



Gender equality and representation
within and beyond the University
of the Highlands and Islands

*A book in celebration of International Women's Day
2021 (Edited by Alexandra Walker)*



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**A book in celebration of
International Women's Day 2021**

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Alexandra Walker (Editor)

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The final version of this book was edited by Alex Walker. Please contact authors directly for further information on their topics.

Foreword

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My grandmother, Barbara, was born in the year 1930. She had always been academic and had a lifelong interest in learning: reading, writing, and especially languages. She had been evacuated as a child during World War Two and her parents died within quick succession. She was adopted and raised by a family who owned a shoe shop and, thus, when she was older (and after an initial delay due to the war) she was fortunate enough to go to University. She graduated with a degree in German and Latin in 1952 from the University of Bristol, an institution that I myself would first graduate from 59 years later. Whilst my grandmother always recognised the immense privilege she had in

attending University at this time, as a woman, she was always reflective of the opportunities that might have passed her by on account of her gender. For my other grandmother, Maureen, who was born around the same time, education was not really an option as an adult; she had her first child at 17, after which time she worked briefly as an auxiliary nurse. After this, she dedicated her life to her family, including supporting her granddaughter in her education every step of the way. Why am I telling you this? Isaac Newton said, "If I have seen further, it is by standing upon the shoulders of giants" and, whilst it would surely make my grandmothers blush to hear it, they were giants to me, shaping the ways in which I would engage with my own higher education. I am, therefore, starting here because there are so many women who have gone before us that have made it possible for other women (including myself) to claim their educational space, from grandmothers, to those leading social change, to lecturers, to librarians. One of the things I like most about this

book is its quiet challenge to all of us to build on this work, to do better in our own roles. As I see it, then, this book builds on the work of the past, driving us further towards gender equality across a whole range of areas.

Women's equality – my starting point for this foreword, written for International Women's Day 2021 – is an issue from top to bottom within further and higher education. Women hold disproportionately low percentages of senior positions even today, are under-represented in reading lists in many programmes, and can find themselves unwelcome in more traditionally male areas of education. This matters for a variety of reasons: descriptive representation, as I have explained elsewhere drawing upon analyses of women in legislatures, is where the institution resembles the society from which it is drawn and is important for reasons of fairness. Secondly, however, substantive representation is where a

group's interests are represented and attended to, and this is also important here. Whilst they may not put it in these terms, both descriptive and substantive representation are things that students want and are increasingly vocalising their desire for. Neither of these types of representation alone or enough to ensure that women can flourish in further and higher education but together they are a good starting position. Under-representation is even more stark when we consider this from an intersectional perspective. Dr Nicola Rollock, for example, has found that there are almost no black female professors in the United Kingdom. Despite successes that we may have had since my grandmother's time at university, we still have some way to go towards ensuring gender equality in further and higher education.

As I sit down to write this foreword today, it has been over one year since the UK became gripped by the COVID-19 pandemic. None of us in the further and

higher education sector were sure at the start how the pandemic would impact us, however, it became obvious quite quickly that it was going to pose challenges across a range of areas, especially with respect to equalities. I am not a parent, but one of the things that was evident almost immediately was that women were struggling to provide childcare and perform academic work at the same time. In terms of our teaching there were a range of other inequalities to consider, from sinophobia and its impact upon our East Asian students in particular, to class disparities that made it harder to engage with online learning due to a lack of technology and suitable home Wi-Fi equipment. Why would I want to remind us of this pandemic by immortalising it in this foreword? Because it shows us that there are often equalities issues that we don't see: the pandemic has made it much harder to look away from these. It is a reminder that we all need to work together to solve issues of inequality, whether these relate to gender, race, class, disability, sexuality, or (most likely) all at once.

The pandemic has caused us to re-focus upon some equalities issues and to work harder to create solutions to the problems that we have. I am hopeful that this has reminded us of the importance of embedding equality considerations, both in our work with students and for ourselves as practitioners. As identified by numerous chapters of this book, one of the key changes in recent years has been the opening of the Internet to the public and its increased influence in day-to-day life. The Internet causes a variety of challenges from a gender perspective however, one positive is the potential to use the Internet as a site for raising awareness, community building, and taking action. With the pandemic complicating face to face meeting and organisation, there are perhaps now new and creative ways in which we might approach improving gender equality in further and higher education that we might not have considered before.

The range of topics covered in this book is a broad one, from holding space for autistic women in science technology, engineering and maths subjects, to the use of women's networks in further and higher education, to the need for a dedicated library attention to the issue of gender. I think this range of subjects makes clear just how important the subject of gender is; it is not simply something that should be bolted onto many modules in the last class of the term (which is sadly still the case in some places), it is a subject in itself. It is, however, also an important organising structure within further and higher education itself, with a wide range of difficulties and as a result a wide range of solutions. As a result of its laudable aims, I am especially pleased to be contributing this foreword having come to know some of the participants in this book through the delivery of a talk for the University of Highlands and Islands on the subject of feminist curriculum activism. This book will provide a useful resource for anyone in further and higher education who has an

interest in driving forward the gender equality agenda. For me, one of the main motivators is my 8-year-old niece. My niece is funny, smart, energetic, and kind; I want the whole world to be open to her and that starts with education. I want her to grow up to be a scientist if she wants, to never feel pushed out of leadership roles, and to be able to connect with other women in mutual support networks. I want things to be better for her and – other girls – than they were for my grandmothers and for us. I want things to continue to get better for all the girls who come after but, as the authors of this book have demonstrated, that will require both time and effort. Consider this an invitation, then, to think about the ways in which you might help with this endeavour, too.

Introduction

Observed annually every 8th March, International Women's Day is held as a worldwide day of celebration, protest and, in some countries, as a national holiday.

The first university wide International Women's Day (IWD) event took place at the University of the Highlands and Islands (UHI) on 8 March 2018. From then the annual event has set out to explore and champion gender equality in education, raise awareness and influence initiatives to support women working and studying in education, and champion gender equality and diversity in learning and teaching and curriculum design. As well as acknowledging the international theme, the UHI organising group have identified an internal focus for each annual event since 2018.

The event in 2021 saw individuals and teams from across the university partnership¹ present short workshops and presentations exploring how they approach or promote gender equality within their own subject area, teaching or research practice, in supporting or leading the development of learning and teaching, or in curriculum design. These topics have been expanded on and explored in this book. Acknowledging the underrepresentation of men in some curriculum areas the book also provided the opportunity for colleagues to explore with the readers the ways in which men are encouraged into subject disciplines that are typically dominated by women.

In compiling this book, the various chapters have been organised into three broad sections. The first section presents chapters that have explored the

¹ UHI is a geographically distributed tertiary university comprising 13 independent academic partner colleges and institutes across the expansive Highlands and Islands region.

wider context in relation to gender inequality for women in education and specific initiatives that the university has initiated or should consider to address these. In Section 2 'Personal experiences and professional outlooks' the book moves on to consider personal experiences and perspectives with the authors exploring their own position, role and outlook as women educators and researchers, while in Section 3 the book moves on to initiatives at UHI that aim to address gender balance and representation.

Section 1: Gender equality in education: the wider context and initiatives to champion equality for women

The first chapter in Section 1, following the preface and forward, is titled 'Women's Networks in further and higher education: key considerations for cultural change, digital engagement and responding to COVID-19'. The chapter sees Alex Walker begin by

summarising literature around gender imbalance of women in leadership positions in universities and the masculinist working cultures that can 'other' women and create barriers to career progression. The chapter then explores the role and benefit of women's networks in education, alongside other gender equality initiatives intended to address gender balance and promote women to leadership. Importantly the chapter also outlines the limitations as well as the benefits of these initiatives to challenge and change working cultures for women and promotion to leadership. Finally the chapter focuses in on the University of the Highlands and Islands' Women's Network, the role it has played supporting colleagues during COVID-19 and how it has been aligned to wider university wider events and initiatives.

The second chapter 'Advance HE Aurora leadership development programme for women' presents the outcomes of an evaluation report that aimed to

determine the extent to which UHI participants in the Aurora leadership programme were more encouraged to apply for senior roles within the institution. The chapter begins by summarising the origins of the programme, in response to the paper 'Women in Higher Education Leadership: Absences and Aspirations' authored by Professor Louise Morley and the aim of the programme to support women and their institutions to fulfil their leadership potential. The outcomes of the evaluation reported a growth in confidence in UHI participants leadership capabilities across both the two cohorts engaged in the programme since 2018. In the context of UHI other benefits highlighted in the chapter include networking opportunities, a sense of belonging, and the further development of understanding relating to leadership behaviours. In common with the first chapter, the author Ann Tilbury concludes that addressing gender inequality requires changes in cultures and structures and that approaches and initiatives should move beyond 'fixing the women'.

The third chapter of the book explores 'Distancing the (privileged) male from the machine: supporting gender balance and representation through acts of allyship in academic processes and practices' with respect to supporting gender balance and representation in academic processes and practices. Beginning with an exploration of some of the historical ways in which the male voice has been privileged in academic work and knowledge production, Keith Smyth then scrutinises gender bias in journal boards and learned societies, in peer review and citation practices, and in the context of the curriculum. Smyth then considers those acts of male allyship that male colleagues in positions of influence or leadership can embrace to support the amplification of the work and voices of women colleagues, including supporting women colleagues in their scholarship and research, and in shared and distributed approaches to leadership.

Our fourth chapter, and the concluding chapter of Section 1 is titled 'Larissa Kennedy: We're not settling. Because in many ways...we don't have much to lose'. This chapter takes the form of an interview between Ash Morgan, the Vice-president Further Education for the Highlands and Islands Student's Association (HISA) at the time of writing, and Larissa Kennedy the National Union of Students (NUS) UK president. The interview focused on women of colour and working class women, who were originally at the roots of International Women's Day, the student movement in the UK, and the role and value of unions and how they are of benefit to all women.

Section 2. Personal experiences and professional outlooks

Roxane Permar begins with the chapter 'The impact of feminist art practice and theory on pedagogical practices from a personal and institutional perspective'. This chapter takes a first person

perspective that follows the career of Permar, a feminist artist, exploring the challenges of being a woman practicing art and working in education, including the positive experiences and influence feminist theory and activism has played on that journey and in relation to the MA Art and Social Practice programme at UHI that she leads.

The sixth chapter of the book 'Attracting women into engineering – a personal reflection' finds the author, Lois Gray, providing her account of working and leading in engineering, realising her feminine qualities enhanced her impact as designer, teacher and leader and, furthermore, being a positive role model for women studying engineering. Although having had positive experiences working in a male-dominated industry, Gray also highlights where she has experienced male bias in the working environment, which she acknowledges values masculine traits. The chapter proceeds to explore how through Industry 4.0 there is potential to develop

the existing synergy between 4.0 skills and feminine attributes in order to balance the qualities valued in engineering. Gray highlights some existing initiatives that aim to balance the gender representation in the engineering workforce and in education before outlining other ways that she has identified that have potential to promote balance and her next steps in intending to implement some of the identified solutions.

Finally, for Section Two of the book Jay van der Reijden has authored the chapter 'Promoting autistic women in science: benefits for their own dedicated Society'. Stemming from personal experiences and extensive literature, van der Reijden begins by outlining how autistics are perceived by neurotypicals and the challenges people with autism face in entering professional fields, which for 'already oppressed' STEM women often leads to knowledge and expertise not being harnessed through publication. van der Reijden then focuses

on expressions of women with autism, before outlining the benefits of autistic traits to science, including pattern association, lowered delusions of reality, and being unerringly ethical. van der Reijden highlights the lack of support groups for autistic women in science and the role that a professional organisation to support autistic women in science who are often marginalised might provide, and finishes the chapter by exploring how such a group could provide representation against behaviours of injustice and a safe space for autistic women to share experiences and consider action.

Section 3. Addressing gender balance and representation at UHI

Section 3 starts with the chapter 'Aiming for Awesome: improving perceptions of engineering amongst girls through a digital STEAM based intervention'. The author Blair Watson outlines an initiative on behalf of the STEM team working at UHI, who worked in partnership with Royal Air Force

(RAF) on a series of workshops aimed at encouraging students to explore engineering. Before exploring the workshops, Watson outlines the existing barrier to girls pursuing engineering studies and careers, which currently sees only 12% of women in the engineering sector. The RAF tasked the UHI STEM team with redesigning workshops aimed at Primary 5-7 students, with a focus on female, black and minority students and students in rural areas to address the leaky pipeline, whereby secondary school students begin to make decisions about their preferred career. Aligning the workshop to the Scottish 'Curriculum for Excellence' the STEM team designed through a STEAM (incorporating Science, Technology, Engineering, Art and Mathematics) approach, guiding students in discussions and critical thinking. The STEM team ensured the workshops also explored the variety of careers available in engineering and introduced the participants to women role models – an important leverage to encouraging more girls into engineering.

The ninth chapter in the book 'Highland Women in STEM' provides a 'snap' shot of the author's Chloe Rodgers photography project which aims to highlight the many inspiring women working in STEM in the Scottish Highlands. Rodgers has outlined her reasons for the project, and the importance of woman role models working in STEM to encourage more women into the workforce which currently stands at only 24%. As well as the photographs she shares in her chapter, Rodgers has asked the role models questions related to location of work, motivation and highlights to working in STEM and what could be done to encourage more women into the STEM workforce. The result is a visual and reflective project that highlights to girls and women considering a STEM career path the positive rewards that can bring.

The next chapter 'Gender Studies: library provision and support via a Gender Studies 'Libguide' is authored by Elizabeth McHugh, and outlines a

Gender Studies library guide (libguide) that McHugh created for International Women's Day 2021. The libguide aims to encourage the University to embed elements of gender studies in modules across the curriculum at UHI by providing access to online content and materials relating to gender studies. Using her expertise as the University's eResources Manager McHugh outlines the broader benefits of libguides that can be updated across subject disciplines, before focusing on the libguide she created exploring gender studies including content, structure and how content was sources to produce a valuable resource for the University.

Our penultimate chapter of the book 'In the Menority' recognises that there are subject areas that have under representation of male students, including in the UHI Applied Life Studies (ALS) Subject Network. Authored by colleagues working in the aforementioned network, and the UHI Equality and Diversity Adviser, the chapter explores UHI

initiatives to address this imbalance, acknowledging that in doing so can advance the causes of feminism by destigmatising normative gender roles. One successful initiative which is explored in the chapter is the design of a male only Children and Men in Practice (CHAMP) further education course, in recognition that early years and childhood practice is largely dominated by a 97% female workforce. Positive outcomes from the course has included the 2019 cohort progressing to positive destinations of further study and arise in males of 75% of males on varying early years courses in comparison to previous years. 'Softer' positive outcomes included the types of interaction that a male only cohort presented and is explored more in the chapter. Recognising the importance of role models in underrepresented subject areas the chapter also explores a second initiative currently being piloted at UHI called 'Minority Men'. Seven champions across subjects including childcare, nursing and psychology will work with staff champions, looking to

communicate with staff, students and employers to build a remit which challenges societal norms and under-representation at all levels, from pre-school to employment. Although the initiative is fairly new it follows a similar approach that proved highly successful at UHI, the 'UHI STEM Femmes', who were student champions and encouraged and supported women into STEM related courses thus raising aspirations and visibility of students in counter-stereotypical subject areas.

Finally, in our closing chapter for the book, Heather Fotheringham draws together the themes of the chapters to provide her closing thoughts for the book. Fotheringham reflects back to the theme for 2021 International Women's Day #Choosetochallenge and relates it to the topics covered by the authors. Fotheringham summarises that the chapters as covering initiatives that support and promote women, and men, in a single sex environment, which is dominated by the other sex,

or initiatives that relate to curriculum design and approaches, and role models, that offer a fairer and more representative approach to disseminating knowledge. To finalise her closing thoughts Fotheringham provides an overview of the societal view on what is valued in relation to gender roles in the workplace and how this relates to the topics covered in this book, and what remains to be done to achieve gender parity in education and wider sectors.

It is hoped that this book offers the reader a valuable variety of perspectives on gender balance and representation in education and research from personal, professional and sectorial viewpoints which are grounded in evidence-based practice, research and literature. The authors acknowledge the barriers and challenges for women working and studying in education and highlight areas of curriculum underrepresentation for both women and men. Furthermore our collection of chapters outline

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positive initiatives that colleagues and teams at the university have successfully initiated to address gender balance, inequality and representation, and importantly acknowledge that there is still much to be done with many of the authors exploring what further progress might look like going forward.

Alexandra Walker, Editor
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Section 1: Gender equality in education: the wider context and UHI initiatives to champion equality for women

Women's networks in further and higher education: key considerations for cultural change, digital engagement and responding to COVID-19

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Abstract

Women's networks in further and higher education offer spaces for women to come together to discuss the challenges and barriers for women working in education, to hear from inspirational women, take part in professional development and to lobby for change. Beginning with a review of key literature and research this chapter will explore the role of women's

networks in further and higher education, including the potential of digitally mediated women's networks. The literature highlights the current inequality in further and higher education for promotion of women into leadership and senior roles and is drawn from a period of 20 years which reflects that issues relating to gender equality are still as relevant today as they were 20+ years ago. Furthermore, the chapter will explore the limitation of networks and development initiatives to have real impact when inequality is embedded within masculinist working cultures and structures. Finally, the chapter will highlight the implications and impact of COVID-19 on gender equality and potential for women's networks to provide peer support and a safe space at a time of isolation and challenge of home and work balance, with a focus on the University of the Highlands and Islands (UHI) Women's Network, including what it has achieved, lessons learned and plans for the future.

