

Leadership gender disparity in the fifty highest ranking North American universities: Thematic analysis under a theoretical lens

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ABSTRACT

Background Despite changes in the discourse around gender distributions within academic leadership, women continue to be under-represented in academia. Our study aims to identify the extent of gender disparity in the academic leadership in the top 50 North American universities and to critically analyse the contributing factors through a comprehensive theoretical framework.

Methods We adopted the theoretical framework of leadership continuum model. A retrospective analysis of the gender of the leadership ranks was conducted between December 2018 and March 2019 for the top 50 universities in North America (2019 Quacquarelli Symonds World University Ranking system). The leadership hierarchy was classified into six tiers.

Results A total of 5806 faculty members from 45 US and five Canadian universities were included. Women were overall less likely to be in a senior leadership role than men (48.7% vs 51.3%; p value=0.05).

Women accounted for fewer positions than men for resident/chancellor (23.8% vs 76.2%; p value<0.001), vice-president/vice-chancellor (36.3% vs 63.7%; p value<0.001), vice provost (42.7% vs 57.3%; p value=0.06), dean (38.5% vs 61.5%; p value<0.001) and associate dean (48.2% vs 51.8%; p-value=0.05). Women however were in a greater proportion in the assistant dean positions (63.8% vs 36.2%; p value<0.001).

Conclusion Leadership gender imbalance is trans-organisational and transnational within the top 50 universities of North America and progressively widens towards the top leadership pyramid. This correlates with the lack of women leadership progress and sustainability in later cycles of the leadership continuum model (beyond assistant dean).

INTRODUCTION

Despite the growing discussions around the gender disparity within academic leadership in higher education, women continue to be significantly under-represented. This is particularly the case for senior academic ranks of non-traditional disciplines such as engineering and applied sciences, public health¹ and academic medicine.² Unfortunately, this leadership gender imbalance prevails despite evidence showing no significant differences in leadership capabilities between men and women.^{3,4} This gender gap exists in US higher education institutions even after accounting for age, experience and measures of research productivity among faculty

members^{5,6} despite evidence that female deans are perceived to be more likely than their male counterparts to not only enhance the education in their academic units but also engage in research, community and professional endeavours; promote institutional diversity; and manage resources both fairly and effectively.^{4,7}

Several studies have previously identified gender disparity in the leadership ranks of academia, with the vast majority focusing on the field of academic medicine.^{5,6,8–15} Similar disparity has also been documented in professional societies and editorial boards of journals.^{16–18} A 2013 report showed that women in the USA accounted for 22% of all university presidents, 40% of all chief academic officers and 43% of all other senior administrators.¹⁹ Some studies have attributed these lagging statistics and lack of career advancements to unsupportive work environment, occult institutional discrimination in the hiring process, grant funding, journal reviewing, access to resources and personal career choices.^{20–24} Although there has been a positive shift in recent years with more women being hired in senior leadership ranks, leadership within the academia continues to be male-dominated.^{25–27}

The vast majority of gender leadership research focuses on academic medicine and doesn't extend to the broader academic ranking. Our study aims to identify the extent of gender disparity in the academic leadership positions in the top 50 North American universities and to critically analyse the contributing factors through a comprehensive theoretical framework.

THEORETICAL FRAMEWORK

We adopted the leadership continuum model²⁸ as a framework to explore the gender disparity in academic leadership hierarchy. This conceptual framework describes a repeating or looping cycle of four phases: preparing, transitioning, sustained success and transitioning again. The first two phases predominate in early-to-mid-career stages, while the latter phases predominate in mid-to-late career stages. This model takes into account the decreasing percentage of women leaders along the leadership hierarchy. It acknowledges that specific organisational policies as well as individual choices and perceptions must target the mid-to-late stages of women leadership career rather than early-to-mid-stages in order to bridge that gap and retain critical

mass of women leaders, enough to sustain organisational and cultural change.²⁸

Despite the fact that women now account for more than half of all medical schools matriculants in the USA²⁹ and more than half of UK medical school graduates,³⁰ women faculty in academic leadership roles are still low—although increasing—not only in academic medicine³¹ but also in academia in general.²⁸ Although the systems of career influences model² describes the individual and organisational influences that affect women faculty career advancement, it's not designated or optimised to address the differential gap in women leadership where women leaders are less likely to get promoted to and to maintain top leadership positions as assistant deans and higher.

