. Therefore, MANOVA p-values for Question 2 are reported in the presentation of results.

For the MANOVA tests of Questions 1 and 2, statistically significant is defined as the standard $p \leq 0.05$, since items of each question are considered together in the analysis. For discussion purposes, we also define “marginally significant” to be a range within twice the p-value thresholds for each test ($0.05 < p < 0.10$); this allows for further comparisons and discussion by expanding to a 10% risk of producing a result with no association.

Lastly, we identified strategic priority areas for faculty equity work by evaluating the differences in perceptions from administrator and faculty survey responses for specific question items on equity policies and practices, and from qualitative data. We focused specifically on policy areas where there was the greatest discrepancy between administrator and faculty perceptions. These priority areas are specific to our institutional contexts as primarily undergraduate institutions (PUIs).

Results

Confidence in and among administrators. Figure 1 shows the percent distribution of all responses to the Confidence Question items, with p-values from the MANOVA statistical test. Likert responses were significantly different ($p \leq 0.05$) between administrators and faculty for all Confidence Question items. The sum percent of “strongly disagree” and “disagree” responses for administrator and faculty responses to each question item are also reported in Table 1.

To gain additional insight into the survey data, faculty were invited to provide additional open-ended qualitative responses to the Confidence Question from Figure 1; and the 28 faculty free responses reported were coded into three predominant themes summarized in Figure 2. About half of the responses were negative in tone, with 18% reflecting faculty experiences of explicit bias, discrimination, and lack of support, further emphasizing the need for institutional change. Also, 25% expressed that their administration does not understand or prioritize faculty equity at their institution, indicating a need for administrator professional development on implementing effective policies and practices. However, half of the responses were of a positive tone, with 32% indicating how administrators want to make change, but also noting that equity reform is difficult.