Keywords: Women's Networks, COVID-19, gender equality, further and higher education, leadership

Gender imbalance in further and higher education: in leadership and senior roles

An [Advance HE Equality in Higher Education Statistical Report](#) published in 2019 reported that gender imbalance in promotion into professional roles begins early after graduation, with women holding 45.9% of academic roles and yet only 25.5% of professorial roles (statistics collected by gender 2017-18) which is an increase of just 5% from data collected in 2009/10 (Morley 2013: 121) and is despite women being over represented at undergraduate and graduate level (Savigny 2014: 796). Male-dominance is not unique to the UK higher education sector. Across the European Union 86% of higher education university heads are men, 76% of which are in professorial grades (O'Connor

2020: 207). The Advance HE report shows that employment contracts, part-time working and lack of gender balance on university boards creates barriers that women need to overcome to achieve progression and/or promotion in academia in the UK sector. Further barriers include significant cultural ones, such as the perception of the leadership role as being “demanding, aggressive and authoritarian” (Morley 2013: 123) and best suited to males. Additionally, the “male dominance of leadership can produce stability in relationships, networks and structures that reproduce professional hierarchies” (Morley 2013: 125) and position the woman as the ‘other’ (Savigny 2014: 798, Crabtree and Shiel 2018: 902). This masculinist working culture “understood to mean compliance to a regime of almost total and uninterrupted commitment to wages work” (Crabtree and Shiel 2018: 901) does little to encourage women who are more likely to be balancing work and caring commitments than their male colleagues, to remain and progress in academia.

When women do reach senior positions their experiences of leadership can still leave them feeling isolated and in the minority. Interviews with 18 senior women professionals from leading UK higher education institutions found that despite them having successfully reached leadership positions “their experiences of leadership could often be quite confronting and be characterized by men behaving in an aggressive, loud and domineering manner, particularly in meetings with other senior managers” (Burkinshaw and White 2017: 5/6). A lack of discussion around these issues leads to further compound the under-representation of women in senior and leadership roles in academia and sends a negative message to women earlier in their careers about their own prospects for success (Savigny 2014).

O’Connor (2020) explores organisational hierarchies through vertical and horizontal level lenses. The vertical level refers to senior positions dominated by

men, whereas the horizontal 'segregation' refers to areas of the organisation that are predominantly staffed by women. O'Connor points out that the different approaches to evaluating the vertical and horizontal levels, with the vertical areas of work being considered more skilled and strategically important, create a barrier for women to progress to senior roles (212). As O'Connor observes these cultural "practices value men and (to) facilitate their access to such positions and (to) undervalue women and inhibit their access' (O'Connor 2020:208).

In summarising key findings from research to date, it is clear to see that promotion practices favour men and cultural structures value areas and practices dominated by males which are considered as more strategically important, which in turn creates masculinist working cultures. Part time working, employment contracts and lack of female representation in senior positions, and not in the male dominated networks, create further barriers for

women progressing in further and higher education. The limited opportunities to talk about these barriers further compounds the problem.

Women's networks in further and higher education

A literature review carried out by Pini et al. on women-only spaces from studies dating between 1986-2001 found they could increase self-confidence, raise awareness of learning opportunities, and help women gain new skills and grow social networks. However the authors also argue that they shouldn't be seen as a single fix or approach for increasing women's representation in management positions (2004: 2) which instead require cultural and structural changes. Research carried out by Macoun and Miller into the experience of women participating in a feminist book group at an Australian Political Science department found that those who participated benefited from peer support, navigating the "often hostile space of the University"

and nurturing a community of belonging within the group (2014: 288).

Leathwood (2004) also explored the perceived benefits of women-only spaces. Citing the works of Marilyn Frye (through Tong 1992), Thompson (1997) and Hartsock (1998), Leathwood stressed their importance as a space away from men and male defined and dominated practices, and as safe spaces to grow and learn away from the participants' oppressors (2004: 449).

Online and online supported women's networks

With the advancement and access to technology, online women networks and movements have broadened the reach and visibility of gender equality in education beyond a single institution or group. Online spaces can encourage contributions and memberships from different, for example the femedtech collective (feminist education technology

@femedtech) welcomes “colleagues of all nationalities, races, ethnicities, sexualities and genders” (<https://femedtech.net/about-femedtech/values/>) to become involved, aware and join in the critical conversations beyond women-only spaces. Formed in in 2016, the femedtech collective offers an open digital network for people learning, practising and researching in educational technology, and aims to be “alive to the specific ways that technology and education are gendered, and to how injustices and inequalities play out in these spaces” (femedtech, n.d.). The Women in Academia Support Network (@wiasnofficial) offers a digital space and hashtag for women academics from all stages of their careers, and is also open to all to follow and contribute.

These spaces are important to ensure that allies of change are recruited, that equalities are explored beyond specific group-only spaces, and that inequalities are exposed and challenged.

However, as Leathwood explores in her paper, women often have “a straightforward desire to meet in a space with other women and to be able to talk about issues, concerns, ideas, and experiences free from negative responses from men” and it is often the combination of integrationist and separatist strategies that promotes change and challenges practices (2004: 450).

Limitations to gender equality initiatives

Despite the aforementioned benefits of Women’s Networks, it should be acknowledged that there are limitations in the extent to which women-only networks, professional development initiatives, sector awards and leadership programmes can support progression into leadership and management roles for women.

Leadership programmes can offer opportunities to develop leadership skills and qualities, but without

cultural changes can leave participants still feeling marginalised. For example, interviews with both academic and administrative women working in middle management positions or aspiring into those positions at a new Australian university found that a leadership programme left participants feeling disenfranchised or sidelined, with one interviewee stating that having had the time to think about the workings of the university had served to “convince me that I am a poor fit with this university” (Burkinshaw and White 2017: 9). These types of experiences further compound women’s feelings of being ‘othered’ and disadvantaged.

Athena Swan is an initiative that awards a bronze, silver or gold award for commitment of HE institutions towards gender equality across all roles (previously focusing on STEM). However, Athena Swan, as O’Connor contends and argues, drawing evidence from the work of Amery et al (2019) and Graves, Rowell and Hunsicker (2019), has no

leverage at very senior level to promote gender equality, hasn't changed the pay gap, and has not increased gender equality at a senior level nor changed organisational culture (2020: 219). Therefore, providing a useful space for discussion around gender equality does not necessarily translate to institutional change.

Although mentoring is an established professional development opportunity for supporting minority groups there are limitations to the extent that mentoring can influence career progression, and these limitations can be felt by women professionals who seek mentoring to support career progression opportunities within an institution. It is therefore critical that mentoring programmes should not be considered the 'fix' to the issue of gender inequality. Consequently, it is important to acknowledge the barriers to career progression which may influence the perceived benefits of the mentoring partnership

(Kent et al. 2013: 213, Tareef 2013: 703, Castanheira 2015: 338 and Morley 2013: 125).

However, despite the aforementioned limitations, professional development opportunities can offer some benefits to individuals. For example, mentoring does offer less measurable but significantly important benefits for minority groups, including increased self-confidence, institutional awareness and networking, and it can be contended that these skills “should be inherently linked to career success” (Allen et al. 2004:128). Furthermore mentoring partnerships can provide both the mentees and mentors with “the opportunity to develop their own thinking in the presence of others who faced similar experiences” (Padgett 2004: 182). Interviews carried out with 30 women who took part in the women-only leadership programme Aurora found that participating in the programme increased their motivation to seek leadership opportunities, and develop the skills of

leadership and career management. Although lower than other perceived benefits of taking part in the programme 30% of those interviewed agreed that the impact of Aurora meant that 'I openly challenge the system and/or culture of my workplace' and 40% agreed that 'I find way of turning systems and/or culture of my workplace to my advantage' (Barnard et al. 2021). This shows the role of leadership programmes to highlight and challenge the cultures that are enablers to inequalities.

There is less literature available specially focusing on Women's Networks. This likely highlights Women's Networks as a 'nice to have' and where they are in place perhaps considered more informal networking spaces for likeminded people and often for women in senior positions. However, both the literature review by Pini et al. (2004) and the article by Leathwood (2004) acknowledge that since women-only networks and spaces have been around they have provoked debate, with some

feeling women-only spaces are separatist and exclusive, whilst others believe they are necessary to provide a protected space away from masculinist dominance and hierarchies. Women-only networks encourage discussions around challenges and barriers within the group which are impacted and disadvantaged by these barriers, so there will always be a limitation by which change can come from women-only networks, if that is indeed the purpose of the group. This highlights the need for such networks to find opportunities and pathways to lobby for change. Furthermore, there is some consideration around whether women are 'othering' themselves by creating spaces that exclude men and this highlights the need to position women's networks alongside groups and initiatives that are open to both men and women and do not position gender inequality as women's problem.

In summary, despite the underrepresentation of women in leadership and senior management

positions in education, the approach is often “an individualised response to problems that may require more collective or structural solutions” (Morley 2013: 125). This focus on ‘fixing the women’ further ‘others’ women and “focuses on why women do not measure up to HE leadership roles” (Burkinshaw and White 2017: 3). The aforementioned initiatives and networks do have benefits and together can make an individualised difference but unless cultural barriers are addressed they will produce limited impact in the way of actual change to inequality in further and higher education. Despite the aforementioned limitations these spaces, and the conversations within them, hold value and opportunities to raise awareness, champion cultural change and challenge indifference, recognising the latter in relation to what Bryson (1999) points out ergo: “men can benefit from the overtly oppressive or discriminatory practices of others; because their failure to oppose such practices can itself be seen as a form of connivance,

the distinction between male power and male persons is frequently difficult to sustain” (as cited by Leathwood 2004:455).

UHI Women’s Network

The UHI Women’s Network was formed in 2018 after the first university wide International Women’s Day highlighted a women-only network would be of benefit to colleagues across the university partnership. Therefore, after the event an email was sent out to all participants and colleagues across the UHI academic partnership to see who would like to join the network, with over 40 positive responses then received.

In forming the network, the decision was made early on that it would be open to colleagues who identify as women across professional services, research, teaching, and leadership roles and at any stage of their career. The Women’s Network provides a space for all women working at UHI recognising that

a space for only 'one' group within a group marginalised by gender would be counterproductive in not 'othering' women holding varied roles in education. Women's networks are often for senior women and given that the main barrier in universities is around promotion to senior positions it felt important to be inclusive and have a network with colleagues at any stage of their career, including senior women. It was hoped this would nurture fruitful discussions around barriers to career progression, as well as insights from women who had been successful in moving into senior and leadership roles within the university.

Alongside the women-only network there is also an online University of Highlands and Islands Women's Network hosted in Yammer. This is open to all, with male colleagues regularly contributing to the space to share articles, news articles, and professional development opportunities for women, and information of benefit or of interest to anyone

passionate about gender equality in education at UHI.

Utilising technology

As well as online and open spaces, technology has opened up the opportunity for participation in women's networks regardless of geographical location. Within UHI, due to the geographically distributed context, traditional approaches to engage staff in professional development and networking opportunities, which typically involve face-to-face facilitated sessions, are not possible to offer in an equitable or cost-effective way. The UHI Women's Network, is offered to women across the academic partnership with meetings attended in person and through synchronous technology pre-COVID and entirely synchronously post-COVID. Network members are able to join meetings through their own college or home and from a range of technology including laptops, tablets and phones. This requires more pre-meeting planning and facilitation than

perhaps a traditional network where meetings take place in person but does not disadvantage those who could not attend in person (pre-COVID). Furthermore, since COVID the need for spaces to mitigate against isolation and provide online locations to continue the discussion around gender equality has been crucially important, especially given the data emerging that highlights that women have been more disadvantaged by COVID than men. For example, the UHI International Women's Day 2021 event which was opened up to anyone working in education, and moving from an in-person to wholly online event opened up these important discussions beyond a single institution or group, and also saw the highest number of participants since the event was launched at the University in 2018.

Recognising the aforementioned limitations for initiatives to 'progress' women through the masculine hierarchies of further and higher education, it was important to stress that the network

is not intended to 'fix the women' who belong to the network but instead offer a safe space to discuss common challenges, hear from inspirational women, and to lobby for change through sector and national initiatives such as Athena Swan and International Women's Day itself. Moreover, in a distributed university it was hoped that the network would offer networking opportunities beyond the member's immediate Academic Partner college and subject or disciplinary context.

Aligning to university wide events and initiatives

The UHI Women's Network has also aligned and fed into wider initiatives and events. In Digital Education Week which took place in January 2019, Dr Louise Drumm, lecturer at Edinburgh Napier University, spoke to the network about her experiences as a professional woman working within the different fields of theatre and learning technology, exploring from her own perspective, challenges, barriers and

successes. The network has also fed into the Athena Swan application through a survey and focus group exploring experiences and perceptions of women working at UHI. Within UHI the Auroran alumni have become active and a vital voice in the spaces of the women's network and events like International Women's Day, facilitating meetings, presentations and workshops.

Benefits so far

Members of the Women's Network have highlighted that being part of a community, the process of networking, peer-peer learning, support and guidance as being of great value, as captured in the comments below.

“The women's network brings together an inspiring community of colleagues from across the partnership. It's been a catalyst to discussion and learning. I took so much from the recent interactive session with Dr Irene Garcia on exploring the topic of imposter

syndrome that I've tried to embed in my day-to-day'."

"UHI women's network - a positive, empowering, supportive network of like-minded people. I always come away from the events, thinking I can make a difference. The group has helped me build my own network within UHI and to the welcoming nature of the network I would have no hesitation in contacting any of the members for support/advice and would welcome the same in return."

"The UHI women's network has brought me into contact with university colleagues I may not have met otherwise. It's been invaluable, enjoyable and uplifting to be part of the network".

Looking forward

As the Women's Network has developed and awareness of gender equality has risen in the university through initiatives such as the women-only leadership programme Aurora, International Women's Day, and Athena Swan, the need to move some of the discussion beyond the space of the

meetings has come more to the foreground. The focus going forward will be to find fora, groups and pathways to highlight the main messages of the network, without compromising the safe space that the network provides where members are free to talk openly and share experiences that they want to stay within the group. Furthermore, as the group gains further traction, a decision around whether there should be special interest groups could be explored. For example, in the early stages of the network a pilot feminist reading group was set up and this has recently been restarted again with the first reading group meeting, since being reconvened, being held in May 2021.

The impact of COVID-19 on women and the UHI Women's Network

COVID-19 has highlighted and exasperated gender inequalities for women, with a number of publications and reports emerging on the impact of COVID-19 on gender equality since the first

lockdown in March 2020. Women are more likely to have taken on increased caring and domestic responsibilities, with mothers spending on average 2 fewer hours of doing paid work and 2 hours more housework and childcare than fathers (Andrew et al. 2020: 3). This has particularly impacted on BAME women, with a study carried out by Fawcett Society, the Women's Budget Group, QMUL and LSE finding that 45.5% of BAME women said they were struggling to cope with all the different demands on their time, compared to 34.6% of white women and 29.6% of white men. Furthermore, women with children are one-and-a-half times more likely than fathers to lose their jobs or to have been furloughed in the first lockdown (Andrew et al. 2020: 3). Workers in the shut-down sectors are disproportionately female, young and low-paid. Those under the age of 25 twice as likely to work in a shut-down sector as those over 25 (Blundell et al. 2020: 298).

However, the report by Blundell et al. state that some benefits to COVID-19 on working approaches could be accelerating gender norms, such as remote working providing career opportunities for women with children, and the opportunity for fathers to spend more time during the lockdown with their children due to working from home which could potentially change the way that they work in the future (2020: 293).

Gender-based violence has increased since COVID-19. [‘Counting Dead Women’](#), a project that records the killing of women by men in the UK, reported that between 23 March and 12 April sixteen women were killed by men, in comparison of an average of five deaths at the same period over the last 10 years.

Given the impact of COVID-19 on women, it is unsurprising that the mental health of women has been affected. In their investigation into the mental health effects of the first two months of lockdown and

social distancing during the pandemic, Banks and Xu (2020) found that the mental health of UK women aged 16-24 was seriously impacted. As measured via the extensively used twelve-item version of the General Health Questionnaire (GHQ-12), average scores amongst women in the aforementioned category rose by 2.5 points or 18.2% against a 'non-pandemic' projection for 2020, and the share reporting a severe problem doubled from 17.6% to 35.2% against the same projection.

The impact of COVID-19 on women in higher education

As well as existing barriers for women working in further and higher education highlighted in this chapter, challenges for women in early career positions can include balancing work and parenting commitments and often while being on part-time contracts. These existing challenges and barriers, with the addition of the increased impact of COVID-

19 on societal gender equalities, further jeopardise the progression of gender equality within and outwith education. A survey of 8,416 (51% of respondents were women) UK researchers by Vitae (2020) on the impact of COVID-19 on researchers indicated that early career researchers reported a decrease in working hours and reduction of 15 hours for research that cannot be done from home, and concern about being furloughed or not having contracts extended (37% women and 29% men) than other levels of researchers. In the same report, caring responsibilities disrupted both men and women's working hours with an almost equal percent of men and women having to cancel important meetings and conferences due to caring responsibilities. Almost equal numbers of men and women reported the number of hours spent on research had decreased due to caring responsibilities (42% women and 41% men). However an article published in The Guardian highlighted that women's publications dropped dramatically during COVID-19, whereas men's

publication rates increased (Thackery 2020). Yet despite this, 50% of those surveyed in the Vitae survey did report exploring new research directions during lockdown. When asked the question “What has been most challenging about sustaining your research since 23 March 2020, when ‘lockdown’ came into effect?” the second biggest challenge (the first being lack of access to onsite facilities/spaces) from the Vitae survey was struggling with mental health.