METHODOLOGY

Data collection

The scope of our study encompassed academic North American universities (the USA, Canada and Mexico). The top 50 universities in North America were selected as reported by Quacquarelli Symonds (QS) World University Ranking website,³² which includes reviews and rankings of over 1000 universities globally. QS World University Ranking was selected as the ranking platform because of its robust ranking methodology, which uses six metrics: academic reputation, employer reputation, faculty/student ratio, citations per faculty, international faculty ratio and international student ratio.³² This is in contrast to ranking platforms like US News metrics, which ranks primarily on publications and research. Using the ranking provided by QS World University Ranking, 45 of the selected universities were in the USA and five were in Canada.

The data from top 50 universities were compiled into an Excel spreadsheet. Six leadership tiers were created with strict faculty leadership inclusion and exclusion criteria to mitigate and account for the variability in the leadership titles. The first tier included president/chancellor. The second tier included provost, vice-president and vice-chancellor. The second-tier roles were lumped together because of similarity in the rank. The third and fourth tiers included the vice provost and the dean, respectively. The fifth tier included associate dean and its equivalent positions as deputy dean and vice dean. The sixth and last tier included the assistant dean. The faculty exclusion criteria included the position of dean emeritus, retired staff and all individuals without identifiable gender or leadership position.

To ensure consistency, the same researchers from December 2018 to March 2019 generated the entire data set from publicly available universities' websites. For each university, we first identified the full-time academic leaders that corresponded with the six leadership tiers. Second, we navigated through the universities' website to find its leadership directory, from which we recorded the name and position of individuals who met the inclusion criteria. For clarity and convenience of statistical analysis, the highest academic position was included for those who held more than one leadership position during the study period. The gender of individuals that met the inclusion criteria was determined by pictures on faculty websites and gender pronouns in official biographies. In cases of gender ambiguity, faculty were identified using personal identifying websites including LinkedIn.

The data that support the findings of this study are available from the corresponding author on request.

Statistical analysis

Stata V.14.2 was used for this analysis. To assess gender differences, we compared academic ranks between men and women

Table 1 Gender proportion by leadership rank

| Position | Gender | | Total | P value |
|----------------------|--------------------|--------------------|-------------|-------------|
| | Female | Male | | |
| | N (%) | N (%) | N | |
| President/Chancellor | 15 (23.8) | 48 (76.2) | 63 | <0.001 |
| VP/ vice-chancellor | 226 (36.3) | 396 (63.7) | 622 | <0.001 |
| Vice provost | 67 (42.7) | 90 (57.3) | 157 | 0.06 |
| Dean | 326 (38.5) | 521 (61.5) | 847 | <0.001 |
| Associate dean | 1334 (48.2) | 1434 (51.8) | 2768 | 0.05 |
| Assistant dean | 861 (63.8) | 488 (36.2) | 1349 | <0.001 |
| Total | 2829 (48.7) | 2977 (51.3) | 5806 | 0.05 |
| VP, vice-president. | | | | |

using the test of proportions (table 1). We looked specifically at the gender difference based on individual leadership rank, the gender proportions of leadership positions as a function of all leadership positions and the proportion of female leadership roles among the 50 institutions.

RESULTS

Gender proportion by leadership Rank

A total of 5806 faculty members with various leadership positions in 45 institutes in the USA and five institutes in Canada were included (2977 men and 2829 women). Using one-sample test of proportions, men were overall more likely to have a senior leadership role than women, 51.3% vs 48.7% (p value=0.05) (figure 1). Leadership positions accounting for fewer female representation (figure 2) included president/chancellor (15/63; 23.8% vs 76.2%; p value≤0.001), vice-president/provost/vice-chancellor (226/622; 36.3% vs 63.7%; p value≤0.001), vice provost (67/157; 42.7% vs 57.3%; p value=0.06), dean (326/847; 38.5% vs 61.5%; p value≤0.001) and associate dean (1334/2768; 48.2% vs 51.8%; p value=0.05). In contrast,