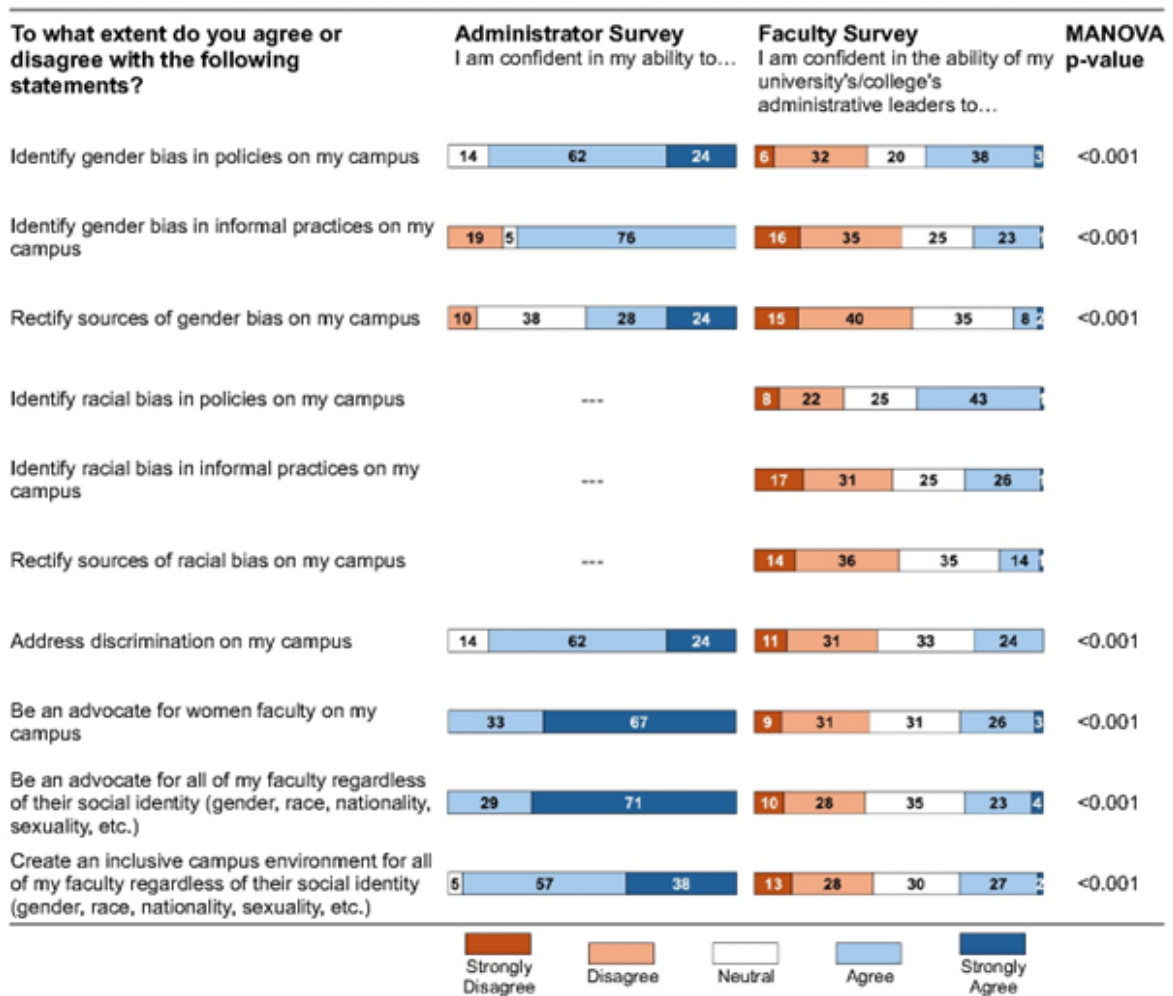


Figure 1. Confidence question items and responses. Likert results of degree of confidence (from strongly disagree to strongly agree) in administrator ability to conduct equity practices, from surveys of administrators (n=19) and faculty (n=108). Three items were not asked in the administrator survey, but added to the faculty survey. Statistical significance from MANOVA analysis of the 7 items for all faculty vs. all administrator responses are reported as p-values.

Table 1. Level of disagreement between Administrator and Faculty responses to Confidence Question.

Confidence Question Items	Administrator# % responses of disagree or strongly disagree	Faculty## % responses of disagree or strongly disagree
Identify gender bias in policies on my campus*	0%	38%
Identify gender bias in informal practices on my campus*	19%	51%
Rectify sources of gender bias on my campus*	10%	55%

Identify racial bias in policies on my campus	--	30%
Identify racial bias in informal practices on my campus	--	48%
Rectify sources of racial bias on my campus	--	50%
Address discrimination on my campus*	0%	42%
Be an advocate for women faculty on my campus*	0%	40%
Be an advocate for all of my faculty regardless of their social identity* (gender, race, nationality, sexuality, etc.)	0%	38%
Create an inclusive campus climate for all of my faculty regardless of their social identity* (gender, race, nationality, sexuality, etc.)	0%	41%

* Statistical significance ($p \leq 0.05$) between all $n=19$ administrators and all $n=108$ faculty

I am confident in my ability to...

I am confident in the ability of my university's/college's administrative leaders to...

-- Administrators were not asked this item

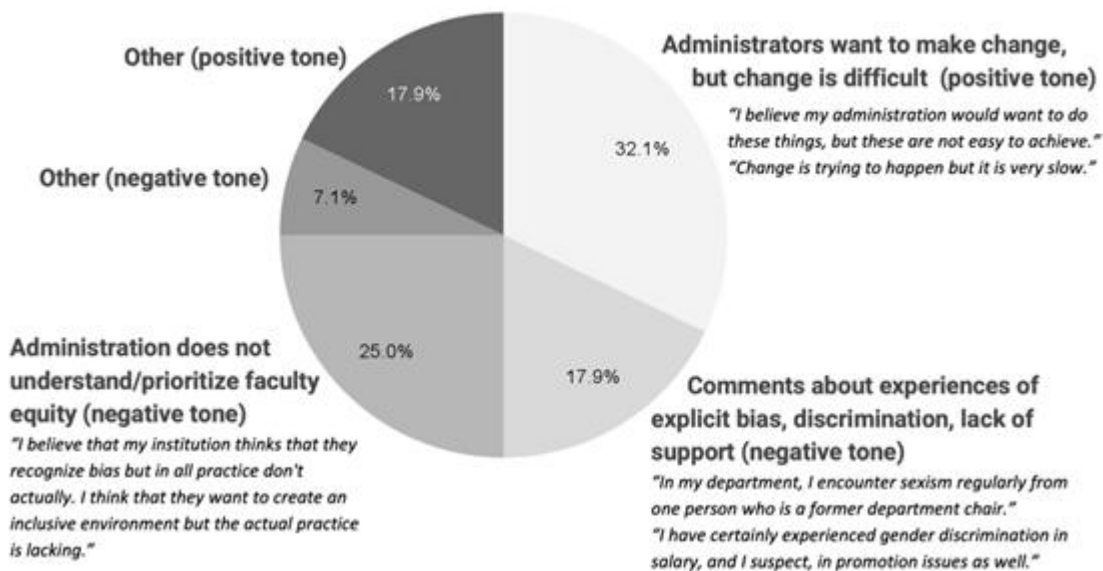


Figure 2. Predominant themes and representative free response comments from faculty to prompt to provide additional comments or feedback on the question, "I am confident in the ability of my university's/college's administrative leaders to..." Twenty-eight faculty provided open ended responses; approximately half of the responses were coded with a positive tone and half with a negative tone, as indicated.

