

Diversity and Inclusion Research

Bronwyn Chorlton
John Gales

Advancing Women in Engineering

Deciphering Key Factors in Training,
Retention and Support

 Springer

Diversity and Inclusion Research

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Thomas Köllen, Institute of Organization and HRM
University of Bern
Bern, Switzerland

The book series 'Diversity and Inclusion Research' examines the facets of diversity in a variety of contexts, as well as approaches to and perspectives on diversity and inclusion. It presents organizational research on workforce diversity, and covers diversity and inclusion-related issues within communities, cities, regions, nations, and societies.

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Bronwyn Chorlton 
Civil Engineering
Queen's University
Kingston, ON, Canada

John Gales
Civil Engineering
York University
Toronto, ON, Canada

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All persons who have met authorship criteria in this book are listed as authors. These authors certify that they have participated sufficiently in the work to take public responsibility for this manuscript's content, including the participation in the concept, design, analysis, writing, and revision of this book. Those that do not meet the full criteria are listed in the acknowledgments above.

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Chapter 1

Introduction to Gender Diversity in Engineering



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The engineering discipline has been historically dominated by men, and now, as we move through the twenty-first century, there is a need to embrace women and people of diverse genders in creating a diverse field of professionals that reflects the society they are working in. This book will examine the factors affecting the recruitment of women into, and the retention of women in the engineering profession.

Figure 1.1 illustrates the male dominance of the engineering profession by showing the participants of the International Fire Prevention Congress, which took place in London, United Kingdom, from July 6 to 11, 1903, organized by Edwin Sachs and the British Fire Prevention Committee. The congress generated ideas and concepts of fire safety that continue to influence the fire engineering profession in Canada and globally today.

1.1 The Importance of Representation Across Genders in Engineering

The impacts of engineering projects are felt across society, thus, the teams working on said projects must be reflective of the diverse society they are a part of. Gender diversity in engineering teams can better help create solutions that are aware of the needs and desires of a more diverse population. Examples of underrepresentation



Fig. 1.1 Group photo of men taken at the conclusion of the 1903 International Fire Prevention Conference in London. (From Sachs 1903)

include considerations of women (and especially racialized women) in medical clinical trials, which creates health inequities (Bierer et al. 2022), and the history of automobile testing (with only recent consideration for female bodies through crash test dummies) having impacts on safety outcomes for women and those in female bodies (Fu et al. 2021).

In conditions of equitable and integrated work environments, diversity has been found to lead to increased creativity, innovation, and productivity; however, this is only true where diverse individuals are fully integrated within the team (Smith-Doerr et al. 2017). Diverse teams bring about more diverse perspectives—it has been found that a critical mass of 30% women in a group decreases groupthink phenomenon (in which a group of individuals reach a consensus, without a full evaluation of the consequences or alternatives) (Torchia et al. 2011).

Having women in leadership positions is also beneficial to organizations. Women have been shown to improve an organization's ability to navigate complex strategic issues (Francoeur et al. 2008), positively influence board strategic direction (Nielsen and Huse 2010; Lückerath-Rovers 2013), are more prepared to push difficult issues (Elstad and Ladegard 2012), reduce conflict on boards (Nielsen and Huse 2010), and reduce negative social practices (Galbreath 2011; Boulouta 2013).

In addition, the increase in diversity in engineering provides access to a greater pool of talent. If only a subset of people are entering a profession, there remains a large proportion of the population who have the potential to make meaningful contributions to the profession, but who are not pursuing engineering due to identity and perceptions. Creating greater diversity in engineering means that there is significantly more talent entering the profession.