Advance HE published a report in February 2021 which highlighted some benefits to the move to working from home with 6 out of 10 HE staff reporting remote working helped them complete administrative work and attend meetings (Aldercotte, Pugh, Codioli McMaster and Kitsell 2021). More women than men said the move to remote working enabled them to attend meetings, conferences and career development opportunities. The report however does go on to say that women who did not

have access to adequate space were the least likely to say that they had had the opportunity to engage in career development activities while working from home, meaning that not all women have experienced the same level of benefit.

COVID-19 has highlighted and exacerbated gender inequalities for women. Women's networks therefore offer the potential to support colleagues in a time of potential isolation and home/work challenges. Offering a space to talk about these challenges with colleagues facing similar difficulties can help alleviate the feelings of being alone, and can provide the opportunity to signpost colleagues to other groups/organisations internally and externally who can provide support.

The role of the UHI Women's Network during COVID-19

Due to COVID-19, the priority focus for the UHI Women's Network for the academic year 2020-21

has been on mental health and wellbeing, and the feelings of imposter syndrome. This started with an interactive session facilitated by UHI Aurora alumni, with discussions turning to mental health and the impact of COVID-19 on women working from home, balancing home and work life and negotiating space (that which we live and work within, and the blurring of the boundaries of both). Another meeting saw Dr Irene Garcia facilitating an imposter syndrome workshop which explored participants own feelings of imposter syndrome and their position within the university with some practical tips to confront and tackle these feelings. The final meeting of the year will focus further on the impacts of COVID-19 on women's mental health, exploring current reports on the impact on women during COVID-19 generally, before an interactive activity exploring the impact on individuals in the network. The network will then welcome the UHI Mental Health and Counselling Manager who will facilitate a discussion to explore what the university and external bodies and groups

can do to support colleagues in a time of isolation and challenge. Finally, break out spaces on the online platform will allow small groups to engage in informal networking over lunch. It is difficult at this stage to gauge the impact of the women's network in supporting colleagues through COVID-19 in particular, although offering a space with others sharing the same experiences has, it has hoped, lessened the feelings of being alone and offered some small solutions to make an individual difference. Furthermore, COVID-19 has shone a light on existing inequalities with an increasing volume of research literature and reports being published in the last year which highlight existing inequalities and those which COVID-19 has exacerbated. This has encouraged wider discussions around gender equality within other spaces, shared with male colleagues, which encourages consideration and reflection around not only the impact of COVID-19 but the pre-existing and

post-COVID-19 inequalities that women face inside and outwith education.

Conclusion

This chapter has highlighted the need to challenge the cultural barriers to gender equality in further and higher education, namely in relation to barriers to career progression into leadership and senior management roles for women. Although networks, initiatives, awards and professional development opportunities have proven effective in offering individual benefits they should not be presented as a solution to fix the problem of gender inequality, and to attempt to do so 'others' women and suggests that women are the problem. However, these spaces do provide a voice for women, an important space to discuss challenges and barriers and an opportunity to learn, network and champion change to masculinist working cultures and structures.

Throughout COVID-19, the UHI Women's Network has also provided the space to discuss gender equality in light of the pandemic and to focus in on mental health while also providing the opportunity to network in a time of isolation. However, as the chapter highlights, it is important that discussions had within women-only spaces have pathways to highlight the messages coming from these spaces, to raise awareness and champion change from within the cultural hierarchies.

For those considering setting up a women's network then recommended due diligence should be around who the network is for, deciding the purpose for the network early on, and enlisting the support and leadership of individual/s who drive the agendas and topics for discussions, as well as setting up the meetings and inviting speakers. Women's networks can often be seen as a 'nice to have' rather than an established initiative that is supported by the institution, and the impacts can often be felt by

individuals in ways that are not always valued by the university and are not easily measurable. Therefore, if the network is to have an impact within an institution consideration of the ways in which the network can have an influence on recognised institutional and sectoral initiatives is important. For example, representation on internal equalities groups, in senior fora, and feeding into initiatives such as Athena Swan, highlighting the main themes of the network discussion, but without jeopardising the confidentiality and safe space of the group. Finally, accepting that individuals will often have to prioritise workload and/or family commitments over attendance is important, so ensuring a large enough network that results in appropriate representation at every meeting should be considered.

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Alex has worked in supporting research, learning, and teaching in education since graduating with a

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Implementing the Aurora leadership development programme in the University of the Highlands and Islands: insights and implications

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Abstract

At the University of the Highlands and Islands' (UHI) first International Women's Day event in March 2018, delegates proposed engagement with the Advance HE Aurora Leadership Development Programme for those identifying as women as part of a range of actions to address gender inequality in leadership roles within the institution. Later that year, the university approved funding for ten participants and since then twenty-one women from across

the university partnership, employed in research, teaching and professional services roles have undertaken the programme.

UHI Aurorans, as they are known, have shared their experiences and reflections on completion of the programme through the 2018/19 Evaluation Study (Tilbury 2019) and research study of the 2019/20 cohort which is currently underway. While these studies highlight the profoundly positive impact of the programme for UHI Aurora participants, they also draw attention to the limitations of an institutional approach to addressing gender inequality solely focused on a women-only leadership development programme. The findings reflect the current research literature which argues that addressing gender inequality requires changes in organisational cultures and structures and that this in turn requires a critical exploration of leadership: how it is enacted, valued, rewarded, and developed. By moving beyond approaches preoccupied with 'fixing the women', organisational cultures, structures, practices, and behaviours can be changed to ensure that

those (particularly women) who aspire to leadership are not excluded from opportunities to lead. This chapter concludes with recommendations arising from the evaluation studies which aim to contribute to greater gender equality and inclusive approaches within the university and to inform other institutions facing similar challenges.

Keywords: Leadership, leadership development, women, Aurora, higher education, evaluation

Advance HE Aurora Leadership Development Programme for women

In 2013 Professor Louise Morley produced the Stimulus Paper - Women in Higher Education Leadership: Absences and Aspirations. Morley's research on the number of senior leadership roles in Higher Education Institutions (HEIs) highlighted some stark findings: although 44% of academics were women only 19% were in professorial roles, and only 28% were in senior management roles (Morley 2013: 15). Based on Professor Morley's

recommendations a six-month development initiative to address the gender imbalance within senior leadership positions in higher education was launched by the Leadership Foundation for Higher Education in November 2013. This initiative was named the Aurora Leadership Development Programme for Women. Since 2018, Aurora has been offered through Advance HE, the higher education sector agency.

The programme aims to support women and their institutions to fulfil their leadership potential through a 5-month development programme delivered in regional cohorts across the UK and Ireland. Since it began, in 2013, over 7,000 women and nearly 200 institutions have participated in the programme (Advance HE 2021a). Facilitated by leadership development experts the programme consists of four development days which comprise of keynote speakers, group working, individual reflection and networking. The development days are structured around four key aspects of leadership: Identity impact and voice; Politics and influence; Core leadership

skills; Adaptive leadership skills. Participants also attend an introductory webinar and two action learning set days which focus on supporting participants to explore work-related challenges, identify solutions and next steps.

University of the Highlands and Islands (UHI)'s engagement with Aurora

The University of the Highlands and Islands is a federated institution encompassing both further and higher education. It brings together a partnership of 13 independent colleges, research institutions and a central executive office based in the Highlands and Islands of Scotland. Many of these colleges are in rural island communities and incorporate small learning centres which enable students to remain in their local community while studying. Most staff are based at and employed by these colleges with their own employment terms and conditions, strategies, and priorities. This diverse geographical, organisational and cultural landscape forms a unique and richly varied backdrop to the university's engagement in Aurora.

On 8 March 2018, at the university's first International Women's Day conference, delegates proposed engagement with the Advance HE Aurora Leadership Development Programme (referred to as 'Aurora') as part of a range of actions. This proposition was considered by the university's Partnership Council who approved funding for ten participants on the 2018/19 programme. The stated aim of the investment was "*to encourage women to apply for more senior roles within the institution*" and to deliver on the university's Athena Swan Bronze Award action plan (Docherty 2016) of funding two female staff per annum on Aurora. Established in 2005 the Athena Swan Charter provides a framework to support gender equality within higher education and research with a particular focus on "advancing the careers of women in science, technology, engineering, maths and medicine (STEMM)" (Advance HE 2021b).

The funding also aimed to address issues identified in previous reports including the university's Update to Equality Outcomes and Mainstreaming Report which

reported a mean gender pay gap of 22% in favour of men. The report noted that through “*support for women on the Aurora Leadership Programme, we hope to encourage more female applicants to senior posts*” (Hall 2019: 51). In addition, the Enhancement Lead Institutional Review (ELIR) Report of 2015/16 (QAA 2016) recommended initiatives to build leadership capacity within the institution.

The university’s Learning and Teaching Academy (LTA) supports and enables the enhancement of learning and teaching and has led the university’s engagement in Aurora since 2018. The programme began the LTA’s educational leadership capacity building as a key initiative in delivering the Learning and Teaching Enhancement Strategy (UHI 2019). For the purposes of this chapter, leadership capacity is defined as the “*collective ability of leadership to detect and cope with changes in the external environment by maintaining the primary goals of the organisation*” (Kivipõld and Vadi 2010: 118).

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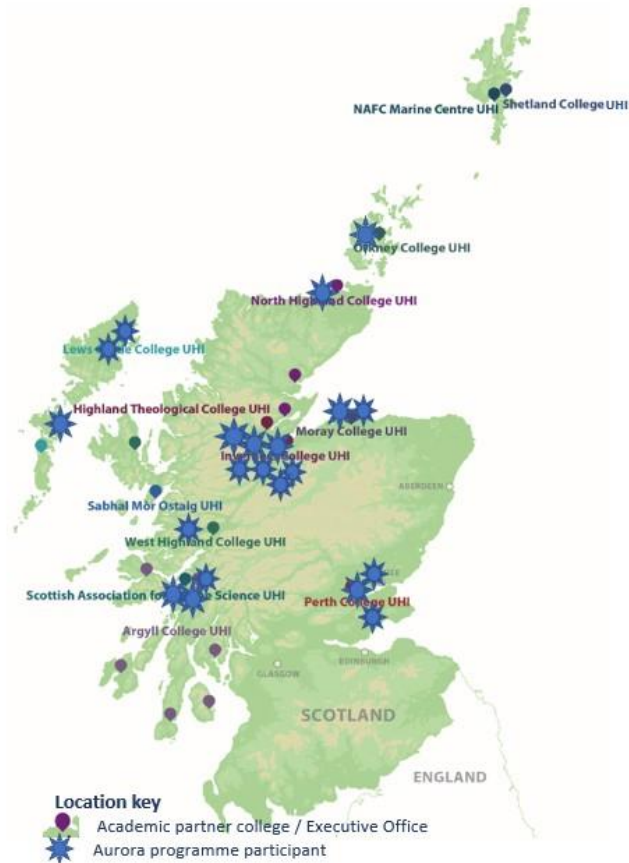


Figure 1.1: Map showing the location of UHI Auroras within the university

Implementation of Aurora in UHI

The approach to implementing Aurora in UHI was informed by academic and practitioner literature on leadership development programmes. In particular, the literature highlighted the benefits of providing additional professional development opportunities and meaningful opportunities for participants to continue developing their professional practice. (Avolio et al 2009; Gentle and Foreman 2014; Bamber and Stephani 2016). The implementation includes a rigorous panel-based selection process and for selected participants, a welcome webinar, regular cohort communications, a mentor from the University's Mentoring Scheme and an annual opportunity to present their experiences at the university's International Women's Day event. Since 2018, twenty-one women have successfully completed the programme; ten in 2018/19; five in 2019/20 and six in 2020/21. They have formed a growing community of UHI Aurorans who have collaborated and shaped the UHI Aurora experience.

Evaluation of 2018/19 approaches

The evaluation approach of the university's engagement in Aurora aimed to determine the extent to which participants were more encouraged to apply for senior roles within the institution while also exploring their perceptions of the outcomes of the programme, including any changes in their outlook on leadership, their leadership behaviour and practices, and their leadership aspirations. The approach aimed to understand effects which were likely to be *“indirect, behavioural, enacted through relationships and conversation, occur over time and would be messy and difficult to capture in a demonstrably ‘cause-effect’ manner”* (Jarvis et al 2013: 33). The studies also identify how the university could support them to further realise their leadership aspirations.

The evaluation study of participation in Aurora 2018/19 used a mixed-methods approach: an online survey instrument to gather individual feedback and a virtual focus group to bring participants together to co-construct their feedback as a group. Developing this approach, a more

formal research study was adopted to evaluate participation in Aurora 2019/20 using an extended version of the 2018/19 online survey tool, and the addition of semi-structured one-hour participant interviews. All fifteen Auroran participants from both cohorts engaged in the studies.

The evaluation studies are inevitably limited by the small number of participants; an analysis based exclusively on participants' perceptions; and the researcher's involvement as an "*embedded evaluator*" (Stefani and Baume 2016: 169). These constraints inhibit opportunities to generalise from the studies, however, the findings provide a strong sense of "*the intangible outcomes*" (Bamber and Stefani 2016: 243) of Aurora through participants' feedback data and suggest a direction of travel to address gender inequality in leadership development.

Emboldening effect of Aurora for UHI participants

The narrative which emerges from the evaluation studies indicates that Aurora has encouraged the participants to

apply for senior roles and that they have valued the opportunity to explore their perceptions of leadership within their current professional practice. Aurora appears to have a profoundly beneficial impact on participants' professional practice as UHI Aurorans emerge emboldened by the experience. This emboldening effect can be explored through four recurring themes derived from the data analysis of both studies:

1. Growth in confidence in the practice of leadership
2. Creating a sense of belonging through a new internal network
3. Exploration of the nature of leadership
4. Identifying as a leader

Growth in confidence in the practice of leadership

A growth in confidence is evidenced by the survey data from both cohorts, with all ten 2018/19 Aurorans reporting an increase in their confidence in their leadership capabilities and similarly, the 2019/20 Aurorans reporting

an increase in their confidence in their leadership as one of the top four benefits of Aurora. This increase in confidence was a recurring theme in the feedback from the focus groups and individual interviews as the following quotes illustrate:

“ .. Although my leadership journey has only just started, this programme has given me the confidence, connections and tools to strive for success and hone my skills.”

“It has given me the confidence going forward to step up and take the lead, as I feel like I have hundreds of inspirational women behind me all the way, saying: You're in charge!”

“ .. I feel quite empowered, and I've definitely had a mindset shift in what I think leadership is all about”.

“I think it's having a voice and certainly, it is about having a voice at the table and using that voice and knowing that actually, other people can have things covered but you have a unique contribution to make, and I think that's what's coming over to you”.

Exploration of the nature of leadership

Feedback from the 2018/19 focus group evidenced the value of the opportunity to examine the nature of leadership particularly in the context of their professional practice. This sentiment was also evident in the feedback from the 2019/20 focus group which explored the values and behaviours of leadership:

“So, maybe it's less about necessarily becoming a leader, but it's more about being able to connect to your individual ... motivations and then through that process, I think that helps you see where you sit in both in your own, in your own team and also the institution and I think just being able to make the link between these different values.”

“... the best definition I could come up with for leadership was that it was a relationship of influence. We're all in relationships and we exercise influence.”

The feedback indicates that participants were encouraged to critically reflect on what leadership meant to them and what values underpinned their own leadership practice. As one respondent reflected.

“This increased understanding of what other leaders are experiencing and how they respond to/address different situations and challenges. This allows me to use such observations to support my own leadership development”.

This finding is not surprising as one of the principles of Aurora is to encourage participants to find their own authentic approach to leadership:

"The Aurora programme does not define leadership or promote a particular model. Participants are encouraged to think in terms of leadership behaviours and characteristics, to construct their own meaning of the concept and to enact leadership in whatever way they choose, appropriate to context." (Barnard et al. 2016: 17)

Creating a sense of belonging through a new internal network

The evaluations highlight that networking opportunities with internal colleagues are particularly beneficial in the context of a geographically distributed university where distance and isolation were often a barrier to networking. For the 2018/19 Aurorans, internal networking opportunities were

viewed as *“paramount [for] a group of professional leaders”* and regarded as significant in supporting a greater *“understanding how the organisation works”*. These newly developed internal networks helped them to co-create a greater understanding of the ‘business of the university’ through sharing their knowledge and expertise within their network. Similarly, the 2019/20 Aurorans survey findings rated internal networking opportunities as one of the most beneficial aspects of Aurora.

Feedback from Aurorans suggested that the sense of belonging that arose from the programme was an unexpected outcome as one put it, “I am delighted to have shared the journey with such a wonderful bunch of colleagues from across the UHI partnership. Already we are working together to share ideas and keep in touch”. Another Auroran said “I think there's something about bonding”, another said, “being part of the UHI cohort was a real highlight of the programme and has given me real excitement for being able to continue my leadership development alongside this group at UHI”. The tone of the

focus group and individual interview feedback also evidences how fundamental this sense of 'belonging' is to the UHI Aurorans and that their learning appears to have been significantly enhanced because of its collaborative approach. This sense of belonging is captured in each of the short films the UHI Aurorans have presented at the university's annual International Women's Day celebrations since 2019.

Identifying as a leader

The findings of the 2018/19 study indicate that Aurora supports participants to develop their approach to leadership through identifying their professional values and a more nuanced understanding of leadership behaviours. Combined with a greater sense of confidence, this empowers UHI Aurorans to identify as leaders and to seek out leadership opportunities.

"This was a really brilliant opportunity AURORA raises the profile of female leadership and enables you to embark in some great professional networking and self-belief as a leader".

"The Aurora programme has already had a huge impact on me; it really has helped me to grow in confidence and have faith in my own abilities (something that I question far more than I should). It has been very refreshing to explore my own feelings and doubts in a safe and supportive environment and realise that I am like so many other females in the University sector. The programme has helped me to identify my strengths and weaknesses as a leader and most importantly has given me the tools to try and make me both a better leader and mentor."