Assessing the positive impact of existing policies. Responses for the Positive Impact Question 2 are shown in Figure 3, with the percent distribution of Likert responses and the total numbers of Likert and of no policy (N/A) responses indicated for each item. Because COPLAC PUIs have different policies in place, the number of Likert vs. no policy responses varies by Question item. The column of percent of campuses with the policy or program in place was determined from the number of no-policy (N/A) administrator responses by institution. Responses from a second administrator at the same institution was not included in the percentage. Note that all administrator (n=19) and faculty (n=104-108) responses are reported in Figure 3, either as no-policy responses or as percentages of each Likert response shown in the colored bars. In addition, the sum percent of “strongly disagree” and “disagree” Likert responses for administrators and faculty are reported in Table 2 for each question item.

Several important aspects about equity policies can be determined from Figure 3. First, the number of campuses that have specific equity policies in place varies widely. We elaborate on this in the discussion. For institutions that have a policy in place, we use the Likert responses to assess agreement of policy effectiveness. Upon first inspection, administrators predominantly have agreement and faculty have more disagreement in policy effectiveness. However, confirming the statistical significance of this difference is complicated by the complexity of the way the question was asked. MANOVA p-values in Figure 3 compare the limited data set of administrators (n=4) and faculty (n=23) at institutions with all policies in place (see

Data Analysis). From this set of institutions with full policy implementation, differences in faculty and administrator responses are statistically significant for 11 of the policies ($p \leq 0.05$), marginally significant for two of the policies ($0.05 < p < 0.10$), and not significant for one of the policies (Figure 3), further reinforcing the differences in perceptions of policy impact.

Qualitative open-ended responses were collected for the Positive Impact Question from 29 faculty (Figure 4), and corroborated with the Likert data. After coding, predominant themes included responses on the lack of equity policies and practices on their campus (35%), which reinforces the large number of practices or policies with 60% or lower adoption across COPLAC PUIs. Comments also focused on workload inequity in service (13%) and general lack of childcare or parental support (16%), paralleling the high number of strongly disagree responses for those items in Figure 3. The qualitative data also capture faculty input not included in the quantitative responses, for example, for faculty from the 47% of campuses without childcare policies or from the 60% of campuses without processes to monitor or rectify service load (whose response would be N/A for those items in Figure 3).