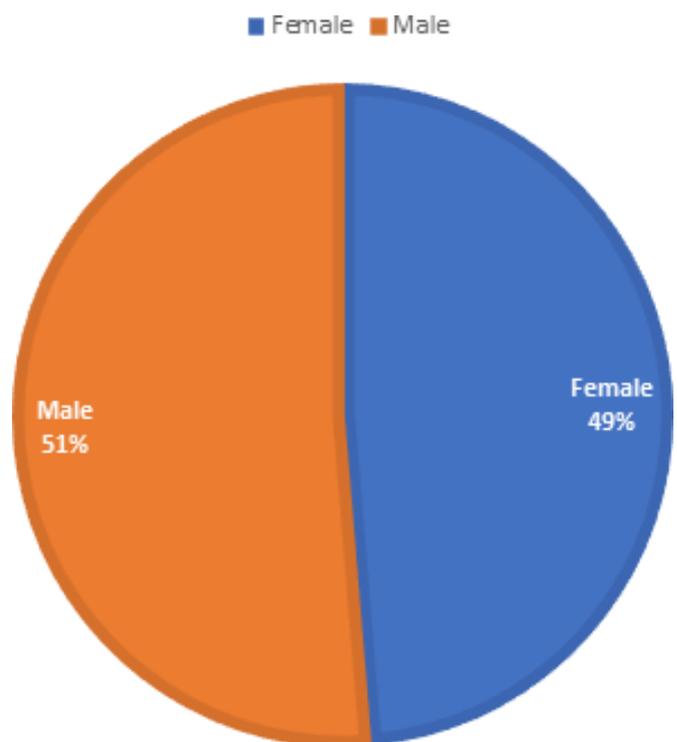


Figure 1 Overall academic rank by gender.

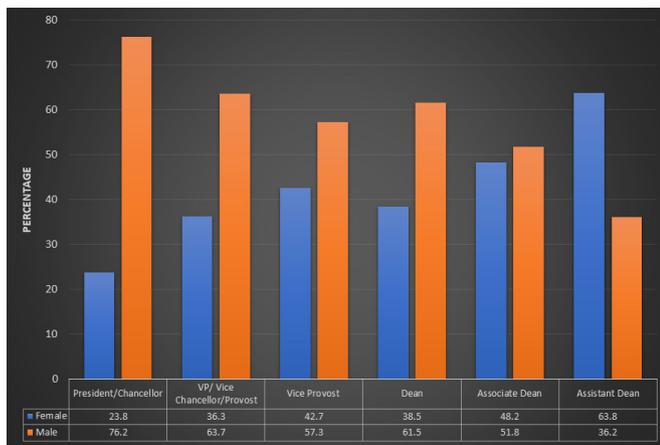


Figure 2 Gender proportion of leadership ranks for the 50 highest ranking universities.

higher proportion of women was represented as assistant deans (861/1349; 63.8% vs 36.2%; p value ≤ 0.001) (table 1). Online supplemental table 1 illustrates the percentage distribution of female leadership among the 50 highest ranking North American universities.

Gender proportions as a function of total leadership

The gender proportions for each leadership position were assessed as a percentage of the total of 5806 faculty members being assessed using two-sample test of proportions. Of the proportion of 2829 women who had leadership positions, a lower percentage was held for higher academic positions relative to their male counterparts, with the exception being the position of assistant dean ($p \leq 0.001$). Women accounted for a lower overall percentage of positions versus men for presidents/chancellors (0.5% vs 1.6%; p value = 0.746), vice-president/provost/vice-chancellor (8% vs 13.3%; p value = 0.045), vice provost (2.4% vs 3.0%; p value = 0.819), dean (11.5% vs 17.5%; p value = 0.017) and associate dean (47.2% vs 48.2%; p value = 0.598). Conversely, women held higher proportions for assistant dean (30.4% vs 16.4%; p value ≤ 0.001).

