Advancing gender equity in the academy

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Implementation science offers a rigorous set of tools to help mitigate long-standing and worsening gender disparities in academia.

We are women scientists who have worked in university settings for most of our careers. National data suggesting persistent gender inequities are corroborated by our daily lived experiences. Women are overrepresented in nontenure track roles, are underrepresented among full professors and senior leadership, and receive lower pay across all ranks compared to men counterparts (*1*). These data tell an even more dire story for women from racial and/or ethnic minority groups. Coronavirus disease 2019 (COVID-19) has made everything worse, and many women are leaving the academy. Universities and funders must take action now.

What is the best path forward? We recommend using implementation science to deploy and evaluate interventions that work. This approach focuses on the scientific study of methods and strategies to implement interventions that work in real world settings (*2*). Practically speaking, this means that universities must prioritize scientifically backed approaches to support women faculty, including individual-level approaches such as leadership training. They should also develop and evaluate new structural approaches, such as hiring strategies and policies, to make universities more inclusive, diverse, and equitable places for all faculty.

The power of implementation science

Implementation science offers an intentional and untapped approach to mitigate the gender inequities that are rife in universities, as it aims to reduce the gaps between what we know and what we do (*2*). It also offers insights into continuous learning about what works, under what conditions, how adaptations are made, and how those adaptations may affect outcomes. Applied to the challenge of gender disparities in academia, implementation science offers (i) research designs that are rigorous and maximize the knowledge gained, (ii) frameworks to guide intervention deployment with an eye toward context, and (iii) evaluation of equity-focused outcomes.

Evaluating implementation and intervention outcomes

While individual-level interventions (e.g., leadership training) for gender equity have strong evidence, there has been little study of structural approaches (e.g., flexible work arrangements; see Fig. 1) (*3*, *4*). To assess these approaches, rigorous implementation studies, designed along a "hybrid" continuum, can emphasize different implementation and intervention outcomes depending on how well-established the evidence is for a given intervention (*5*). For example, a university attempting to evaluate the success of a well-established leadership program for women faculty may tilt their evaluation toward how well they implemented the program rather than the number of women who move into leadership roles. When developing new approaches where less data exists, universities should consider using a hybrid design that emphasizes intervention outcomes more heavily.

Understanding the interplay of interventions and context

Implementation science frameworks provide guidance on how interventions interact with the environment in which they are deployed—both the environment within the organization and the broader environmental context in which it operates (*6*). Attention to context is necessary for a new intervention to have maximum impact (*7*). Different types of schools (e.g., liberal arts and professional schools) within a university and across universities (e.g., public versus private) may experience varying challenges given their contexts. The social environment in which the university operates (e.g., urban or rural) can also influence intervention implementation. These multilevel forces must be at the forefront during program implementation and are well suited to guide use of both individual- and structural-level interventions.

Focus on equity

Blending implementation science and equity-oriented approaches will enhance our learning about the efforts that are successful, why they are beneficial, and who gains from them. Particular attention must be given to the intersections of women's roles, especially for women of color, given that the experiences of people at multiple marginalized intersections typically reflect social-structural systems of power, privilege, and inequity (*8*). For example, an important implementation outcome is who is exposed to an intervention (i.e., reach). It will be important to focus on equitable reach throughout any change effort, considering who benefits from an intervention and who does not (*9*). Some approaches may benefit faculty from one disciplinary area or rank or only those who have the time and flexibility for individual-focused programs added to their ongoing responsibilities.

Recommendations for universities and funders

In light of the urgent need for action and the untapped potential of implementation science to support work on gender equity in the academy, we recommend the following.

Deploy existing approaches that we know work

Evidence-based interventions that support the careers of women faculty have already been developed and shown to work (*3*, *4*).