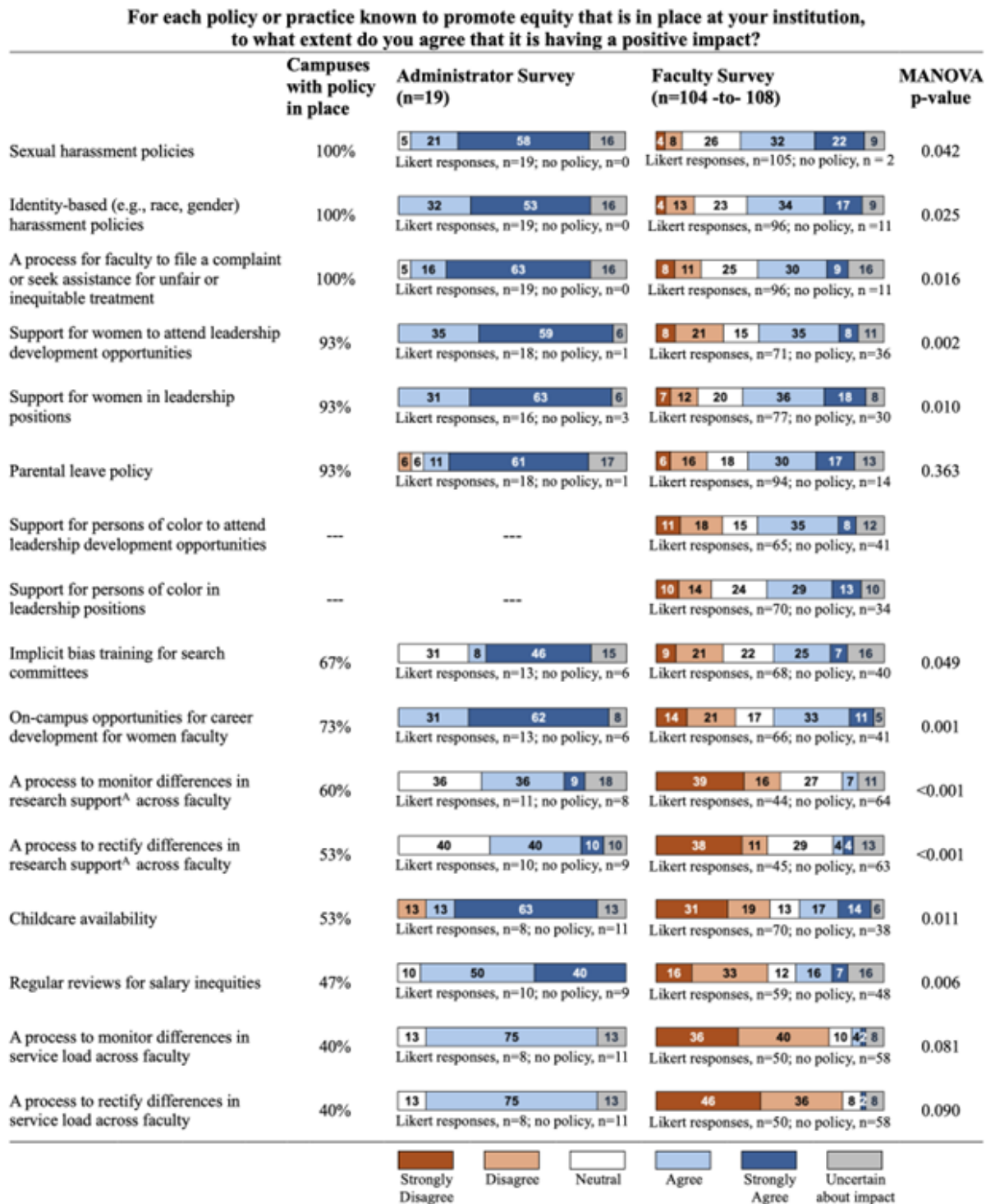


Figure 3. Positive Impact question items and responses. Bars report percentages of Likert responses of positive impact agreement (from strongly disagree to strongly agree, and uncertain about impact) for each listed policy or practice item from

surveys of administrators and faculty. The number (n) of Likert responses evaluating the policy impact and of no policy (N/A) responses are indicated for each item. Percent of campuses with policy in place is given by the total percent of Likert responses from the administrator survey (not counting multiple responses from the same institution). Statistical significance from MANOVA analysis of items for the limited set of institutions with all policies in place (i.e., respondents with all Likert and zero “N/A” responses) is reported as p-values.

Table 2. Level of disagreement between Administrator and Faculty responses to Positive Impact Question

Positive Impact Question Items (% of campuses with policy or program in place)	Administrator [#]	Faculty [#]
	% Likert responses of disagree or strongly disagree from Figure 3	
Sexual harassment policies (100%)	0%	12%
Identity-based (e.g. race, gender) harassment policies (100%)	0%	17%
A process for faculty to file a complaint or seek assistance for unfair or inequitable treatment (100%)	0%	19%
Support for women to attend leadership development opportunities (93%)	0%	29%
Support for women in leadership positions (93%)	0%	19%
Parental leave policy (93%)	6%	22%
Implicit bias training for search committees (67%)	0%	30%
On-campus opportunities for career development for women faculty (73%)	0%	35%
A process to monitor differences in research support, including funding, space/equipment or other resources, across faculty (60%)	0%	55%
A process to rectify differences in research support, including funding, space/equipment or other resources, across faculty (53%)	0%	49%
Childcare availability (53%)	13%	50%
Regular reviews of salary inequities (47%)	0%	49%
A process to monitor differences in service load across faculty (40%)	0%	76%

A process to rectify differences in service load across faculty (40%) 0% 82%

For each that you already have in place, to what extent do you agree that it is having a positive impact?

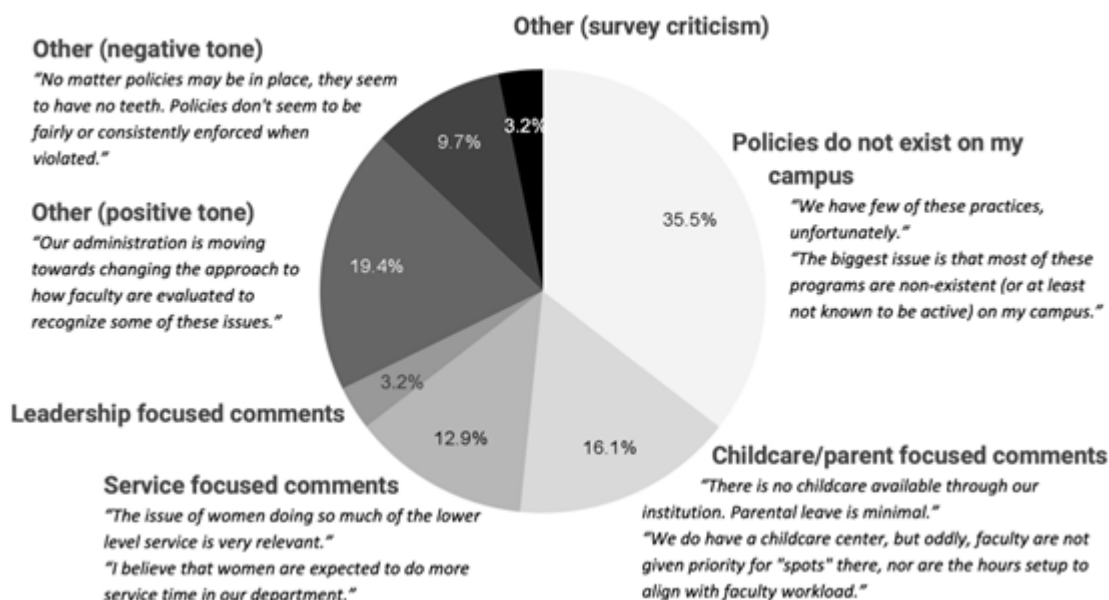


Figure 4. Predominant themes and representative free response comments from faculty to prompts to provide additional comments or feedback on the question, "For each that is in place at your institution, to what extent do you agree that it is having a positive impact?" Twenty-nine faculty provided open-ended responses.