DISCUSSION

Using a retrospective cross-sectional approach to obtain data between March 2018 and March 2019, we found significant differences in the leadership status of men relative to women. Although cumulatively half of the overall leadership roles (assistant dean, associate dean, dean and senior administrators such as vice provost, provost, vice-president, vice-chancellor, chancellor and president) were women, the gender difference within each role was significant. All leadership positions excluding assistant dean had higher male representation. A report by the College and University Professional Association for Human Resources demonstrated similar results with their 15-year analysis of administrative roles in higher education. Across higher education institutions in the USA, they demonstrated women to represent assistant dean, dean and top executive positions at roughly 55%, 41% and 28%, respectively, with an upward trend for the positions of dean and top executives.³³

Interestingly, our study demonstrated that within the North American academia, a lower proportion of women holds leadership roles and with the position of presidency/chancellor rank showing the greatest gender disparity (only 23.8% female representation). These results are also in line with a report on

higher education in the USA from 2015 to 2016, which demonstrated newly appointed female presidents/chancellors, provosts and deans represented 31.7%, 37.7% and 42.8% of positions, respectively.¹⁹ This trend of fewer representation of women as a function of increasing academic rank has also been demonstrated elsewhere across continents where data from 28 countries of the European Union in 2013 showed similar results, with a wider gender gap as a function of increasing academic rank.³⁴

This study is the first of its kind to investigate the gender disparity across a spectrum of higher leadership roles for the top universities in North America. Studies looking at gender disparities for leadership roles within the academia have focused primarily on academic medicine. Within academic medicine in the USA, gender differences for the positions of provost, dean and associate dean are in line with our findings.^{5 25 35} Despite our findings that show substantial gender disparity among deans of North American universities, it's worth noting that there is a higher proportion of women in dean positions within medical colleges in the USA. Data from Yu *et al.* (2013) demonstrate that women deans within American medical colleges increased from 6.96% in 1998 to 11.96% in 2008 over a 10-year period.²⁵ Similar trends have been demonstrated for deanship in the field of academic dentistry as well.²⁶ The longitudinal changes in female deanship, although minimal, have only been demonstrated in academic medicine and dentistry. Trends for other academic positions including senior leadership roles have not been adequately quantified, limiting any extrapolations from these studies to the academia as a whole. Any recent increase in women leadership may in part be because of increasing women's representation as academic teaching staff. Data from Statistics Canada suggest that women in 2016–2017 held 40.2% of full-time academic teaching positions at Canadian universities, up from 37.6% in 2010–2011.³⁶ Even with higher representation of women in full-time academic positions, the proportional increase in leadership roles has clearly not been in sync. Several barriers have been attributed to the lack of advancement of women to higher administrative roles including individual, cultural and societal factors.^{2 37}

From a contemporary organisational milieu, transfer of gender role stigma from the household to the academy has been identified and could enforce domesticity-based gender roles in universities, considering that universities are living social structures open for both change and continuity. This further emphasises the cultural change as the linchpin for academic gender equity.³⁸

The gender gap of assistant dean and higher along the Northern American leadership hierarchy is an excellent reflection of two well-known phenomena in academic gender disparity: the bottleneck career transition phenomenon³⁹ and the 'glass ceiling' phenomenon.⁴⁰ Probable causes for the bottleneck phenomenon are that women are more likely than men to assume interim and midlevel administrative positions early in their career, resulting in longer duration before reaching a full professor or senior leadership position.³⁹

Carnes *et al.* (2008) referred to the obstacles that prevent women from advancing in leadership positions as the 'glass ceiling'. Although the under-representation of women is shown in our data throughout all leadership positions beyond the assistant dean, it's most obvious when considering that women constitute only 23.8%, 36.3% and 42.7% of university president/chancellor, vice-president/provost and vice provost ranks, respectively. A recent review of leadership literature highlighted that one particularly important subject missing in these highly cited articles was succession planning in leadership, which is vital to continued improvement and lasting excellence in healthcare

organisations.⁴¹ On the other hand, some healthcare administrative institutions have succeeded in eliminating the leadership gender gap.⁴²