"I went to find out about leadership. Instead, I discovered I am being an influencer. I found that far more profound and important to me".

Tangible and intangible outcomes of Aurora

These extracts from the evaluation studies demonstrate the positive impact of Aurora and how participants are emboldened by the experience through a growth in confidence, belonging to new networks, an exploration of their perspectives on leadership and establishing their identities as leaders. Their reflections and feedback focus on defining leadership in their own terms and the emotional

and relational aspects of leadership. The studies present a clear account of participants emerging from Aurora as reflective, highly motivated, leaders with the capacity and aspirations to further their leadership and make a greater contribution to the future of the university.

The tangible outcomes of the programme to date include the securing of new positions outside the university by three UHI Aurorans. In addition, one UHI Auroran has undertaken a secondment, and several have applied for more senior roles; others have undertaken professional recognition through ALPINE¹ and one has recently begun a second, three-year term, staff representative role on the UHI university court (with three of four recent nominations being UHI Aurorans).

These examples only partially evidence the impact of Aurora, as the research and practitioner literature on the

¹ ALPINE is the university's framework for the recognition of good practice in learning and teaching and allows the university to award Fellowships of the Higher Education Academy (HEA) with Advance HE

limitations of evaluation approaches on leadership development programmes highlights (Avolio et al. 2010; Day et al. 2014; Bamber and Stephanie 2016; Baume and Popovic 2016; Jarvis et al. 2013) much of the impact is 'intangible' and evades measurement.

The intangible outcomes of Aurora including the emboldening effect appears from the evaluation studies to pervade the participants professional practice and include a 'ripple effect' with the colleagues.

"I think there's huge amounts of professional capital and leadership capital, honestly, the organization would fall apart without it, but it isn't seen because it's the glue and it's doing its job. So, maybe there's a role for us in highlighting the glue, highlighting that there is this flow of capital going."

Conventional approaches to evaluating leadership development programmes often miss this 'invisible 'glue' and in doing so underestimate the significant value of programmes like Aurora. The evaluation studies aim to capture and demonstrate to stakeholders both the intangible and tangible outcomes of Aurora at UHI to date.

The absence of opportunities

The evaluation studies evidence the value of Aurora in providing participants with an increase in confidence in their leadership capabilities and motivation to seek leadership roles, and to take on new responsibilities within the university. However, the evaluation studies also reveal a deep sense of participants' frustration that a women-only leadership development programme appears to be the only initiative to address gender inequality in leadership roles within the university. The recurring themes from the 2018/19 Aurorans include:

- lack of opportunity to utilise new skills developed from the programme;
- lack of supportive institutional workplace culture and practices;
- lack of identification of potential opportunities;
- lack of recognition of the demands of balancing home and working life.

Similarly, feedback by 2019/20 Aurorans stated that:

“those [leadership] positions don't exist.”

“There is no obvious trajectory for leadership progression.”

“There are no obvious institutional opportunities apart from voluntary ones which do not then fit in contracted hours.”

“... part of my reason for attending Aurora - to identify potential opportunities in UHI beyond being Programme Leader and beyond being employed in one AP. I am still unclear what these might be or how I can become aware of them.”

“It is not clear how UHI wants to make use of Aurorans or sees them as having something, in particular, to offer to particular (new) roles.”

“I cannot identify opportunities for career progression in leadership as a recognised trajectory. Roles are tied to programme networks or existing linear structures, are purely managerial within APs and primarily to do with FE, rather than being cross-AP or leadership (interpersonal or impact) focussed.”

“it's not about fixing us. It's about fixing structures and cultures.”

Their reflections also underline significant challenges related to balancing home and working life particularly

those with caring responsibilities. The expectations of leadership roles whether research, academic or professional services were regarded as unattainable and/or unappealing.

Moving beyond ‘fixing the women’

The evaluation studies expose aspects of current working cultures, structures, practices and behaviours which exclude those (and not just those identifying as women) who aspire to leadership. These aspects are evidenced in the recent publication of the fourth and final report of the five-year longitudinal study: “Onwards and Upwards: Tracking the Careers of Women’s Leadership in Higher Education” (Barnard et al. 2021) which follows the career journeys of Aurora participants and provides an effective backdrop to the findings of the UHI evaluation studies. Barnard et al. (2021) reported that:

“... women in senior leadership roles may be defeated by the frustrations of the job, excessive workload, pressure or poor managers (Acker 2014) and, for academics, the lack of time and energy to undertake

prestige academic work." (Barnard et al. 2021:8)

As recommended in their previous report: "Onwards and Upwards? Tracking women's work experiences in higher education Year 3 report" (Arnold et al. 2019):

"Institutions should consider the leadership discourses they use, their effectiveness and the value of 'discourse diversity' to promote different legitimate ways of leading. They should review what they say they want and whether that is really what gets rewarded" (Arnold et al. 2019:5)

There is a clear case for leadership development initiatives to move beyond approaches based on '*fixing the women*' and to undertake a critical reflection on how we talk about leadership, how leadership is enacted, what we value in leadership, and approaches to leadership capacity building within the university. The university's first Educational Leadership Symposium, held in November 2020², initiated the LTA's contribution to exploring these 'discourses of

² Described in the LTA blog post *Building Educational Leadership Capacity: Urgency and Agency* (Connor, S. and Tilbury, A. (2021)

leadership’ and provided an opportunity for colleagues to explore the behaviours and structures which exclude those who aspire to lead in the university from leadership roles.

Recommendations

The findings of the evaluation studies and the longitudinal study of Aurora (Barnard et al. 2021) can be drawn together as an evidence-based set of recommendations to support a critical reflection on addressing gender inequality in leadership roles and building leadership capacity within the university. These recommendations should include:

- Defining what is valued in leadership and how it is rewarded;
- Identifying and provide more inclusive approaches to leadership roles including part-time and job share options;
- Reviewing the requirements of senior leadership roles so that they are:
 - not potentially harmful to everyone who does them and

- potentially differentially detrimental and off-putting to some groups of staff;
- Defining work/life balance and flexible working patterns and how they are supported;
- Gathering data across the university on decisions relating to the recruitment, and appointments of leadership roles to support an evidence-based approach to addressing gender inequality within the university;
- Exploring opportunities for career progression and development into leadership roles including effective secondments and shadowing;
- Continuing to fund the university's engagement in Aurora, to sustain and develop the benefits of the programme and to evaluation and report on its impact;
- Continuing to develop other initiatives to support the building of educational leadership capacity within the university.

Conclusion and next steps

As the Barnard et al. longitudinal study observes much has changed since Aurora began, but “the underlying concerns raised in 2013 about gender inequalities in the HE sector remain as pertinent now as then” (2021:5). The evaluation studies of the university’s engagement in Aurora aim to add to the body of evidence that argues that addressing gender inequality requires changes in organisational cultures and structures and that this will require a critical exploration of how leadership is enacted, valued, rewarded and developed. By moving beyond approaches preoccupied with ‘fixing the women’ these changes can be grounded in what is valued in leadership.

The research-based evaluation studies aim to offer a more detailed understanding of the impact of Aurora in the context of a geographically distributed, tertiary institution and to contribute to the development of effective approaches to address gender inequalities in the sector. The next step in this journey will be to disseminate the

findings of the 2019/20 evaluation through a peer-reviewed publication.

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Distancing the (privileged) male from the machine: supporting gender balance and representation through acts of allyship in academic processes and practices

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Abstract

This chapter seeks to address how male colleagues who are in privileged positions of leadership, influence or seniority within universities can contribute to challenging gender bias, and champion greater gender representation in academic processes and practices, through acts of male allyship. The chapter begins with a consideration of the historical developments that have privileged the male voice

in academia and the generation and dissemination of knowledge, before exploring in the current context the dominance and favouring of male voices within the publication of academic and scientific research through issues that include homogeneity in journal boards and learned societies, and phenomena such as citation and co-authoring bias. The chapter then briefly considers contemporary movements and campaigns (including ‘Why is my curriculum white?’ and ‘Decolonising the curriculum’) which are seeking to challenge the dominance of white, male western scholars within the curriculum.

This then leads into an exploration of the specific acts of male allyship that can support gender balance, and amplify the voices of women colleagues, in curriculum design, authoring and presenting scholarship and research, and in leading learning and teaching related work and initiatives. An emphasis is placed on the importance of distributed leadership as a key act of allyship that can enable greater gender balance in educational leadership and decision making. The chapter concludes with the point that male

colleagues who are seeking to support gender balance and representation in academic and higher education institutions have to pro-actively commit to acts of allyship, recognise when they themselves and other colleagues are being complicit in sustaining or reinforcing gender imbalance, and be prepared to challenge both the status quo and indeed their own status, leadership and responsibilities.

Keywords: Allyship, gender balance, privilege, bias, academic practice, curriculum, research, distributed leadership.

A historical perspective on the privileging of the male voice

The privileging of the male voice in education, academia and the production and dissemination of knowledge can be traced to more points in human history than this short chapter can possibly consider. However there are pivotal defining developments and eras in the evolution of culture

and society to which we can look, and which are particularly relevant to current practices that prevail in privileging the male voice in academia, academic practices and research.

We may look directly to the roots of philosophy and education in ancient Greece, where through the work of Socrates, Plato and Isocrates there is an emphasis placed on education as being about the development of citizens, but within which the citizen was almost universally assumed to be male. Furthermore while there were many women philosophers active across the different periods of ancient Greek history, engagement in philosophical endeavour was largely seen as the reserve of men to the extent that, beyond Hypatia, there is little common knowledge in the wider populace of other women philosophers such as Aspasia, Diotima, Arete or Hipparchia. This was compounded by and is attributable to, as Wider (1986: 21) observes, ancient and modern sources that are so gender-biased and sexist in their nature that they lessen and “easily distort our view of these women and their accomplishments”.

Tuana and Peterson (1993: x-xi) scrutinise and challenge the five major beliefs about woman's nature that were generally accepted by Western philosophy, theology and science up to the nineteenth century, specifically that: woman is less perfect than man; woman possesses inferior rational capacities; woman has a defective moral sense; man is the primary creative force; and woman is in need of control. Tuana and Peterson contend and reveal how these beliefs about woman's nature permeated and reproduced themselves in the realms of philosophy, theology, science and politics, and permeated social and cultural institutions, to the exclusion and distrust of women's voices and in reducing the sphere of the woman to the private, domestic realm.

The disenfranchisement of women voices extended to the development and dissemination of knowledge and the written word. Prior to the development of mass publishing, to be literate was the privilege of royalty, nobility and ruling elites, including organised religion, and the hand produced written manuscript was an instrument of power for priests,

princes and the privileged, allowing them to enshrine laws and belief systems that were themselves overwhelmingly patriarchal. The invention of the Gutenberg printing press in the 1440's revolutionised publishing and the mass distribution of knowledge that we have to this day, and was pivotal to the development of literacy across society, but mass printing technology remained largely in the hands of privileged males and the first book to be mass produced using the Gutenberg press was the Gutenberg Bible (also known as the Mazarin Bible). Printed works by European women authors did noticeably begin to increase in the sixteenth century, but only marginally. In her exploration of women and the cultural politics of printing, Stevenson (2009) observes that between 1500 and 1600 there were a total of only twenty writings by English and Scottish women printed, twenty in Spain, twenty-three in Germany and the Netherlands, thirty-two in France, and a more substantial two-hundred and twenty-one printed publications by women writers in Italy.

While we may observe the above as historical trends and developments, there is a legacy or at the very least a direct comparison we can draw between the above and the modern practices that continue to privilege the male voice - and marginalise and underrepresent the work and voices of women - in academia, education and research.

Prevailing practices and privilege

If space permitted, an appropriate starting point in exploring the prevailing practices that privilege males and the male voice in academia would involve examining the myriad of ways in which women have been disadvantaged within higher education.

Rees (2011) provides a thorough analysis, in the context of the gendered construction of scientific knowledge. Beginning with the observation that historically women were excluded from 'the academy' (and giving the example of Cambridge University, who did not allow women students to graduate until 1949 even if they had passed all their exams), Rees goes on to explore the various kinds of

gender-based segregation in universities, and draws on a substantial body of data to underline the disproportionate numbers of male graduates who become professors in comparison to females, despite female undergraduates outnumbering males in the data drawn upon at the time. Rees also examines the scarcity of women in leadership posts in European universities (with only 13% of heads of higher education/research institutions in the EU being women in 2009). As discussed elsewhere in this book, these trends prevail, and there are multifarious factors at play in this context. As Rees observes, many of these factors relate to the dominance of males and male perspectives in positions of influence in relation to what academic work is valued, and whom is being valued for producing it. This extends to the mechanisms and conventions that govern the production, scrutiny and dissemination of academic knowledge, and as Jester (2018) observes also encompasses decisions and practices around the curriculum and what is legitimised as 'valid knowledge' through being included in the subject material of curricula.

Gender bias in journal boards and learned societies

The underrepresentation of women in leadership positions, and in spaces of influence within academia, is particularly notable in the gender distribution within and across the editorial and review boards of journals, and also of learned societies and professional associations within higher education and academic research.

In an extensive recent study (Liévano-Latorrea, Aparecida da Silvaa, Vieiraa, Resendea, Ribeiroa, Borgesa, Sales and Loyola, 2020), the gender composition of editorial boards for thirty-one leading journals in the field of biological conservation were assessed. Of the 1251 editors across the journal boards that were examined, only 28.7 percent were women. While Liévano-Latorrea and colleagues note some variance in gender representation on editorial boards in other discipline areas, the imbalance is consistently in one direction. They also observe the wider implications of women being underrepresented on editorial

boards, with membership of editorial boards being an important indicator of status and professional standing in their fields for academics, and an important proxy indicator of the presence and leadership of women in academic spaces. Liévano-Latorrea et al. (2020) also articulate the wider benefits of greater gender balance in editorial boards, including drawing upon a richer pool of expertise and experience, surfacing a broader range of research, and identifying more innovative solutions to issues. Ultimately they contend that the undervaluing of research by women and of their wider academic and professional standing, as reflected in the composition of editorial boards, largely needs to be addressed by male editors taking direct action to achieve gender balance through recognising the “need to assume their part in the movement and start, for example, to hire and promote women's work” (Liévano-Latorrea et al. 2020: 5).

The awareness of editors with respect to gender representation on editorial boards, and within the reviewing and publishing processes, is an important area to address

in order to progress greater gender balance and increase the participation and representation of women. In their qualitative study exploring journal editors perceptions of gender, Lundine, Bourgeault, Glonti, Hutchinson and Balabanova (2019) found that there was little consideration of gender beyond striving to be 'gender blind', which they contend is not cognisant of the wider systemic factors at play. Ludine and colleagues underline the need for journals and publishers to consider being more explicit about the values of their journal, defining what research equity means and implementing measures to both gauge and promote greater gender representation.

Rees (2011) offers similar observations relating to research councils, professional bodies and other 'learned societies' within academia, the memberships of which tend to be male dominated, and for which membership and leadership of are marks of esteem associated with standing and, as with editorial board membership and publishing, are often key factors in career progression and promotion.

Rees (2011: 138) challenges us to ask several questions regarding gender balance and the membership of such councils and societies:

“The critical issue is how do people get selected to become Council members of these and other international science bodies...? What are the recruitment mechanisms for membership of prize committees and learned societies? Who are the gatekeepers to accessing these powerful positions who determine what is deemed to be excellent? By what criteria are they operating? What roles do networks and ‘knowing’ potential candidates or those who recommend them play in the process? A lack of transparency and evidence-base in the vetting of candidates raises concerns that contacts, networking and cloning may have a disproportionate impact.” Rees (2011: 134) also asks the pertinent question that is central to judging the extent to which opportunities for academic influence, leadership and presence are actually gender neutral: “if systems of adjudication are largely acceptable and if we accept that academic ability is equally distributed

between the two sexes, then why are there so few women among the recipients of accolades in the academy, such as fellowships of learned societies, medals or Nobel Prizes? Why, indeed, are there still so few women professors?"

Citation and review bias

Citations of published work are, rightly or wrongly, taken as a key indicator of scholarly esteem within academia. The citation of one author's (or group of co-authors) work by another underlines the perceived value of that work to supporting or even advancing the work that the other author (or authors) is disseminating, and the number and spread of citations (within and beyond the immediate field that work is published within) is accepted as a key measure of impact of both the author(s) and their work.

Unfortunately the phenomena of citation bias, in the various forms it can take, also serves to privilege the male voice in academia. It is well accepted that male authors tend to cite other male authors more frequently than women authors (Ferber and Brun 2011; King, Bergstrom, Correll, Jacquet

and West 2017), which disproportionally validates research and knowledge generated by males. This results from and further compounds the challenges already in place due to the lack of equal opportunities for women to progress into significant research and scholarly roles (Rees 2011), and also disadvantages women academics who are already in small minorities within their fields and the collective work of whom is less visible overall (Ferber and Brun, 2011).

In their expansive study examining citations in 1.5 million research papers published between 1779 and 2011, King et al. (2017) also found that men self-cited their own papers 56 percent more than women did, rising to 70 percent more since around the year 2000. Women were also found to be over 10 percentage points more likely not to cite their own previous research, with there being clear implications to these overall patterns for both the scholarly visibility of women researchers and academics, and a cumulative advantage for men with respect to their academic standing and careers.

There is also an established gender bias when it comes to the peer review of work for potential publication, or the peer review of applications for research funding. With respect to the peer review of work for potential publication, Liévano-Latorrea et al. (2020) draw on a range of previous research in discussing the phenomena of ‘homophily’, which manifests itself through practices including: the majority of review invitations being made by men to other men; the higher acceptance of papers with male leaders or first authors; and when women-led papers are reviewed more harshly and receive lower acceptance rates than papers with male lead authors.