Obstacles to change. Both administrators and faculty were asked to provide open-ended qualitative responses about obstacles they faced at their respective campuses in implementing impactful policies or practices for equity, as shown in Figure 5 for 13 administrator free responses and in Figure 6 for 50 faculty free responses. The majority of administrator responses (60%) were a request for help, emphasizing administrator interest in institutional change and their need for

professional development, collaboration, and guidance in this effort. Themes of institutional obstacles from faculty responses on lack of institutional plans (18%) and lack of administrator understanding on equity issues (25%) also support the need for a consortium-wide initiative. Additionally, both faculty (24%) and administrators (27%) expressed budget challenges as major obstacles.

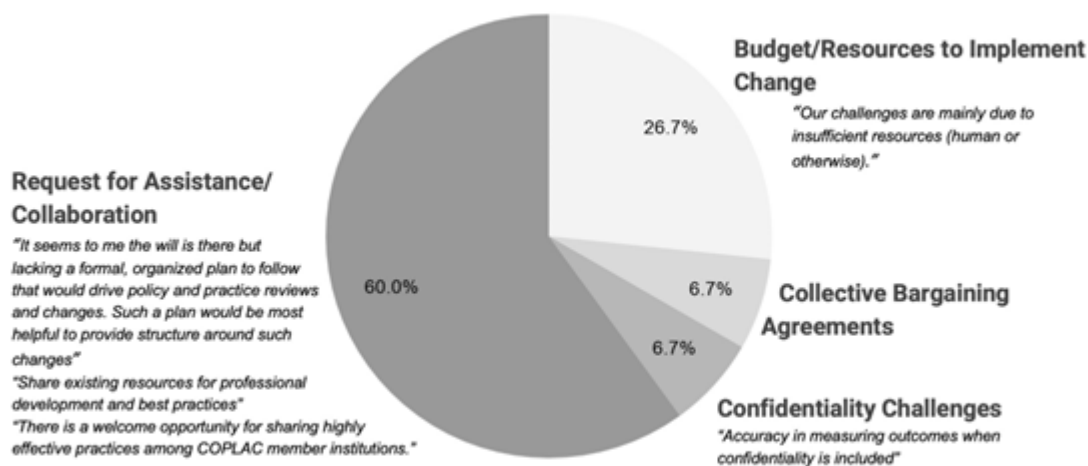


Figure 5. Predominant themes and representative free response comments from administrators when asked about obstacles they faced at their respective campuses in implementing impactful policies or practices for equity. Thirteen administrators provided open-ended responses.

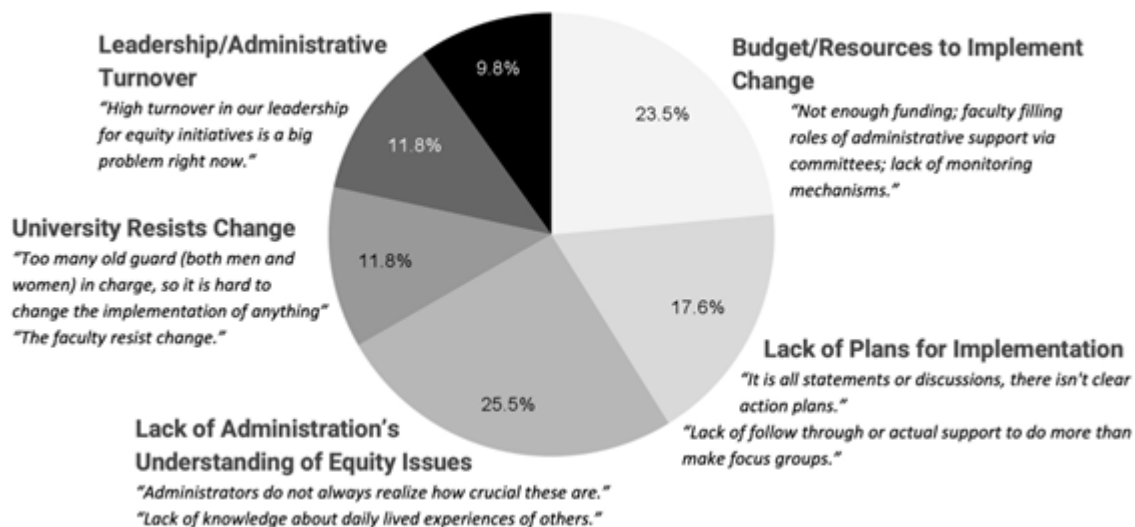


Figure 6. Predominant themes and representative free response comments from faculty when asked about obstacles they faced at their respective campuses in implementing impactful policies or practices for equity. Fifty faculty provided open-ended responses.