The leadership continuum model constitutes a repeating or looping cycle of four phases that pertain to leadership role advancement. The first two cycles are important in placing women in early leadership roles during their early-to-mid-academic careers. Women usually have more difficulty in the third and fourth phases of the leadership continuum. The model recognises the recent and ongoing progress in ameliorating the academic gender gap and builds on these accomplishments to create a combined organisational and individual pathway to increase—and more importantly sustain—the critical mass of women in senior leadership positions.²⁸ The segmental nature of the model adopts Ely *et al.*'s conceptualisation of small and incremental organisational changes as the basis for successful cultural change.⁴³

Our results support the assumptions of the model evident by wider gender gap at the top of the leadership hierarchy. Probable aetiology is that women are more likely than men to feel uncomfortable with more power and have difficulty negotiating for support and resources.⁴⁴ Our conclusion that leadership gender imbalance is evident and progressively widens towards the top leadership pyramidal hierarchy emphasises the need for revision and improvement in career advancement policies for women faculty with focused attention at the bottleneck leadership hot zone (ie, at and beyond the assistant dean level).

Our study has its share of limitations. First, gender identity is a multifaceted individual and social construct. While all subjects in this study were identified in binary terms on the basis of their name and appearance, a certain portion of subjects may self-identify as gender neutral or as trans. To add to this, subject background information including duration of career, number of publications based on the Hirsch Index and highest degree attained was not collected and had the potential to confound our results. Second, our study identified subjects on the basis of leadership roles as represented on the university-specific websites. Several websites displaying the various leadership status within the respective departments may have been outdated or included interim positions. Although this has the potential to skew the data, our sample size was large enough (and hence with more statistical power) to control for these discrepancies.

Third, the choice of only the top 50 universities from one continent limits the generalisability (external validity) of the study. Additionally, our study accounted for only 1.7% and 5% of accredited American and Canadian schools, respectively, and the representation between American and Canadian schools was not matched.

Lastly, universities often had a different hierarchy structure and position titles. At our discretion, we categorised the leadership positions for each university into six tiers. The most frequent challenge was differences in position titles, which was easy to fix in most instances.

Main message

- ⇒ Leadership gender imbalance is trans-organisational and transnational within the top 50 universities of North America.
- ⇒ This leadership gap progressively widens towards the top of the leadership pyramid.
- ⇒ Applying the leadership continuum model shows associated lack of women leadership progress and sustainability in later cycles of the model.

Current research questions

- ⇒ What is the extent of gender disparity in the leadership of the top North American universities?
- ⇒ What are the patterns and characteristics of the leadership gender imbalances?
- ⇒ How can the leadership continuum model be used as a theoretical framework to analyse potential contributing factors?

Contributors HA and FK conceptualised the research question and methodology. HA and JD conducted the data analysis. SA conducted the statistical analysis. WA contributed to the theoretical framework and reviewed and submitted the manuscript. HA, WA, JD and MN participated in writing and reviewing the manuscript.

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Supplementary Material

Supplementary table 1: Distribution of female leadership among the fifty highest ranking north American universities.