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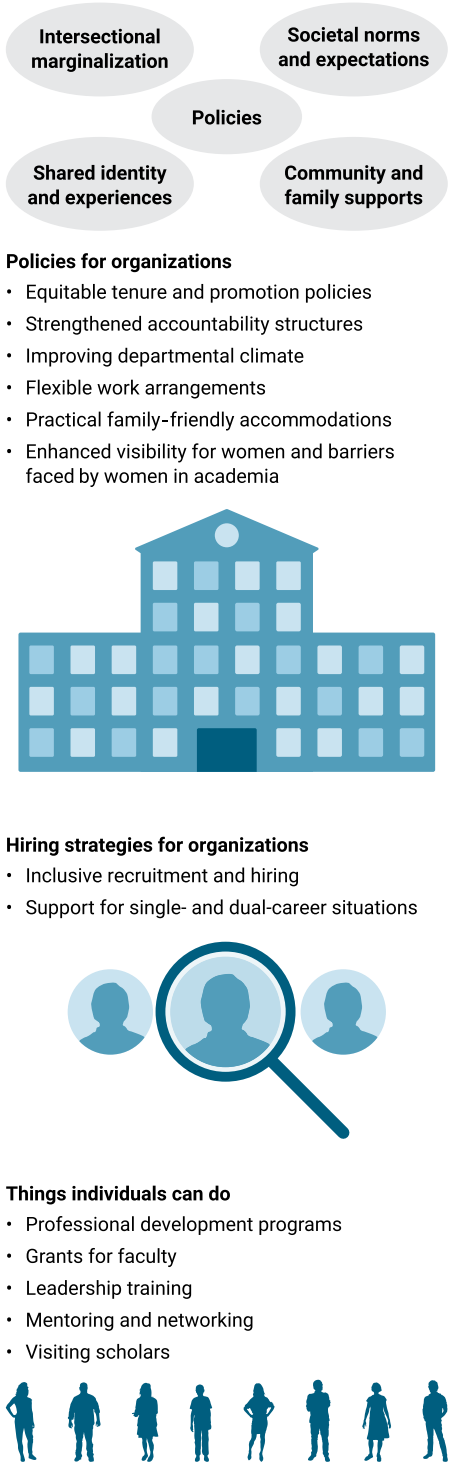

Fig. 1. Multilevel approaches for gender equity in the academy. Credit: Ashley Mastin/*Science Advances*.

Most of these interventions target individuals and include intensive and advanced leadership training. Yet, few universities offer these programs. The time is ripe to implement these effective interventions broadly and systematically, recognizing that individually focused interventions may be necessary but not sufficient for lasting and meaningful change.

Build the science for structural interventions

Structural and organizational problems demand structural and organizational solutions. The relative dearth of studies on structural interventions is notable, and rigorous research is needed to build the evidence base. Effective structural approaches can benefit all faculty, regardless of their characteristics.

Evaluate interventions using an implementation science lens

Evaluations using methods and frameworks from implementation science are paramount to understand the success of interventions to improve gender equity. Implementation science study designs will provide efficient approaches to both test and evaluate interventions and their implementation within different contexts.

Challenges to achieving this vision

The path forward is not without challenges. Measuring the success of these approaches requires exploration of how women with multiple intersecting identities, such as women of color, LGBTQ women, and nonbinary individuals, benefit. There are challenges with anonymity in collecting these types of data, especially when just a few people identify with a given category or when environments lack the safety for faculty to answer openly. Given the new NIH UNITE initiative to end structural racism in STEM and that many universities are engaging in cluster hires for faculty from minority communities, an opportunity exists to gather these data to ensure that efforts to reduce inequities do not inadvertently disadvantage some women.

We must also consider the potential of unintended consequences that can occur when new initiatives are implemented. Evaluations must be open to exploring experiences around such programs. Unintended effects can include feeling singled out (e.g., the perception that women need leadership training but men do not), and taking time away for individualized development could detract from research or teaching efforts.

Raising diversity's voice in academia

In the wake of COVID-19, we are at risk of losing much of the gender equity progress gained in academia. We feel this keenly in our daily conversations with women trainees, faculty colleagues, and institutional leaders. Using approaches from implementation science can accelerate progress by providing an

evaluation framework, understanding the interplay between interventions and context, and staying laser focused on equity to lead to programs that are effective, sustainable, and equitable. New structural approaches need to be developed, refined, and tested to restart progress toward gender equity. When implementing new programs, universities must not settle for the status quo. A change in mindset is needed. Rather than putting the weight of change on the shoulders of individual faculty, universities must remove structural barriers to the advancement of faculty. This will improve outcomes and career satisfaction for all faculty, not just women. By applying rigorous methods from implementation science, we can further develop the knowledge base on gender equity practices and strengthen the availability of these interventions to universities. Our community must take the best of what we know to be fair and equitable and put it into practice to support all women in the university workforce. This will also increase the diversity of voices in universities, which will only serve to enhance the entire enterprise.

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