Similarly, with respect to the review of research funding proposals, there is a wealth of evidence which underlines the systemic bias within the peer review and awarding of research grant applications. In synthesising a range of this research, Morgan, Hawkins and Lundine (2018: E487) found that “female applicants with past grant success rates equivalent to male applicants were given lower application scores by reviewers, and male applicants with less

experience than female applicants were favoured and awarded grants at a higher rate". Morgan et al. attribute this to historical and systemic gender bias within academic institutions that have favoured the development and promotion of male academics in research and leadership positions, and contributed to the development of cultures within which gender stereotypes influence the work men and women academics are respectively expected to or as seen as best able to do, and within which women with domestic responsibilities are particularly disadvantaged in relation to engaging in various kinds of academic work.

Similarly, Guglielmi (2018) reported on research which demonstrated that women academics are far less successful than male applicants for funding when the review process is focused on assessing the researcher, but with this gender bias greatly reduced when the review is focused primarily on the research proposal itself.

Authoring and co-authoring bias

Authoring and co-authoring bias is also at play in privileging the work and voices of male academics over that of women. There is a general trend for male academics and researchers to publish with other men, and to support other men to engage in publishing (Liévano-Latorrea et al. 2020). This extends to co-authoring, with the study by Frances, Connor, Fitzpatrick, Koprivnikar and McCauley (2020) finding that male researchers in the last author position were more likely to co-author with other males, whereas women first and last authors were more likely to publish with men.

While in their own field of biology the authors found that there had been a modest increase in the proportion of women co-authors over a thirty year period, this was correlated with an increase in the average number of authors per paper. Additionally, they found that the proportion of women co-authors on papers remained well

below the proportion of PhDs awarded to women in biology over the same time period.

This provides further evidence of the disconnect in place between the successful engagement of women graduates, in this case research postgraduates, in their academic studies and the numbers subsequently successfully transitioning into further academic work and developing their profile as academics and researchers.

The COVID-19 global pandemic has only served to widen gender differences with respect to engagement in academic work, including research, through exacerbating gender imbalances in childcare, care of relatives and domestic responsibilities. Bell and Fong (2021) investigated gender differences in first authorship in public health research submissions during the pandemic. While there were higher submission rates overall, increases were higher for men (41.9% first author) compared to women (10.9% first author), with women authoring only 29.4% of COVID-19 related articles.

Gender bias in the curriculum

In recent years there has been a groundswell in contemporary movements and campaigns which are seeking to challenge the dominance of predominantly white, male western scholars within the curriculum, and within bodies of knowledge more generally. These have emerged as a collective student and staff process of questioning the colonial legacies reproduced in the design, delivery and assessment of the curriculum, and more widely in challenging the dominance of the privileged western male voice. Movements and campaigns active in this space from around 2015 onwards include 'Why is my curriculum white?', 'Decolonising the curriculum', 'Dismantling the Master's House', 'Rhodes must fall' and 'Women also know stuff?'.

Jester (2018: 606-607) considers many of these movements and campaigns in the context of the decisions academics make about the curriculum, observing that higher education "operates in a system that typically

privileges the white male experience” and that “the decentralised nature of higher education means that every programme or course leader asks themselves, consciously or otherwise, certain questions when designing the curriculum. Whose voices are imbued with the most authority? What must students know to be well-versed in a particular topic? What type of knowledge is valued in the context in which you are operating?”. Jester also puts forth a range of evidence that illustrates the bias inherent in this decision making about the curriculum, and within which “the experiences and work of those who are women and/or people of colour are typically underrepresented”.

The privileging of the male voice, both historically and to this day as perpetuated through the biases and biased mechanisms of academia explored thus far, has imbued and shaped curricula to the extent that many curricula present a narrow view of the world, constrained and kept restrained by the processes that continue to provide a platform to predominantly male perspectives, scholarship and research. However, due to the relative autonomy that

course and programme leaders have for the content of the curriculum within higher education institutions, there are pragmatic means of direct action that can be taken to address this, and to realise the curriculum not simply as a body of knowledge to be taught, but to enact the 'curriculum as praxis' (MacNeill, Johnston and Smyth 2020) directed at democratically and inclusively challenging and changing that within society that requires to be challenged and changed.

Male allyship

The cumulative effect of the phenomena and practices explored above, with respect to gender balance and representation in academic and related work in our universities, and in wider related fields of academic and scientific endeavour, is that women academics, researchers and educational professionals are disenfranchised, disadvantaged and disempowered in their engagements, visibility and opportunities in comparison to men within 'the academy'. As a consequence women are underrepresented in published bodies of knowledge, in

spaces and positions of influence, and in the curricula we support the education of our students through.

In asking what is to be done, the problems hitherto outlined reveal for themselves many of the potential answers. However, and as already briefly alluded to, there is a responsibility (and it is both a moral and ethical one) upon male colleagues within the higher education sector, and within our HE institutions, to support and champion gender equality and representation through their own actions and directed efforts.

Broido (2000: 3) defines allies as “members of dominant social groups (e.g., men, Whites, heterosexuals) who are working to end the system of oppression that gives them greater privilege and power based on their social-group membership”.

For men in positions of influence, leadership or seniority in academia and universities, there are specific acts of ‘male allyship’ that can support gender balance, and amplify the voices of women colleagues, in the areas of curriculum

design, authoring and presenting scholarship and research, and in leading learning and teaching work.

Distancing the privileged male through acts of allyship

Bilen-Green, Green, McGeorge, Anicha, Burnett, Prime and Moss-Racusin (2013: 4) discuss the nature of male allyship in relation to faculty development and institutional change, and to the development of male ally identities. In relation to the latter, they note a consensus in the literature around the importance of: potential allies first understanding unearned advantage and how it works in their own favour as well as how it impacts those who are systemically disadvantaged persons; the need for successful ally development approaches that educate and support members of the dominant group; and the need for male allies to practice ally behaviours and to hold themselves accountable through feedback from non-dominant group members.

Bilen-Green et al. (2013: 3) also explore the factors that can inhibit male allyship, including “fundamental fears [that] concern a loss of status, apprehension about mistakenly acting offensively, and inhibitions due to anxiety regarding other men’s disapproval”. A commitment to change, and commitment to critical reflection and action in relation to their own privileged position, is therefore key to male allyship. In this respect it may be observed and contended that in relation to supporting and championing gender representation and equality in academic institutions and practices, the overall challenge is to distance the (privileged) male from the machine.

In what follows, and drawing on personal experience, the practical ways in which ‘male allyship’ might be practiced in academia and academic work are considered.

Curriculum design and development

One of the most significant problems in relation to gender representation within the context of the curriculum, but perhaps one of the easiest to address, are gender biased

reading lists. In their analysis of over forty International Relations syllabi in one institution, Phull, Ciflikli and Meibauer (2019) found that over 79% of texts on reading lists were authored by men, which was in no way reflective of the representation of women in the professional discipline nor in the published body of work in the discipline.

Phull et al. also established that gender and seniority of the course convener were contributing factors, with readings authored by women assigned less frequently by male and/or more senior course conveners, and furthermore found evidence that gender bias was strongest in the early stages of curricula when students are being orientated to their field. This study is illustrative, and the phenomena of reading lists and the content of the curricula being heavily biased towards predominantly male scholars is a widely observed one, and a key focus of action for the aforementioned campaigns including 'Why is my curriculum white?'.

The implication for male allies involved in the design, development and approval of curricula are clear, which is to challenge their own potential bias, and identify and challenge that of colleagues, in ensuring that reading lists are inclusive and representative with respect to gender but also culture and ethnicity. This requires a criticality and awareness of source, and also extends to diversity in concepts, theories and ideas within the content of the curriculum, and a commitment to valuing and representing a range of voices in subject matter and material. There is a particular responsibility here for male programme leaders, who oversee and manage curricula, for male convenors of curriculum approval boards, and for male external examiners who scrutinise curricula and learning and teaching at other institutions.

There are pragmatic interventions to be considered too, including the extent to which curriculum approval and re-approval processes formally scrutinise gender and other forms of representation within reading lists and the wider

curriculum, and make appropriate representation a condition of programme approval or re-approval.

Scholarship and research

In the area of scholarship and research, then of the aforementioned answers that have already revealed themselves, there is clearly an undeniable need for senior male academics who have editorial leadership, or responsibility for journal editorial and review boards, to proactively ensure gender representation within membership. They also need to go beyond this in scrutinising and clarifying the ethos of their journals, and in implementing measures designed to address gender representation and bias.

For male allies engaged in research and publishing, there is a need to reflect critically on whom they are citing, and why, and to commit to citing the work of women. Similarly, for those male colleagues involved in supporting others to engage in scholarship and research, then encouraging women colleagues to self-cite their own work as well as

exploring and citing the work of other women in their field would seem obvious.

Male academics also need to reflect on who they are supporting to engage in scholarship and research, and how they are supporting them. Engaging in co-authorship with women colleagues, and supporting or mentoring early career women colleagues to engage in scholarly and research activity, are positive acts of male allyship which, if more male colleagues mindfully chose to engage in them, would certainly have both a cumulative and a cascading effect over time.

In this context, recognising the importance of ‘paying forward’ privilege to women who are new or ‘early career’ authors is essential, and to this end male allies would do well to consider when ‘first author’ attribution for collaboratively authored work can and should be attributed to women co-authors. Male academics who have already had the privilege of being published, but who are authoring with a women colleague who is publishing for the first time,

may want to reflect on both professional courtesy and their commitment to supporting their woman co-authors, and ask themselves who would most benefit from being named as lead author? A similar point can of course be made in relation to supporting any colleagues who are early career scholars or researchers, but in the context of addressing gender balance and amplifying women voices in 'the academy', acts of allyship with respect to author attribution are important.

'Paying forward' privilege in supporting gender balance can also be manifested in other important ways, for example through male allies seeking to ensure gender representation in the conferences and events that they are organising or co-organising, including ensuring women voices are heard in invited and keynote speaker slots, and avoiding the phenomena of all male panels. Co-presenting or co-facilitating with women colleagues who are new to presenting, but aspiring to do so, may be a positive intervention for experienced male allies, and even more so would be 'silently supporting' women colleagues to present

by offering guidance and advice in the background. Male allies who have already had the privilege of being invited to speak at conferences and events may also want to seriously consider when to suggest a more experienced or more talented women colleague who they know would be a better or more appropriate presenter for that next speaking invitation that they receive.

The work that male allies can do to support women colleagues in their scholarship and research should not just be limited to those women colleagues in academic roles, and should include women colleagues in professional services and leadership roles who may be seeking to engage in scholarly writing and presenting in the context of sharing their own knowledge, views, experiences and professional practices.

Shared or distributed leadership

Experienced male allies who are in leadership roles in universities may also want to reflect critically on the underrepresentation of women colleagues who hold

leadership roles and responsibilities, and determine what they can personally do both to address this and to create leadership opportunities for women colleagues.

For male allies in leadership roles, this may mean confronting the concern which Bilén-Green et al. (2013) highlight in relation to their own perceived role or status, and asking themselves some challenging but necessary questions. Based on the experiences of the author of this chapter, these questions must include:

- Do I need to lead the next iteration of that project I successfully led last time?
- Am I the best person in my team/area/department to lead that new initiative?
- Is there any part of my role I know a specific woman colleague could do better?
- Am I contributing to or supporting a working culture within which women colleagues get supported to initiate and lead on their own ideas?

In the context of these questions, and supporting gender balance and representation, the practice of shared or 'distributed leadership' becomes important. In broad terms, distributed leadership is the dispersion of leadership activities and responsibilities more democratically across teams, contexts and organisations, rather than within formal leadership positions (Jones and Harvey 2017; Jones, Lefoe, Harvey and Ryland 2012). Distributed leadership practices need to be approached critically, lest they create an unfair distribution of work or result in colleagues assuming more responsibility without recognition or opportunities for progression (Lumby, 2013). However Jones et al. (Jones and Harvey 2017; Jones, Lefoe, Harvey and Ryland 2012) observe how distributed leadership approaches in universities can provide more equitable opportunities and working arrangements that allow colleagues to apply and further develop their own knowledge and experience, bring a diversity of views to the fore, and support innovation and enhancement within the work that universities do.

In their research exploring strategies that male allies can use to advance women in the workplace, Madsen, Townsend and Scribner (2020) identified 'leadership development' opportunities, including male colleagues creating, providing or sharing leadership projects and initiatives with women colleagues, as particularly impactful and beneficial to supporting the development and progression of women colleagues in leadership and leadership roles. This was allied to mentoring, and chimes with work in the area of mentoring within HE contexts which evidences that informal mentoring can help structure career progression, allow early career and established education professionals to develop confidence and work to their full talents, and that this has an additive impact on the work of teams (Lunsford, Crisp, Dolan and Wuetherick 2017).

Distributed leadership and mentoring, as a means to ensure greater gender balance in leadership roles in universities, arguably requires a commitment to 'succession planning' if it is to be effective and sustainable, and in reflecting on the questions above requires identifying and supporting those

women (particularly early career women colleagues) who are the ideal colleagues to lead and provide leadership.

The overall implication of this, for male colleagues working in positions of influence and responsibility in educational institutions, is that a key act of allyship is to commit to sharing their own influence and responsibility with women colleagues to democratise and distribute educational leadership and decision-making.

Arguably this applies particularly to advancing and amplifying the work and voices of women in professional roles within universities, who are often the majority of staff in professional development and enhancement departments, and who support and drive learning and teaching enhancement activities in effectively 'leading without authority'. Greater support for, recognition of, and career progression opportunities for women in these kinds of professional development areas and roles is critically important, and male leaders supporting and campaigning with women colleagues for this is essential.

Conclusion

The privileging of the male voice in academia and academic work is historically and systemically embedded in universities and wider spheres of academic practice and research. From the peer review, funding and publishing of scholarship and research, through biased citation and authoring practices and into the design of curricula, the work and voices of women in ‘the academy’ are underrepresented, and through a combination of the aforementioned and other factors, women in academic, research and also professional roles are disadvantaged and disenfranchised.

Male allyship does not provide a solution to the systemic biases that disadvantage women in universities and higher education. However it can provide an important contribution and there are specific acts of male allyship that can help address gender inequalities and support greater gender balance and representation in academic work and practices. Male colleagues who are seeking to support gender balance and representation in academia and higher

education institutions have to pro-actively commit to acts of male allyship, of the kind explored in this chapter. In doing so they must recognise when they themselves and other male colleagues are being complicit in sustaining or reinforcing gender imbalance, and be prepared to challenge both the status quo and indeed their own status, leadership and responsibilities.

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To the extent that it was possible to determine, all of the publications cited in this chapter were either authored or first authored by women.

Author bio

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Keith's research interests relate to co-creative pedagogies and curriculum models, digital and open education, educational strategy, and academic development. There is strong focus on inclusion and widening participation embedded in much of this work. Keith has also been involved in a number of equality and diversity initiatives and organisations, including a period as Vice-Chair of the charity LEAD (Linking Education and Disability) Scotland. Keith blogs at <https://3eeducation.org/> and is on Twitter @smythkrs.

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Larissa Kennedy: we're not settling. Because in many ways...we don't have much to lose

Ash Morgan
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Abstract

The chapter outlines an interview between Ash Morgan and Larissa Kennedy, current National Union of Students (NUS) UK president. The interview focused on women of colour and working class women, who were at the roots of International Women's Day, as well as unions and how both are of benefit to all women.

Keywords: Unions, Larissa Kennedy, NUS, BAME

The interview

For the purposes of this chapter I have shortened the names of the interviewer Ash Morgan to AM, and the interviewee Larissa Kennedy to LK.

AM: The National Union of Students (NUS) is quite an old organisation, not ancient by any means, but 100 years old next year. So many old organisations fall in to that ‘male, stale and pale’ trap. How and why do you think NUS has avoided that?

LK: It’s interesting because NUS is and always has been trying to move at a faster pace than the rest of the population or the world, or the student movement, globally in that sense, has always tried to be moving at a faster pace and so I feel like it was almost inevitable that we would redress that faster than a lot of other institutions because when you’re in a space that’s feet are being held to the fire by the student movement it’s constantly asking for more its constantly demanding ‘why haven’t you been able to get X

community to feel like they can lead here? Why haven't you been able to ensure that that community has a voice here?'

So I think it's the fact that the movement hold NUS' feet to the fire which means that it's constantly going to be ahead of where other institutions are and I think to be honest that's not singular for NUS, it's why student's unions move at the pace they do as well, it's why other NUS equivalents, our sister unions around the world move at the pace they do. is because of the nature of a democratised institution.

AM: I agree that the student movement not only in the UK but around the world moves at that pace but it's just it's still a political organisation and it's jarring to see it against other political groups, if you know what I mean?

LK: Yeah, yeah yeah yeah.

AM: It's head and shoulders above and that's so nice to see. So, how do you think that is of benefit to the students who are members of NUS?

LK: I think it's interesting that you used the word before 'revolutionising NUS' and I think that genuinely is what Black women have done for this organisation but not just in like the very visible leadership roles but also prior to being part of NUS in this way Black women have always been at the helm of the student movement. The way that Black women have consistently been at the helm of the student movement, been pushing for more radical, more progressive, more transformative work has a huge impact on the student movement because we're not just seeing things through one lens we're not allowing the cyclical nature of students always pushing for more than these institutions can give us to quell or dissuade us. It becomes part of what pushes us and I think Black women are always bringing that kind of radical element to the student movement. We're always asking 'okay, but is there more?' We're not settling. Because in many ways when compared to the rest of our peers we don't have much to lose. Our communities have already lost so much and people are so struggling that we aren't looking for the kind of piecemeal things that are going to appease people for this year

because we see our work within the student movement as part of a much broader anti-racist, feminist movement and I think that kind of visionary element is part of it but also but those very direct links to elements outside of our space is also a part of what makes it special and feeds into and pulls into the student movement. So yeah, I think on multiple levels it's a win but I would say that.