Discussion

Our research objective is to identify strategic priority areas for promoting faculty equity at COPLAC PUIs in order to assess leadership capacity of campus administrators to serve as champions of gender equity reform and facilitate the creation of a strategic vision for institutional change. To do so, we evaluated similarities and differences in faculty and administrator perceptions across a variety of policy areas using quantitative and qualitative responses. This analysis provides a unique look at the prevalence of equity-related policies for a network of public PUIs and identifies key policy areas to target when fostering institutional change.

Primary findings. Overall, results show that administrative leaders perceive that they have a high capacity to implement equity-promoting policies, as seen by

agreement to the majority of items in Figure 1. Yet we find that the differences between administrator confidence and confidence faculty have in their administrators for understanding and enacting change to be statistically significant for all items. These discrepancies are supported by qualitative faculty free responses: 50% of free responses were about challenges administrators face in enacting institutional change or the lack of administrator understanding of equity issues (Figure 2). Therefore, there is a need for administrators to adjust their strategic visions to effectively serve as policy champions on their respective campuses.

Results also show that a number of institutional equity policies are missing across much of the COPLAC PUIs, with six policies having an adoption rate of 60% or less (Figure 3). There are large differences between administrator and faculty perceptions of the impact of these equity practices (Figure 3) for the institutions where such policies are in place. The high level of faculty dissatisfaction with existing practices in these areas suggests that reform is needed. We find consistencies in the subset of policies with lowest institutional adoption and those with the highest discrepancy of perceptions of policy effectiveness by administrators versus faculty (Figure 3 and Table 2). For example, only 40% of administrators claimed that their institution had “a process to rectify differences in service load across faculty.” Where that policy does exist, 0% of administrators vs. 82% of faculty disagreed that the policy was having a positive impact. Additionally, 13% of qualitative open-ended responses from faculty specified inequities in service workload, further corroborating that service workload is an area of concern for women STEM faculty at COPLAC

PUIs. A second example is childcare availability. Only 53% of campuses reported campus childcare, with a discrepancy of 13% of administrators compared to 50% of faculty who disagree or strongly disagree that the childcare offered is having a positive impact on their campus (Table 2). The need for reform in on-campus childcare was further supported by 16% of qualitative free responses from faculty related to this need (Figure 4).

Strategic areas for policy reform. We used the overlap of (a) low implementation (policies with 60% or less implementation), (b) highest rates of faculty disagreement about policy effectiveness (over 49%), (c) inference of statistical significance from differences in administrator and faculty agreements from those campuses with all policies in place, and (d) themes in qualitative data (see Table 2 and Figures 3 and 4) to identify six strategic priority areas for reform where COPLAC PUI administrators can clarify their roles as champions of gender equity reform. These strategic areas include: (1) processes to monitor differences in resource allocation, (2) processes to rectify differences in resource allocation, (3) childcare availability, (4) reviews of salary inequities, (5) processes to monitor differences in service load, and (6) processes to rectify differences in service load.

We acknowledge that we have not determined if the differences in faculty and administrator perceptions about the effectiveness of institutional policies (Figure 3) are statistically significant for all survey responses (see details of our limitations below). But, we do find statistical significance ($p\text{-value} < 0.05$), or marginal significance ($0.05 \leq p\text{-value} < 0.10$), for many equity policy items from the MANOVA

analysis of administrator and faculty responses at COPLAC institutions with all of these policies in place, indicating that even institutions with a large slate of equity policies struggle with policy implementation.

Limitations of this study. Limitations of the results and interpretation include biases that exist with the subjective nature of Likert-scaled data, including central tendency bias, acquiescence bias, and social desirability bias (Westland, 2022). In particular, we expect administrators to be reluctant to admit that they lack confidence in their abilities to enact policies crucial for gender equity in STEM, especially given the widespread emphasis on gender equity that exists across higher education. We recognize that selection bias may also affect our results. For example, administrators that are more invested in equity processes may be more likely to respond to the survey, and may also be more likely to view their policies as having a positive impact. However, our survey demonstrates that a large percentage of administrators – over 60% for some policies – were willing to admit when policies were not in place at their institution. The variation in administrator responses to the presence of equity-focused policies gives us confidence in the representativeness of our sample of COPLAC administrators. The same can be said for faculty. Although our sample could be biased towards faculty motivated to be concerned about equity policies, this concern is not inherently negative. As shown in Figure 2, approximately 50% of faculty's open-ended responses about their confidence in administrators to address equity had a positive tone. This gives us confidence that the sample of our faculty is

representative, and not skewed towards faculty that only hold negative views of their administration's management of equity policies.