| University | Assistant Dean | Associate Dean | Dean | Senior Leadership | Overall Leadership |
|--|----------------|----------------|--------|-------------------|--------------------|
| Massachusetts Institute of Technology | 81.82% | 33.33% | 16.67% | 36.36% | 43.75% |
| Stanford University | 69.23% | 60.61% | 37.50% | 41.67% | 57.58% |
| Harvard University | 57.58% | 54.00% | 37.93% | 38.46% | 46.71% |
| California Institute of Technology (Caltech) | 81.82% | 33.33% | 16.67% | 36.36% | 43.75% |
| University of Chicago | 61.11% | 54.79% | 47.06% | 21.43% | 50.36% |
| Princeton University | 84.62% | 69.57% | 60.00% | 41.18% | 63.24% |
| Cornell University | 61.29% | 43.82% | 25.00% | 23.08% | 42.68% |
| Yale University | 65.00% | 46.67% | 57.89% | 40.00% | 52.98% |
| Columbia University in the City of New York | 73.68% | 55.95% | 68.57% | 23.81% | 58.43% |
| University of Pennsylvania | 80.00% | 52.94% | 33.33% | 52.00% | 52.07% |
| University of Michigan | 54.84% | 54.84% | 54.84% | 54.84% | 54.84% |
| Johns Hopkins University | 70.37% | 48.78% | 33.33% | 43.75% | 51.09% |
| Duke University | 55.88% | 49.53% | 60.00% | 19.23% | 47.25% |
| University of California, Berkeley | 55.88% | 49.53% | 60.00% | 19.23% | 47.25% |
| University of Toronto | 75.00% | 50.75% | 35.00% | 33.33% | 46.23% |
| University of California, Los Angeles | 68.09% | 40.00% | 57.89% | 30.00% | 50.33% |
| McGill University | 77.78% | 50.98% | 53.85% | 30.00% | 54.35% |
| Northwestern University | 45.83% | 43.10% | 41.67% | 40.91% | 43.10% |
| University of California, San Diego | 53.85% | 54.17% | 30.00% | 50.00% | 49.09% |
| New York University | 58.49% | 47.31% | 37.50% | 45.83% | 48.97% |
| Carnegie Mellon University | 54.55% | 51.72% | 11.11% | 50.00% | 45.90% |
| The University of British Columbia | 74.29% | 42.19% | 26.67% | 37.50% | 48.46% |
| University of Wisconsin-Madison | 56.10% | 51.76% | 50.00% | 33.33% | 50.64% |
| Brown University | 75.00% | 63.16% | 71.43% | 57.14% | 59.70% |
| The University of Texas at Austin | 57.14% | 40.68% | 33.33% | 30.00% | 44.85% |
| University of Washington | 51.02% | 55.07% | 35.00% | 30.77% | 47.56% |
| Georgia Institute of Technology | 60.00% | 45.45% | 33.33% | 15.79% | 36.67% |
| University of Illinois at Urbana-Champaign | 65.85% | 38.89% | 22.22% | 43.48% | 45.59% |
| University of North Carolina at Chapel Hill | 58.14% | 58.67% | 26.67% | 33.33% | 52.70% |
| Rice University | 85.71% | 37.50% | 25.00% | 52.94% | 47.92% |
| The Ohio State University | 56.10% | 45.59% | 26.09% | 35.29% | 44.30% |
| Boston University | 56.10% | 45.59% | 26.09% | 35.29% | 44.30% |
| Pennsylvania State University | 53.66% | 36.96% | 52.17% | 22.22% | 42.97% |

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|---|--------|--------|--------|--------|--------|
| Purdue University | 80.00% | 38.10% | 41.67% | 27.78% | 33.33% |
| University of California, Davis | 72.73% | 47.62% | 36.36% | 28.57% | 51.22% |
| Washington University in St. Louis | 68.97% | 61.29% | 36.36% | 57.69% | 59.79% |
| University of Alberta | 67.57% | 43.59% | 38.89% | 47.62% | 49.35% |
| University of Southern California | 64.00% | 59.29% | 39.29% | 22.22% | 54.86% |
| University of Maryland | 66.20% | 41.18% | 23.81% | 57.14% | 49.46% |
| University of California, Santa Barbara | 78.57% | 50.00% | 10.00% | 36.36% | 46.81% |
| University of Pittsburgh | 78.95% | 42.37% | 43.75% | 30.00% | 46.49% |
| Michigan State University | 75.00% | 39.73% | 19.05% | 33.33% | 44.94% |
| Emory University | 59.26% | 61.54% | 46.15% | 27.27% | 56.03% |
| University of Minnesota | 77.78% | 35.19% | 50.00% | 22.22% | 41.11% |
| University of Waterloo | 0.00% | 44.12% | 30.00% | 32.00% | 36.62% |
| University of California, Irvine | 54.17% | 40.91% | 20.00% | 30.77% | 39.58% |
| University of Florida | 54.17% | 40.91% | 47.06% | 26.92% | 41.35% |
| Dartmouth College | 76.47% | 43.33% | 50.00% | 15.38% | 47.06% |
| University of Rochester | 11.11% | 45.83% | 41.67% | 40.91% | 49.25% |