AM: Well, I think it is as well. And there are people out there who would say we have moved past the need for these days, like International Woman's Day, they say 'you've gained so much, so why do you still need these days?', what do you think about that?

LK: Do you know what? I think it's so exhausting that we still have to have this conversation. Because a lot of my time is spent looking at liberation of education, what would it mean to re-envision education in a way that it was actually safe and healthy and centred care for the most marginalised communities? And when I think about women in education in particular in the grand scheme of history

women haven't even been part of education spaces. And of course that plays out in a number of ways, we see the disproportionate impact of sexual violence on our campuses and that kind of rages on, you know, for me that particularly hits home with my prior work at Warwick with the group chat scandal. That was a core part of my organising before coming to NUS and I spent about a year and a half of my life dedicated to that particular case and that really has shaped who I am as an organiser, and who I am at NUS as well because doing that work on sexual violence in such a deep but also drawn out way because of what happened is just a complete rejection of even that question because how can you have a situation when women are being described in such demeaning, dehumanising and be like 'oh, well everything's fine, there's no reason to be centring women or having an International Woman's Day'

More broadly than that a lot of the other work I do is liaising with sister unions around the world and of course the fight for gender justice is a global one and the situation of women

around the world in every space, in all spaces, is something that we have to fight for, sometimes when I speak to folks who are the first women president in their country in their respective NUS, I take great inspiration from that but it's also a kind of a harsh reminder of where we are.

There's so many levels to which women's liberation is nowhere near finished. And I think people look at their own interpersonal relationships with women and where those women have got to and make a very surface level judgement about whether or not International Women's Day is needed but the women's liberation movement was never about individuals it was about structural power and how that relates to things on a much broader scale and if we look back at that scale there is still a lot of injustice and we're just not going to see women's liberation within the system that we live in and so when we're fighting for a different system, when we're re-envisioning education, when we're re envisioning our society and the broader world and the broader world that's the route for women's liberation we're talking about.

The point being there's this very reductive understanding of what gender justice looks like that it's never going to win for all women because we still have systems in place where the most marginalised women continue to be exploited for profit, where the most marginalised women continue to be at most risk of destruction when it comes to climate, when it comes to other forms of exploitation all the time, everyday, women are facing exploitation, they're facing injustice, they're facing violence, so for us to sit here and be like "Do we need International Women's Day?", even to ask the question is coming from a huge place of not only privilege but structural power.

AM: What you said reminds me of that whole Margaret Thatcher thing: I got here therefore, other women can get here and they don't need help anymore.

LK: It's so reductive, and the centre of self, the centre of ego, the centre of individualism is one of the biggest traps of neoliberalism because it feigns the idea, even me sitting in this role does not mean that this role is safe or healthy or

conducive to Black women, that's not what that says. It just says people clawed and fought for me to be able to be here and for Zamzam before me and for Shakira before her to be able to be here, but what about a Black trans women; if a Black trans women came to step into this role would this be safe, would it be healthy? How would the student movement receive her? There's so many levels to it. What about a Black disabled woman? Would she have the same access that I do? And if she doesn't that's a problem.

I think that, yes, there's levels, and yes, I'm a Black women but that doesn't mean there hasn't been a lot of things that have enabled my existence within this space; the school that I went to and the way that I talk makes me quite amenable to people, I know how to play conversations and assimilate myself to whiteness when I need to in order to access certain spaces why should I have to do that, why should I have to be doing mental gymnastics all the time to invisibilise my Blackness and my Black womanhood within a space and if there were a Black women who refused to do that would she also be received within the space, would

she also be listened to? I think people see very surface level experiences and they then attach power to that when in fact often it's just a falsified subversion of power momentarily that they're seeing.

AM: So you talked about your education a bit and my next question is actually about your education. So we both went to Girl's Day School Trust Schools, you went to Croydon High School, right?

LK: Yeah!

AM: What is your opinion on that whole atmosphere and how has it shaped you as a women and what is your opinion on single sex primary and secondary education?

LK: So when I mentioned my schooling, and having learnt to assimilate to whiteness and having learnt to speak in a certain way in order to be listened to, I learnt all of that at my school. And it was literally a rearing in how to perform whiteness, how to perform middle-classness, because I'm

from ends. I'm from Thornton Heath which is where Stormzy's from, from where Krept & Konan's from and I got a scholarship to this random school and my parents were like 'okay' and...what can I say about it? The learning of those processes was violent. I don't really talk about it a lot because it was violent.

AM: we don't have to talk about it if you don't want!

LK: Oh no, it's fine, but it's now kind of serving my ability to say certain things in a certain way to get people to listen. No, not that I don't talk about it because I don't want to, it's just that I...

AM: No but you said it was violent; I don't want to press you into talking about it if...

LK: No, I'm all good, I'm all good. But yeah, I think it's interesting that the Girl's Day School Trust and how they have a very particular image around girls empowerment but of course that access comes at a price. And so that's why I'm so passionate about talking about free education. Of

course when I say that rhetoric I'm usually talking about it in reference higher education and that very direct marketisation but also when we think beyond that and about that marketisation of certain skills, certain access to certain information.

We live in a world where some of the most crucial access points to shaping policy, thinking about not only politics itself and the civil service, but journalism and lots of those other things that are shaping the dominant narrative of the world that we live in or the society that we live in, are overwhelmingly represented by private school students. And the impact that that has on our communities and marginalised communities in general, so that's why I'm passionate about free education because it shouldn't be that if you can afford it, you can get access to all of these things and all of these spaces and the knowledge about how to conduct yourself. Why should we have to be doing that? Why should we have to be learning how to assimilate and paying for the luxury of it, for the most part?

It's just it is so messed up to me that, for example me, within my community, I had untold opportunities, which landed me where I am today, versus other people that I went to primary school with, say. Who have not had the same opportunities and have not had the same access. And I guess when I'm fighting for free education, the reason I'm so passionate is those are the people I am fighting for.

AM: So who will you be celebrating this International Women's Day?

LK: I think one of my core points, you know when people say about their compass? I think my compass throughout this has really been Angela Davis. If you ask any one of the team at NUS what my slogan is, what I repeat day after day, is 'radical simply means grasping things at the root', if someone comes to me with a proposal I say 'okay, but is it grasping at the root? Is it empowering people to actually ask 'What is at the core of that problem?' and if not we're not doing it', so that is literally what has driven me throughout this whole time, like the A levels fiasco, and the

classist, racist moderation system, we were also talking about the fact that that fiasco was just automating a system that was always happening, year on year. When we were talking about the exploitation of students in the pandemic and financial hardship, with people having to access foodbanks to survive, when we're talking about securitisation and Black students still being stopped on campuses, in a global pandemic, being put at risk in that way, we're talking about anti-Black police brutality, we're talking about all of it so I keep saying 'okay, but are we grasping at the root? Are we directly using our platform to provide a political education that actually tackles what is at the core of this issue? And if not, we're not doing it and we're not saying it' and the only way that I've been able to do that is through the words of Angela Davis and I come back to them like almost every day, so I'm definitely celebrating Angela Davis.

On a personal note I'm celebrating my Nan, not many people know that I'm a carer for my Nan, so that's what I do, literally most hours that I'm not doing NUS stuff and

she's had her first COVID-19 jab and I'm very, very happy about that so I'm celebrating her and her 90 years of life and also the fact that if it wasn't for her and her bravery in coming to the UK, not much older than I was, and carving out a new life, I wouldn't have been able to do any of the things that I'm doing.

You asked who am I celebrating, there are so many women in this movement who have touched my life and have poured into my activism and my understanding of the world, just so, so many and especially shout out to Zamzam though.

Zamzam has really, and I don't think she knows this but she's really shaped my understanding of climate justice and race in a way that is just so digestible, but also still so radical but yeah, big shout out to Zamzam and obviously the legacy that she left at NUS has made it so much easier for me to step into everything I'm doing and the way that I'm doing it.

And yeah honestly the list could go on forever. The gist of it is that this movement is full of women and Black women

specifically that have grown me, like grown me, and I just am honestly grateful for that.

AM: you said about your Nan, how do you think celebrating the women within our personal circles helps the growth of us as people as well?

LK: I think sometimes around this kind of thing of ‘who are you looking up to, who are you celebrating?’ there is the tendency to go for the Angela Davis’ of the world but I think A) that’s important but B) let’s be careful that it doesn’t promote the hyper celebration of the idol, because I think that is so rooted in the idea of celebrity and the idea of this really problematic positioning of activist influences and how do we move away from understanding feminism or understanding radicalism, or whatever as this individual that is so far away and actually positing that within community and within the local picture and actually making that something tangible people can actually access and feel able to relate to. And I think that’s exciting because organising is all about community, it’s all about people

locally recognising their power to transform society through collectivism. And when you're looking more locally I think you're embodying that because you're positing the opportunity to change something or transform something or inspire someone who often has a lot of money and resource I think both are important but I think it's important to do the local recognition.

AM: I have one more question and then we can chat about anything else you want to mention. So I have been given 30 minutes to open up the day and I was going to talk about this interview but they'll read all about it in the e book anyway, so I have decided to talk about a topic close to my heart, because I am trans, and that's making sure we include trans and gender non-conforming women in our International Women's Day celebrations. Especially gender non-conforming women, I think a lot of people say, 'oh they don't need this day because they're not the hyper feminine type of people who are impacted by this political movement. What do you think about that?

LK: I think, again, this is something that is so exhausting because it's a complete misinterpretation of this day and I remember back when I was organising with Warwick Anti Sexism Society, which is where I got my little feminist roots, I remember talking about the origins of International Women's Day, which was originally International Working Women's Day, and really was about a kind of radical approach to internationalism and broadening the idea of womanhood and really being transformative in that and now it's become this very sanitised, monetised, commodified. It's very much about the cis, white woman, talking about being a 'Boss Babe' and just how did we get here? How did we get here? And you see it all the time, capitalism pulls the teeth from radical movements, it moves the people who built the movement from the centre to the margins, and then reproduces it and repackages it as something that they find more digestible, that they find more profitable and it's exhausting.

But I want any woman, any person who identifies with womanhood in anyway, who feels that they're being

excluded from this day to remember that this day belonged to them long before it belonged to the cis-het white woman.

It's the same thing that has happened with the 4C hair movement, it happens all the time, the people that built the movement, the people that are fighting for radical change get literally picked up, moved out, pack your bags, off you go, thanks for that!

This movement belongs to anyone who identifies with womanhood in anyway, big or small. Do International Women's Day in a way that is authentic to you. It doesn't have to be this performative 'tag 10 women', just do it in a way that serves you, and don't feel any pressure to do it otherwise.

AM: And just before I let you get on what do you want to say on this International Women's Day (2021)?

LK: I guess I want to say people have gone to a lot of effort to make gender equality, make International Women's Day, make all of these things very reductive, very individualist,

very commercial, and I think the student movement has always reinserted the teeth of movements and reminded people why we are doing what we're doing, reminding people of the vision we have for the world and the path that we need to take to get there. Reminding people that collectivism is the only way that we win.

So I think this International Women's Day, please first of all, remember that rest is an act of political warfare, so do that, but once you've done that, keep building those local communities, keep building up the women and femmes around you who don't think that they can make change, who don't believe in their power and remind them that as part of a collective they really, really, really can transform, in our case, the education system, but more broadly also the world. And never let yourself, nor the women and femmes around you that power.

And hold that power, we're so often told we should invisibilise ourselves, and particularly as Black women we're navigating this line between hyper visibility, invisibility

and erasure and that is a difficult thing to reconcile, but it's only through each other and our relationships with each other and building our collective power that we can do away with that and all the other ways that people try to erase our power.

At the heart of it it's about collectivism, it's about feminism as a really, really beautiful root to collectivism that centres care, that centres healing and yeah, big up yourselves to everyone, that's the Jamaican in me jumping out.

I also think it's a really interesting time that at the helm of NUS the folks nationally representing, because obviously you've got our nations officers but the national officer team for the first time is all women and femmes of colour. For the first ever time. And it is such a beautiful team to work in. We have fortnightly meetings with just the four of us and sometimes we'll get to that space and be like 'guys, you'll never believe the misogynoir, the nonsense' and I guess my other message is to have that space, have the space

where you can just be like ‘what is this Earth?! Who put us here and why, because we are suffering’.

I think it’s really beautiful to have that space and to build networks of support you know are going to catch you because it really is an honour to work alongside their friendship and their kindness, as well as their very intentional and powerful work.

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Author bio

Ash Morgan is a former art student turned political activist, who works for the University of the Highlands and Islands Students’ Association (HISA). HISA have a special passion for all things equity and diversity and love seeing all people included in all areas of life.

Section 2. Personal experiences and professional outlooks

The impact of feminist art practice and theory on pedagogical practices from a personal and institutional perspective

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Abstract

In this chapter I examine the impact of feminism on my teaching practice as an artist and lecturer in art schools and universities in the UK. I begin by looking at feminism in relation to my early career in the 1980s, with specific reference to the influence of the women's art movement, and feminist art theory and practice. I identify some of the challenging experiences I faced in academia as a feminist artist, followed by a closer examination of the positive experience in the 2010s when I introduced a new subject,

social art practice, into the art and design curriculum at the University of the Highlands and Islands (UHI). I consider the UHI MA Art and Social Practice programme, which commenced in 2017, from a feminist perspective, including challenges within the institutional context, and achievements, benefits and changes that have emerged in relation to the educational contexts I discuss.

Keywords: Art and social practice, socially engaged art, feminist pedagogy, feminist art, women's art Movement, feminism, higher education

Background

I am a visual artist, born and raised in the United States. Since the 1980s I have been working in UK art schools and universities in London, the West Midlands and Scotland. I currently live and work in Shetland which I first visited in 1985. In January 2001, I abandoned a career in full-time academia to move to Shetland permanently and return to the precarious life of a self-employed artist who engages in

part-time teaching. This move to a community where audiences, both inside and outside the institution, were largely unfamiliar with contemporary art practices proved no mean feat for a non-commercial artist researcher.

I began teaching at Shetland College UHI in January 2001 on the programme that has evolved to become the BA Hons Degree Contemporary Textiles. Shetland College UHI is one of the thirteen partner colleges that together form UHI and offers students a selection of courses from national certificates to postgraduate degrees. UHI has proved a good fit for me. Its emphasis on student centered and virtual and online learning have provided sufficient elbow room for my professional values to develop, enabling me to embed inclusive, collaborative, relational and cross-disciplinary approaches to my teaching and learning.

I am fully aware that I write from a position of privilege, of white privilege and as a highly educated person. I recognise that despite feeling powerless at times, I am empowered, albeit in varying degrees and in particular contexts.

Nonetheless I experience prejudice within the patriarchy of the universities. I see and recognise how systemic race, gender and class prejudice riddle our society, including our educational institutions. I write here with humility, for I aspire to effect change, but I am aware of the small part my work ultimately plays.



Figure 5.1: Recount. Roxane Permar installing part of the work at the former Royal Observer Corps (ROC) Post in Walls, Shetland. R Permar and S Timmins, a Luminare Commission (2013) (Photo credit: Cold War Projects)

Becoming a feminist artist

“What do you hear when you hear the word *feminism*? It is a word that fills me with hope, with energy. It brings to mind loud acts of refusal and rebellion as well as the quiet ways we might have of not holding on to things that diminish us. It brings to mind women who have stood up, spoken back, risked lives, homes, relationships in the struggle for more bearable worlds Feminism: how we pick each other up” (Ahmed 2017: 1)

My feminist journey began during the latter stages of the so-called “second wave” of feminism.¹ During the 1980s the art world was characterised by new fields of enquiry in feminist art history, criticism and art practice, all of which impacted significantly on the field of art education. Research and writing unearthed the “hidden history” of

¹ The second wave of feminism, the first being the Suffragette Movement, was initially concentrated in the United States of America and then spread to other Western countries. It focused on issues of equality and discrimination, including rape, reproductive rights, domestic violence and childcare. The idea that ‘the personal is political’ underpinned these issues and was important for women artists during this period who addressed subject matter such as rape, domesticity and motherhood.

women in art, questioned the representation of women in visual media and analysed power relations in the art world.² As feminist artists we strived to gain equality not just for women artists but more widely for those who were not represented in the Eurocentric view of the world. Artists, and not just women artists, began to integrate practice and theory. We realised the importance of theory to gain better understanding of our practice, learn how to work better, and strive for equality. In art education “The feminisms that entered the art school aimed to undo everything: the curriculum, the power relations, the language that was used in relation to art, and the art itself.” (Robinson 2021: 2)

My feminist pedagogical journey began in January 1980 when I unexpectedly began team teaching with another woman artist, Elizabeth Strath, in a life drawing evening

² Some of the publications which were seminal to my journey as a young feminist artist in the 1980s included *Old Mistresses: Women, Art and Ideology* (Pollock and Parker 1981), *From the Center: Essays in Feminist Art Criticism* (Lippard 1976), *Feminist Aesthetics* (Ecker 1985), *The Subversive Stitch and the Making of the Feminine* (Parker 1984), and *Looking on: Images of Femininity in the Visual Arts and Media* (Betterton 1987).

class at St Martin's School of Art in London. I was thrilled to be working in the art college, but with hindsight I can see that I was naive about the dynamics of the institution and unaware of the huge transformation I would undergo.