While the statistical analysis of the differences between administrator and faculty survey responses for Question 1 is fairly straightforward, there is a limitation in the statistical analysis of responses for Question 2, which asks faculty and administrators to identify the effectiveness of 14 equity policies although many of those policies are not in place at all (or even most) institutions. The number of responses to Question 2 is limited by the existence of the policy at the administrator or faculty member's institution. This results in the appearance of missing data in the MANOVA statistical analysis, even though over 96% of survey respondents completed all aspects of these questions. We approached the statistical analysis using a MANOVA statistical test to provide statistical power, but recognized the limited size of the data set (only those with Likert responses for all 14 categories). Even with this limitation, the comparison of Question 2 provides information about similarities and differences between faculty and administrator responses, which, combined with the extent of policy adoption and insight from the qualitative data, provides important insight about faculty equity policies that can be targeted for reform.

Additionally, there is a difference in the response rate of faculty compared with administrators. Faculty responses were obtained from 89% of campuses, while administrator responses were obtained from just 51% of the campuses. While it is uncertain how broadly applicable these results are outside the COPLAC consortium,

the data show some consistency –despite a broad geographical range – and are valuable for their contribution to understanding equity at PUIs where data are few.

Additional Insights. The high level of administrator confidence to identify and address aspects of bias and discrimination on their campus (strongly agree or agree statements in Figure 1) indicates that administrators take on policy change at their institutions to promote faculty equity. In addition, some widely adopted policies show closer (and greater) agreement of faculty and administrators on their effectiveness (see first 8 policies reported in Figure 3). For example, 100% of campuses report having sexual harassment policies, a process for faculty to file a complaint or seek assistance for unfair or inequitable treatment, as well as identity-based (e.g. race, gender) harassment policies. These same policies had the lowest disagreement of policy effectiveness for both administrators (0%) and faculty (<20%) (Table 2).

One aspect that may be driving the highest levels of disagreement between administration and faculty is communication about ways the institution is addressing faculty equity initiatives. We found that 35.5% of qualitative open-ended responses to the effectiveness of policies fall into the theme, “policies do not exist on my campus” (Figure 4). This reinforces the limited number of equity policies across COPLAC institutions (as low as 40% adoption) (Figure 3). In addition, the similarities between faculty responses at different institutions, as well as similarities between administrator responses at different institutions (Figures 3, 4), indicate the issues are not limited to a few institutions, but are widespread, common, and worthy of attention and reform. Institutional leaders would benefit from assessing the impact of, and communicating

about, existing policies to both focus their work to institutional needs and inform their faculty of institutional efforts to promote equity.

While we argue that faculty equity policy and program development should focus on provost (CAO)-level and president (CEO)-level leadership initiatives, emerging from our findings is the critical role that department chair-level leadership has in promoting equity at their institutions. The policies and practices that had the greatest area of disagreement (e.g. processes to monitor or rectify differences in resource allocation and service load) are areas often administered by department chairs. It became clear that chairs in COPLAC PUIs need additional support and professional development to promote equity. As a result, we responded by developing chair training on gender equity in STEM as part of our efforts to enact institutional change.

Connecting Findings to Areas of Faculty-Equity Work

This formal study of the similarities and differences in faculty and administrator perceptions, supported by open-ended qualitative comments, identifies and highlights six strategic target areas of administrator professional development for a consortium of PUIs and the need for additional support for department chair-level leadership in order to promote equity. Through a review of the literature, we outlined and recommended strategies that address the six areas, as well as faculty career development – although many of these approaches are based on and targeted to large research institutions.

A process to rectify differences in service load across faculty. O'Meara et al. (2017) recommend that institutions identify and provide mechanisms to recognize and value "invisible labor" (that is critical for campus success yet often uncounted for tenure or promotion); provide mechanisms to recognize and reward this service in tenure and promotion processes; use dashboards to monitor amount and types of service; and increase awareness of extra service requests of women faculty and faculty of color for representation.

A process to monitor differences in service load across faculty. O'Meara et al. (2020) recommend that institutions recognize that a contributor to inequitable workload is the lack of information and transparency on how workload is divided. Strategies for institutions to increase clarity include collecting institutional data on teaching, service, and research workload; identifying which comparison categories (e.g. rank, appointment) are useful for analysis; deciding on a strategy for disseminating results; and deciding on degree of transparency (full transparency with names or aggregated data). The overall goal is to make the invisible visible by displaying data on work activities that are critical to the department/institutional mission, but which are not typically counted or shared.