In the early 1980s there was a growing surge in demand among women art students for women lecturers. I found myself surrounded by women artists and art students who were all interrogating women's position in the art world, demanding more opportunities, greater visibility and increased recognition. I acquired work, albeit precariously, on Fine Art degree courses throughout the country in the form of temporary, part-time hours and visiting lecturing. Often these opportunities were initiated by the women students, and on one occasion even paid for by them through their student union.

Many feminist art events, including a major series at the Institute of Contemporary Art (ICA), London, in 1980, were hugely influential to my developing feminist outlook, particularly the conference *Questions on Women's Art*.

Conferences were important occasions, providing a place to learn, find strength and feel a sense of belonging and connectedness. A series of conferences moved across different art colleges, organised largely by women students and women lecturers. We formed women artist groups around the country, and I joined the group Women's Work, one of the sub-groups in the Brixton Artists Collective, where we organised exhibitions, events, workshops and conferences.³

³ The Brixton Artists Collective was a group of artists based in Brixton, London, who ran the Brixton Art Gallery from 1983 to 1990. By 1986, it had nearly 200 members and had exhibited work of 1000 artists. There were open member shows as well as themed exhibitions. The Women's Work group was allocated two exhibitions a year after its first in 1983, and in 1984 we decided to allocate one of these shows annually to the black women artists in the group. In 1986 we published a small book about our first two years of existence, *Two Years in the Life of a Women Artists Group* (1986) [<https://brixton50.co.uk/womens-work-book/>]

Gender equality and representation within and beyond
the University of the Highlands and Islands



Figure 5.2: Our Territory, Women's Work III. Brixton Art Gallery. General installation view (1984) (Photo credit: Roxane Permar)

Feminist perspectives influenced my teaching in a variety of ways, including my approach to content and the theoretical framework I presented to students. Much of what we did at that time has subsequently been adopted more widely in universities. In my teaching style I tried to actively engage students, even in my lecture courses. I introduced teaching materials which challenged traditional curriculum content in order to encourage diversity of art practice and positive role models for all students. I attempted teaching and learning approaches which fostered non-hierarchical,

open and inclusive learning environments. I treated students with respect, as equals, and I aspired to empower students, enabling each one to fulfil their potential by encouraging self-reflection and critical thinking. I also tried to help students understand their position in relation to the social and organisational dynamics they encountered, specifically in the art world. A colleague once remarked that students were “unteachable” after working with me. I took that as a compliment.

This first opportunity to design and test new approaches to teaching arose in 1984-85 when I was invited to create a new short course targeted at art and design professionals at St Martin’s School of Art in London (Central St Martin’s College of Art and Design). The course, *The Nude and Sexual Politics*, was very successful and ran for three years in 1985, 1986 and 1987. I used feminist theories of art and representation as the framework for a series of investigations, I developed an approach that combined practice and theory in order to break down barriers between

artists and models as a means to interrogate traditional modes of representation.⁴

Being a feminist artist in academia

“To live a feminist life is to make everything into something that is questionable. The question of how to live a feminist life is alive as a question as well as being a life question.” (Ahmed 2017: 2)

I quickly realised that a great deal needed changing in higher education and that an hourly paid lecturer with no ‘position’ could have any influence over change. I thus began to seek a permanent post in the belief that I could make a difference. I secured a fixed-term post for two days a week, for two years, which stretched to three in the late

⁴ The title *Nude and Sexual Politics* referenced Kate Millet’s analysis of patriarchal power in *Sexual Politics* (1970). Feminist theories of art and representation drew on such feminist analysis and applied it to the visual arts, critically examining both visual representations of women, art produced by women and the position of women in the art world. The female nude came under particular scrutiny, as it was so predominant in Western culture and indeed a symbol of it. In her feminist critique of the female nude, Lynda Nead cited the feminist approach to life drawing undertaken in this short course, *The Nude and Sexual Politics* (1992).

1980s and early 1990s. For the next ten years, from 1992, I had two permanent posts, one fractional and one full time.

While feminism may have driven me to seek a position of influence, it didn't necessarily help me to function well within established institutions where patriarchy reigns, power hierarchies are firmly entrenched and unconscious bias is usually the norm. I have experienced resistance in all of the universities where I've worked, from subtle, nuanced prejudice to overt antagonism, which I would describe as harassment and bullying. I am not alone in this experience. Many of my women colleagues in academia have also experienced similar resistance. I must hasten to add, that I have also received significant support, too, from colleagues in these institutions. And I have always relied on my network of women artists for mutual support, as I have experienced one challenge after another in academia.

Attempts to diversify curriculum content and bring in examples of practice by women and ethnic minorities were in some cases vociferously decried. Some (male)

colleagues seemed unable to accept the presence of women teaching, to respect or acknowledge our expertise, experience and authority. Others have simply seemed bemused by the fact that we are women, and, I suspect, simply don't take us seriously. One of my (male) referees from an art college in the late 1980s told me he had written in a reference that, even though I was a woman, "I could teach men". And, indeed, at interview I was interrogated about this point. Another of my male colleagues told me I was different from other feminists with whom he had worked because I was "pragmatic".

That pragmatism combined with an 'angry' feminist drive is perhaps what has motivated me to keep going within academia. Fortunately, I have witnessed change albeit more slowly than I'd like. My feminist approach became evident in many ways in the Sculpture Area in Birmingham where I held my first permanent post. Generally the Sculpture Departments in art schools were heavily male dominated. When I arrived to Birmingham in January 1992, about 15% of the sculpture students were women, whereas

there were just over 50% women students in art schools studying Fine Art. By the time I left in 1998, women students formed the significant majority in our Sculpture Area.

Sculpture Departments were equipped with conventional workshops for wood and metal rather than materials that might be considered more “womanly”. I suggested we buy a sewing machine, iron, and ironing board, which happily wasn’t resisted. Perhaps more controversially, after I was put in charge of the area, I introduced training for all students whether male or female, in the use of power tools and construction technologies for wood and metal. The latter caused dissent among some colleagues, but my argument that all students needed to learn how to use all the available tools and equipment won over in the end. I reasoned that we had to fight the presumption that women students didn’t weld because of a ‘natural’ disinclination rather than because no one had ever taught them, or demonstrated belief in their ability to be able to weld.

The materials that sculpture students began to use became much more diverse, including soft materials in addition to welded metal and constructed wood, reflecting growing confidence among the women students as well as the impact women artists had on the discipline. For example, we invited women artists who worked in unconventional ways, such as Cornelia Parker, Tracy Emin and Emma Rushton as guest speakers. The use of ephemeral materials such as dust, textiles and sound became increasingly common, which at the time was a rather brave step.

In 1997 I wrote an article for *Make* magazine about the role and position of women in art education which was republished in 2015 in a collection of articles from the magazine. I praised women artists' positive influence in fueling creative change in the worlds of both art and art education. I asserted that women, by this time, were responsible for introducing new subject matter and making space for plurality of practices in art schools (Permar 2015).

This early experience has widened my thinking and opened doors to work with students who explored not only feminist driven subject matter but also issues related to race and class. By the late 1990s, I could see definite changes for women in the art world. Women had greater visibility as professional artists with concrete signs of increased opportunities and recognition.⁵ More women were teaching in art schools, and some were creeping into senior positions.

Being a feminist artist in UHI

“I think of feminist action as like ripples in water, a small wave, possibly created by agitation from weather; here, there, each movement making another possible, another ripple, outward, reaching” (Ahmed 2017: 3)

I continued to apply my feminist principles as I gained increasing knowledge and skills about pedagogy and institutional dynamics and moved through different

⁵ For example, between 1990 and 1999 two women, Rachel Whiteread (1993) and Gillian Wearing (1997) won the prestigious Turner Prize. Whiteread was in fact only the first woman to win the prize. In 1997 the shortlist was all women (Tate 2017).

positions within academia, eventually arriving at UHI in January 2001. Once again I became an hourly paid lecturer for three days a week, seven weeks a year on the programme which eventually became the BA Hons Degree in Contemporary Textiles at Shetland College UHI. This choice enabled me to relocate to a community I had first visited in 1985 and with which I had become increasingly involved through regular visits and two collaborative art projects, The Nuclear Roadshow with Susan Timmins (1990) and The Croft Cosy Project with Wilma Johnson (1992-95).



Figure 5.3: The Nuclear Roadshow. Roxane Permar and Susan Timmins. Installation at Eshaness, one of 6 sites. Shetland. A Projects UK Live Art Commission (1990) (Photo credit: Roxane Permar)

The move was important because it forced me to redefine and redevelop my professional practice as well as the role research played in my teaching. The move is important because it forced me to redefine and redevelop my art practice as well as my teaching. This move was not regressive, for rather than merely retracing steps in my early career as an hourly paid lecturer, I met new challenges that have required me to develop new and different approaches to teaching and learning. It has included adapting to new situations, such as teaching on a design course and teaching for the first time exclusively with women students and colleagues.

The development of the MA programme, Art and Social Practice, is the most significant outcome in this process of change, and it forms my institutional point of reference for the remainder of this chapter. Social art practice, for the benefit of non-specialist readers, is one which is considered to be 'situated,' a form of creative practice embedded in a location that impacts on the work and gives it meaning. This form of practice involves working with people, is process-

based rather than product orientated, and invites people to take part in engagement through collaboration or participation. Socially engaged practice is described by a variety of terms, including socially engaged art, social art practice, embedded practice or situated practice.

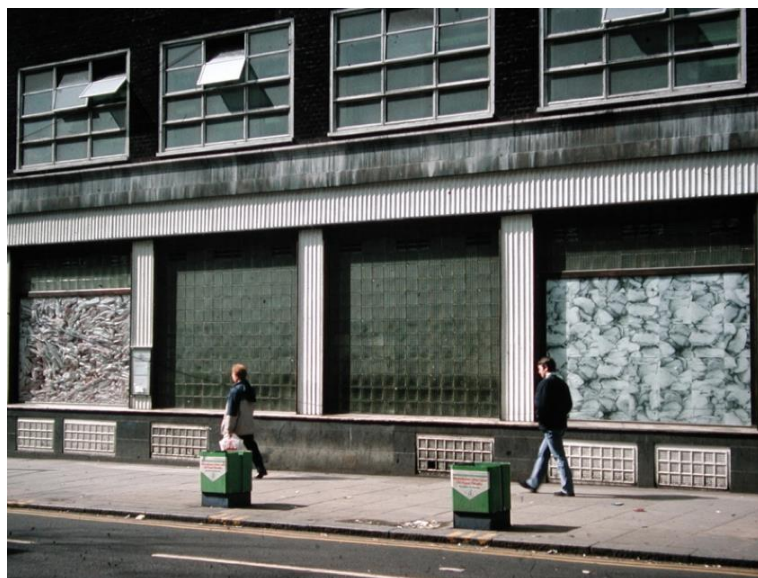


Figure 5.4: Installation for The Windows. Roxane Permar. Central St Martin's School of Art, and Design, Charing Cross Road, London (1990) (Photo credit: Roxane Permar)

The programme has grown out of two modules, one each for undergraduates and postgraduates, originally created during an Artworks Scotland Pilot Research Project, funded

by Creative Scotland, in 2013-14. Findings from the research project revealed that it is possible to teach socially engaged art practice using virtual tools and that synchronous technologies were shown to provide students with the most effective virtual learning experiences. Students told us that we should create an MA programme in this field of practice, which, came into fruition in 2017 with validation of the MA Art and Social Practice.

The programme commenced in September 2017. Currently we are in our fourth year and the programme has grown exponentially. It has attracted an overwhelming majority of women students, and currently there are only two male students out of 43 students in total. This majority may be due to the fact that based on statistics from 2016/17, women form approximately 65% of art students in UK higher education (Robinson 2021: 4). Or perhaps this field of art practice is particularly gendered, as it involves working with people, a form of work conventionally attributed to women's work. The programme team comprises four lecturers, all women.

Feminist principles and values underpin the programme, although when I initially proposed the course, and as we developed it, I did not intentionally set out a feminist agenda. The programme ethos is wholly in step with the feminist approach embedded in my pedagogical practice. Thus the teaching and learning environment is student-centred, non-hierarchical, open and inclusive. These qualities help generate a sense of shared ownership and responsibility for teaching and learning among all of us, lecturers and students alike. Networking, and collaborative and relational teaching are also fundamental to learning and teaching throughout the programme.

Curriculum design for the programme embodies lessons learnt from feminism, too. Plurality of practice underpins content. The need to question, and to test, is important, and feedback from students helps improve the course. In the spirit of plurality and interdisciplinarity, social anthropology, specifically a module about communities of practice, provides students' core theoretical foundation, rather than visual art theory. New subject content is embedded into the

curriculum that is unusual for conventional art and design education, but which is indebted to feminist pedagogy, including reflective practice, ethical engagement and decolonisation. Additionally we foreground island and rural practice, bringing firsthand experience of living and working in small and/or geographically remote communities to a field that has until recently been dominated by urban practice.

The MA Art and Social Practice is the first postgraduate programme in its field designed to be delivered entirely virtually, with students working from anywhere in the world, joining seminars and study groups through video conferencing spaces, and accessing learning resources in online virtual learning environments, in our case Brightspace. Using virtual tools may not seem innovative within the context of UHI, which is geographically distributed and provides tertiary education through a range of modes that has always included online and networked delivery as well as “site-specific” delivery on its thirteen campuses. However, in 2012 when I first began

investigating the idea to use virtual tools to teach socially engaged art, it was unimaginable among UHI lecturers in the visual arts to deliver an art programme without a physical base.

Some of the strengths and qualities of virtual learning and teaching lend themselves particularly well to feminist ways of working. Virtual learning offers flexibility and facilitates networking and connectivity. Artists can work in their own community where they have knowledge and have already developed relationships, a real benefit for social art practitioners. Virtual learning fosters inclusiveness (Stiles 2007). It provides a means to facilitate access to higher education, particularly for students who would not be able to seek a higher degree otherwise. Many of these students are women who have personal commitments such as caring for children, partners or parents that prevent them moving from their home communities to study. Students with mobility issues or chronic illness are equally more able to study in higher education by using virtual tools.

Virtual learning of course brings challenges, as do attempts to introduce new ways of working to established structures or new subject matter to conventional curricula. While in many ways UHI is a progressive institution, it is, like other universities, entrenched in patriarchy. Development of this programme faced numerous challenges in addition to the challenge of virtual delivery for a practical subject. The important point is that some challenges resulted in teaching and learning innovations and have brought benefit.

Some of the challenges can perhaps be seen as gendered, particularly marginalisation. It was difficult to take on new module development, and, ultimately, a new programme from my very marginal position within the university, a common issue for women lecturers. I was a very part-time lecturer, I couldn't access development funding, and I had no paid institutional time to work on the proposal to bring socially engaged art into the curriculum. The approval process for the MA programme was slow, arduous and riddled with setbacks. Nonetheless, this prolonged period enabled me to establish a strong philosophy for the

programme and identify a development team with whom I worked to establish a firm foundation, and thus a successful beginning.

Our programme has repeatedly addressed challenges around marginalisation. It has been difficult to gain genuine understanding and recognition for the subject at all levels within the university. While a handful of lecturers and managers understood the field of practice, or held blind faith in our ability to make the programme work, some lecturers outside our programme, for example, did not understand it, and did not accept that socially engaged art is real art.

There are teaching challenges, too, including the fact that students and lecturers are dispersed across wide geographical regions, with students based in the Highlands and Islands, the rest of the UK and internationally. We have felt the negative impact of virtuality, including preconceived prejudices about its use and feasibility for our field of practice. Fortunately there are benefits to virtual teaching,

and its challenges have encouraged us to develop new ways of working and we continue to experiment.

Values inherited from feminism and feminist art theory of the 1980s have helped to make the MA Art and Social Practice successful and distinctive. Students respond well to the dialogical processes that underpin the programme philosophy, and actively take part in the variety of opportunities for engagement with each other. They are well supported and encouraged, with trust and respect. We listen and have created a variety of mechanisms to collect feedback, and it is important to act on what we learn and to let students know how we do that. These processes not only help improve our programme but contribute to students' knowledge of institutional systems and power dynamics.

The programme is assertively student centred and develops in response to students' needs in order to create relevant learning experiences. It is flexible, enabling new approaches, content and structures to evolve in response

to changes in society, global and local issues, shifts in contemporary art practices and education. Students describe our programme as “life changing” and others call it transformational. Mutual support among students and between current students and alumni not only encourages learning but contributes to the formation of collaborative partnerships. We hope that the relationships that begin when students join our programme will become lifelong. Our aspiration to create a supportive and vibrant community of practice is becoming a reality.

Conclusions

My teaching, research and professional art practice continue to be deeply influenced by feminist theory and activism. The presence of feminism in the university engenders individual and collective empowerment. My engagement in higher education is significantly more effective and rewarding as a result of the way my academic leadership and teaching is informed by feminism.

Core feminist values improve teaching and learning environments, fostering innovative teaching practices, inclusive curricula and progressive course development. Feminist analysis of social and political structures can encourage our students and colleagues to better understand power hierarchies within institutional structures that impact on learning, teaching and professional careers.

Feminists work for change, and as a long-standing feminist, I strive to make a difference to the lives of those with whom I work in the hope that the ripple effect will have wider reaching impact. Thus we can become better equipped to understand our positions as professional practitioners, and students, and be empowered to shape a sustainable career whether in education or as a creative practitioner. In future I hope that our students will contribute to making society better, and to improve our institutions.

Acknowledgements

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the University of Brighton in the session convened by Professor Hillary Robinson and Professor Marsha Meskimmon, titled Critical Pedagogies in the Neoliberal University: Expanding the feminist field in the 21st-century art school. The opportunity to take part in this session encouraged me to consider our MA programme from a feminist perspective.