Regular reviews for salary inequities. Laursen & Austen (2020) recommend strengthening institutional accountability structures by making data available and transparent. This is achieved by collection and aggregation of data on areas such as faculty diversity, service, median time to promotion (from associate to full), and salary

ranges that are then openly available. In this work, institutions will need to balance individual privacy versus the need to distinguish departments/divisions.

Childcare availability. Etzkowitz et al. (2000) recommend institutions increase childcare resources by: creating/expanding childcare facilities of campus; creating childcare spaces in the broader community; publicizing information about local childcare; and having a resource person to compile and disseminate information about childcare needs.

A process to rectify differences in research support (funding, resources, etc.). Laursen & Austen (2020) recommend institutions provide faculty grants and other resources to foster individual success and career advancement for those impacted by a lack of equitable research support. These include resources for enhancing scholarship and career growth; providing career development grants for travel to visit other labs, collaborations, conference attendance, trainings, and workshops; allocating research awards for research-related expenses such as equipment, lab space, renovations, materials; supporting student research or expenses for fieldwork; allowing course releases to carry out scholarship; bridging support to provide continuity in research funds between grants; cultivating on/off campus collaborations; seeding risky avenues of research; and providing opportunities for different career directions.

A process to monitor differences in research support (funding, resources, etc.). Laursen & Austen (2020) recommend institutions increase accountability and transparency through annual reports to hold departments/units

accountable for equity in distributing supports and resources to faculty; and also create faculty information dashboards with data that are accessible and transparent. Similar to addressing salary inequities, this effort must also balance the need to protect the privacy of individual faculty.

On-campus opportunities for career development for women faculty.

Laursen & Austen (2020) recommend institutions provide faculty professional development programs and increase the visibility of women. Program topics can include: meeting tenure and promotion expectations; balancing research, teaching, and service; writing and public speaking; managing time and stress; gender, incivility, and bias; effective communication; presenting and promoting yourself; long-term career planning; using the summer wisely. Institutions can also create events for women considering leadership roles and increase the visibility of women. These include hosting lunches or workshops with more senior women sharing experiences, spotlighting the accomplishments of women STEM faculty by featuring their achievements on the campus website or newsletter, highlighting visibility issues for women in STEM, and promoting campus equity initiatives.

Practical, Theoretical, and Policy Implications

One of the strengths of this study's research design is its affiliation with an existing consortium of PUIs. We utilized standing meetings of COPLAC institutional leaders to familiarize administrators (presidents and provosts) with our study and to advance the first three steps of Kotter's framework for institutional change to (#1) create a sense of urgency, (#2) build a guiding coalition, and (#3) form a strategic

vision. By sharing the results of our survey with administrators, we generated an “awakening” for them, illustrating variation in the number of equity policies across the consortium, the areas where faculty lack confidence in the effectiveness of the policies, and overall, the necessity for change (Fredberg & Pregmark, 2022). By highlighting the strategic policy areas of greatest need, we encouraged administrators to identify the change agents at their own institutions and to create guiding coalitions that could result in policy change (Kang et al., 2020). Finally, by providing administrators with clear actions (see Areas of Faculty Equity Work), we gave them the tools they need to be champions of gender equity and to incorporate equity into their own institutional strategic plans (Williams, 2013). The extent to which these three steps result in policy change is the subject of future analysis and is beyond the scope of this current study. Regardless, the results of our analyses demonstrate the need for administrators to effectively communicate policy change to faculty so the existence of policies and their positive impacts are evident to women faculty in STEM. The survey results also indicate that certain policy areas are not being tackled by higher-level administrators – i.e. presidents and provosts – and may require intervention and implementation at the department chair level.

Our results also show that there is a discrepancy between administrator and faculty confidence in administrator ability to identify and advocate for equity on PUI campuses (Table 1). While zero administrators disagreed that they could identify and advocate for equity, faculty disagreed with statements about administrator capacity for equity reform, ranging from 30% in disagreement (identifying racial biases in

policies) to 55% in disagreement (rectifying sources of gender bias). These results are heartening in that administrators tend to view themselves as champions of equity on their campuses. However, faculty disagreement suggests that administrators lack credibility to serve as champions, which may limit their effectiveness in advancing a change agenda. By emphasizing these results with administrators, we made clear that presidents and provosts need to communicate more effectively and work more closely with faculty to advance an equity agenda at PUIs.

This baseline data on the perceptions of impact of faculty equity policies across COPLAC allow us to test for the impact of the strategies and materials we developed for administrators at multiple levels and implemented as part of this research, with follow-up surveys for comparison. The priority areas identified for this COPLAC initiative are likely not limited to PUIs, but more widespread to different types of institutions. Thus, the strategies associated with target areas from this study could also be applicable beyond this consortium of PUIs to more types of institutions that can support equity for more women STEM faculty.

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