I am indebted to my colleagues, students and artist friends with whom it is a privilege to work, and to whom I am grateful for unending support, inspiration and learning.

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research and pedagogy, most recently in the research project, *Repositioning Practice*, funded by the Royal Society of Edinburgh. Her on-going collaboration with artist Susan Timmins focusses on the Cold War period in Shetland alongside northern and Arctic communities. She is part of the core team for the research project, *Home & Belonging*, with Dr Siún Carden (UHI), Sian Wild (WhoCares? Scotland) and the #ShetlandCrew, a group of care experienced young people. She is a Senior Fellow of the Higher Education Academy, Advance HE.

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Attracting women into engineering – a personal reflection

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Abstract

It is well known that engineering fails to attract sufficient women: in the United Kingdom (UK) 2018-19 academic year, only 21% of all higher education (HE) engineering and technology entrants, and only 12% of the engineering workforce, were women, which reduces to 9% for occupations exclusively within the engineering sector (Engineering UK 2020).

This chapter reviews the literature which supports my observation, over more than 3 decades as a female engineer, that predominantly male workforces value masculine traits: assertiveness, objective rationality, technical capability and direct problem solving. These same

traits are, indeed, the gateway to higher engineering education and the cornerstones of success in engineering degrees. This chapter discusses, from both personal and established viewpoints, why women are still not attracted to engineering careers, despite considerable global efforts to remove the patriarchy. It highlights, by examining published case studies, how failing to attract women into engineering careers is detrimental to the whole profession. Negative effects include insufficient engineering graduates available, abysmally poor retainment of female engineers, products badly designed without female input, and ignorance of the benefits feminine attributes bring to engineering teams.

Critiquing, through research, potential solutions to this worldwide problem, this chapter goes on to recommend realistic and implementable changes which can be made to the University of the Highlands and Islands' HE curriculum to improve gender diversity in engineering, thus supporting the post-COVID-19 engineering environment, where drastic

change is imminent. Industry 4.0¹, the fourth industrial revolution, heralds the start of a Smart Factory era when many traditional engineering jobs will be taken by robots – no longer will engineers ‘fix engines’. Going forward into this automated era, creative multi-tasking and empathetic collaboration are likely to become the dominant skills required for the engineer of the future, and these skills are particularly prevalent in women.

Keywords: Engineering, women in engineering, skills shortages, STEM gender gap, gender equality, higher education, further education

Introduction

Engineering was not an obvious career choice for a girl educated at a single-sex school but during the lean

¹ The Fourth Industrial revolution, also referred to as Industry 4.0, is a technological revolution which is impacting how we live and work, as did the First, Second and Third. It is a digital revolution predominantly driven by the advent and rapid expansion of Artificial Intelligence, Robotics, and the Internet of Things (Schwab 2015).

'Thatcher' years of the early 1980's, it did guarantee employment opportunities, with the newly launched space shuttle, the introduction of desktop computing, and a prediction of engineering jobs increasing by 38% (Marcus 1983: 20). So, I chose to study Electronic Engineering at Dundee University. From day one I was in a gender minority, with less than 5% of my class being women (Baker 2005), however that did not hinder us from all achieving Honours awards in 1985. Within a month of graduating, I was working in a small radar research establishment, Racal, in Linlithgow, Scotland. Here I designed circuits for multi-million-pound, cutting-edge defence equipment. I remained in this fulfilling career for eighteen years, learning and practicing the engineering skills which eventually led to my becoming a Chartered Engineer and leading teams of my own. When the company was acquired by Thales, and our site closed in 2003, I moved to Denchi Power in Thurso, Scotland. This was a similar company making military batteries and chargers. For most of these industry years, I was the sole female engineer on the project team and always reported to a male boss. In 2006, I felt old enough

and wise enough to disseminate my knowledge and experience, so I took the difficult decision to leave, at the pinnacle of a rewarding career, for a Further Education (FE) contract with North Highland College in Thurso, Scotland. Here I progressed from Lecturer to Programme Leader and eventually Curriculum Leader. In 2019, I moved to the University of the Highlands and Islands (UHI) to become an Academic Lead Developer, whilst still lecturing part time at North Highland College UHI. I was, for many years, the only female Lecturer in my department, teaching almost exclusively male classes and managing an all-male team. Most of the College workforce are, however, women. This was a novel experience for me and one where I began to realise that I had feminine qualities which could enhance my impact as a designer, teacher and leader, and could help encourage more women to study engineering. With the advent of the fourth industrial revolution, Industry 4.0, and the rapidly changing engineering roles this entails, I believe that attracting women to train for this evolving, multi-disciplinary, multi-tasking work-force, is imperative and urgent.

Background

Throughout my working life I have never experienced any explicit gender discrimination – I guess I am one of the lucky ones. I did, however, often feel I had to behave like “one of the lads”. One particular example I remember well, was having to eat disgusting Tabasco© sandwiches whilst field-trialling a radar, because this was the only food the ‘guys’ ate. I also remember having to lift heavy and awkward equipment, clearly designed exclusively for male physiques. I surmised this was because of, mostly unconscious, male bias in the working environment. It is well known that engineering fails to attract sufficient women: in the 2018-19 academic year, only 21% of all engineering and technology entrants were women (Engineering UK 2020: 5) and only 12% of the UK’s engineering workforce are female (Engineering UK 2018: 13), which reduces to 9% for occupations exclusively within the engineering sector. This suggests an abysmal retention rate. Coincidentally, 21% is the proportion of female higher education academics in this sector (HESA 2017), so, in

common with most female engineers, I still feel rather an outsider and a pioneer. The problem is self-propagating: the existing patriarchy discourages women from entering the profession, resulting in insufficient prominent female engineers to challenge the situation and too few role models to motivate aspiring girls.

My experience suggests that predominantly male workforces value masculine traits: assertiveness, objective rationality, technical capability and direct problem solving. McBride-Wright's (2019: 6) survey found that over 26% of respondents agreed that engineering was a masculine culture, and over 75% felt society expected men to show aggressively masculine characteristics. Indeed, these same traits are the gateway to higher engineering education and the cornerstones of success in engineering degrees. Stentiford (2019: 218) cites cases of extreme "laddism" in engineering classes, which is obviously disruptive and off-putting for otherwise enthusiastic female students, but she also notes that less overt "laddishness" is

prevalent; this is just accepted, by the girls, as something to be tolerated – mirroring my own observations.

However, there is some indication that a change is imminent: Industry 4.0 heralds the start of a Smart Factory era when many traditional engineering jobs will be taken by robots (Osterreider et al. 2020) – no longer will engineers ‘fix engines’. Cevik Onar et al. (2018: 138) intone that Universities need to adapt their engineering education to instil the skills required for new cross-functional roles, including soft skills such as “capability development, interdisciplinary collaboration, and innovation”. Skills Development Scotland (SDS 2018: 8) further define these new skills as “self-management, social intelligence and innovation”. Considering Table 1, there appears to be considerable synergy between Industry 4.0 skills and feminine attributes. Of course, this does not imply that masculine qualities will become redundant, but perhaps the focus will shift towards a better balance.

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| Masculine Attributes | Feminine Attributes |
|----------------------|---------------------|
| Rational | Multi-tasking |
| Practical | Empathetic |
| Analytical | Expressive |
| Logical | Creative |
| Dependable | Supportive |
| Dominant | Sensitive |
| Decisive | Tolerant |

Table 6.1: Comparison of Masculine and Feminine Attributes (Smith et al. 2018)

I have long believed that women’s contributions to engineering are unique and invaluable, not least because they constitute half a population which could help alleviate the 2020 to 2025 predicted annual shortage of 59,000 engineering graduates in the UK (IET 2019: 2). Strachan et al. (2018: 2088) note that “organisations with a more diverse workforce are more creative and innovative, and ultimately perform better and are more successful”. In Criado Perez’ (2020) book, ‘Invisible Women’, the male bias in design, even although usually unintentional, is shown not only to disadvantage women, but to endanger them. Examples include:

- Ill-fitting, infection preventing Personal Protective Equipment (PPE) resulting in female medical staff having to wear Filtering Facepiece Particle (FFP) masks designed exclusively for males. With 77% of the UK's National Health Service's workforce being women, this presents an unacceptable and unnecessary COVID risk (Fidler 2020),
- Stab vests which cause breast injuries and provide inadequate protection (TUC 2017),
- Car seat belts which are 47% more likely to cause female drivers to sustain serious injury, than male drivers in comparable crashes (Bose et al. 2011),
- Artificial hearts which are too large for many women, so prevent life-saving operations (Syncardia 2020).

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Figure 6.1: Image of a woman putting on a seatbelt
(Image by cfarnsworth; [Pixabay](#) / [Pixabay license](#))



Figure 6.2: Image of heavily armed soldiers
(Image by parameciorecords; [Pixabay](#) / [Pixabay license](#))

These products, and many more, would have benefitted from a women's perspectives and input. There is no reason why the designs of women would not be as good as, and from a gender neutrality viewpoint possibly better than, the designs of men. Women achieve better grades in Science, Technology, Engineering and Mathematics (STEM) subjects, both in high school and at University undergraduate level (WES 2020). Indeed, many female engineers are accredited with design excellence. Examples include (Katwala 2017):

- Stephanie Kwolek's Kevlar[®] super-strength material;
- Tabitha Babbit's circular saw;
- Mary Anderson's windscreen wipers;
- Hedy Lamarr's frequency hopping remote control technique;

There is also evidence that women are equally capable engineering leaders, with some recent, significant engineering influencers being:

- Meredith Westafer, Senior Industrial Engineer and manager of Tesla's Gigafactory;
- Yael Garten, Director of Apple's Siri Data Science and Engineering department;
- Sophia Velastegui, General Manager of Microsoft's Artificial Intelligence Product Unit.

However, gender bias is prevalent because of male domination of the engineering industry, initiated by the historical attitude that women are too weak for this work, and the post-war belief that women should stay at home (Emes 2017). Surprisingly, these attitudes persist today; less so in established economies like the UK, but still evident in men with strong religious beliefs, who are almost twice as likely to support the traditional gender role viewpoint (Emes 2017). This further undermines the determination and confidence girls need to choose engineering careers.

Possible solutions

The key question is, what can be done to solve the problem of under representation of women in FE and HE engineering education and in the engineering workforce? There are numerous high-profile initiatives focussing on this, for example:

- The Women's Engineering Society (WES 2020) host conferences and webinars, award prizes, publish a journal, and have the 'Lottie Tour' and 'She's an Engineer' projects. They also host an International Women in Engineering Day, INWED.
- The Institute of Electrical and Electronics Engineers (IEEE) have a Women In Engineering Society (WIE 2020), which offers a supportive network and hosts global conferences. I was lucky enough to obtain a volunteer position at their 2017 International Leadership Conference

where I met many inspiring and influential female engineers.

- UHI have STEM Femmes (2020a) – paid opportunities for students to help break down barriers faced by women in STEM subjects. They also offer an award to female students who exhibit engineering excellence.
- Equate Scotland (2020) provide training and opportunities for women studying or working in STEM fields. They proactively push to change attitudes and policy in education and industry.
- The Young Scot STEM campaign (2020) which is helping the Scottish Government improve gender imbalances on College and University STEM courses.

These are having some effect: the number of female students on UHI's Electrical and Electronic degree has grown from 5% in 2010 to 20% in 2018 and, since 2010 there has been a UK wide 5% increase in the number of women studying engineering. Progress, however, is slow,

so consequently I have researched other ways to expedite change.

Research

Firstly, as a member of the IEEE Collabratec Women In Leadership Community (2020), I have compiled a list of ideas posted in answer to the question “What is your idea to accelerate entrance of women into STEM fields?”. Respondents included students and highly experienced members, with suggestions such as:

- Set up STEM centres, with safe and welcoming environments, to specifically focus on women,
- Make science less complicated and expose girls to STEM from an early age,
- Remove societal pressures and stereotypical bias, by supporting mothers better and sharing caring responsibilities,
- Publicise inclusive engineering opportunities and share promotional cross-school and University webinars,

- Provide a career space for women with confidence building motivational classes,
- Promote women into top positions, and engage actresses, businesswomen and other famous women to be role models,
- Demonstrate real, successful products which have had women's participation.

Secondly, I carried out some Focused Perspective Taking^{TM2} using secondary literature sources. The results are shown in Table 2.

| Perspective | Result |
|--------------------|---|
| Pessimistic | Engineering UK (2018: 13) believes there to be bias in schools, because, despite over 600 UK organisations running Science, Engineering, Technology and Mathematics (STEM) initiatives directed at schools, only 27.1% of girls, compared to 45.6% of boys, studied STEM subjects at A level in 2017. |

² Focused Perspective TakingTM is the Institute of Leadership and Management's (ILM's) preferred method of solving problems creatively, by examining different perspectives which lead to solutions to problems, challenges and issues which mix skill in execution, sensitivity, creativity and contingency planning (ILM 2021).

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| Perspective | Result |
|-------------|--|
| | <p>It is not believed that pay disparity (Universities UK 2018) is a factor in discouraging women from engineering careers, neither is poor school attainment in STEM subjects, where women are consistently outperforming males.</p> <p>Engineering UK (2018: 13) note that only 12% of the UK engineering workforce are female, and MAC (2019: 112) cites this as one of the four reasons why only 29% of engineering graduates are working in the engineering profession.</p> |
| Optimistic | <p>Romano (2020) suggests that female role models and advocates, with female peer collaboration and practical applications to solve world problems, can entice girls to study STEM.</p> <p>According to Study International (2019), an increasing number of schools are incorporating Science, Technology, Engineering, Art and Mathematics (STEAM), to better engage students and to improve creativity, problem solving, and other transferrable skills.</p> <p>In 2017, the University of Zurich found that the reward centre in female brains reacts more strongly to pro-social decisions than in male brains. Yet although biology and chemistry are perceived as social-minded careers, engineering is not.</p> |

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| Perspective | Result |
|-------------|--|
| Creative | <p>The UK wide balance of women to men in Creative Arts has been 64% to 36% since 2016/17 (HESA 2020). UHI’s Care and Creative Arts subject network, has female bias, with 81% women in 2019/20, and some arts programmes having no male students at all (UHI 2020b). Combining courses could alleviate the problem. For example, in Italy, the Arduino Uno processor was designed so art students could animate their sculptures (Arduino 2020). They thus learned both art and coding.</p> |
| | <p>There is a STEAM synergy within the Scottish Government et al. Inverness and Highland City-Region deal for a “creative industries knowledge investment programme to encourage adoption of technology” (2016: 7)</p> |
| Evidential | <p>Dahle et al. (2017:2) found that female retention was good (87%) on engineering courses offering art as a minor, and that emphasis on the creative facets of engineering increased the number of girls considering engineering as a career.</p> |
| | <p>Wajngurt and Sloan (2019: 22-23) found that a STEM class with an arts component, positively and significantly affected female students’ intentions to pursue a STEM degree, compared to male students.</p> |

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| Perspective | Result |
|-------------|---|
| | Although the number of women in engineering roles has doubled, since 2010, to just over 50000, in 2019 only 14% were in management roles, a drop since 2018 (WISE 2020), affecting the availability of role models. |

Table 6.2: Focused Perspective Taking™ Results

The Spider Diagram in Figure 6.3 summarises these options. Although all these proposals are specific, none are timebound, which is expected for a longstanding problem with no expeditious solution (WISE 2020). The easiest to implement is the emphasis of pro-social, creative, and female-influenced examples into curricula. UK establishments can equally easily implement gender diverse, inclusive, and attractive environments and policies (Royal Academy of Engineering 2015), and conduct Equality Impact Assessments, as UHI already does (2019). Elsewhere, however, those options which address deeply ingrained cultural, historical, political and social attitudes, are unlikely to be effective without other intervention.

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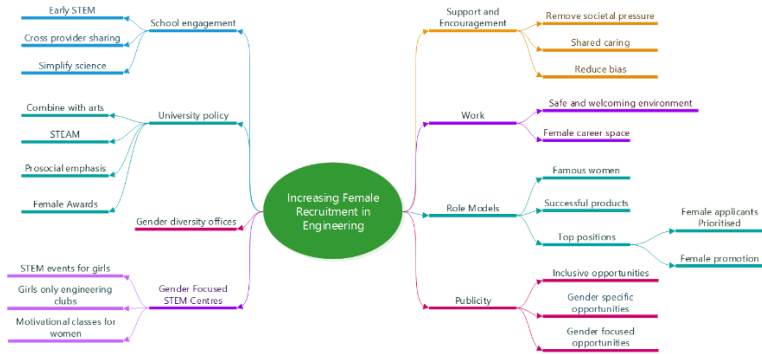


Figure 6.3: Spider diagram of potential ways to increase female recruitment in engineering

The remaining solutions fall into two categories – those focusing on exclusively female incentives, and those using role models and supportive strategies. Whilst exclusively female opportunities are easily implemented, and their effectiveness already positively measured (GirlsWhoCode 2019), care must be taken not contravene the Equality Act (Act of Parliament 2010) by employing illegal positive discrimination. There is also some evidence that these practices exacerbate the problem by alienating male counterparts (Royal Academy of Engineering 2014: 6). Perhaps the most effective solutions focus on promoting role models, who can educate, encourage, support and

mentor a future generation of female engineers (Fryer 2018), giving them the incentive and confidence to succeed in a male dominated career.

Implementation

My next step is to implement the most feasible and cost effective of the potential solutions identified. I have already included examples in my curriculum, which highlight the prosocial benefits of engineering, with some of my students designing prosthetics for Raigmore Hospital (Inverness, Scotland), burglar alarms for supported housing, energy saving products for green economies, and many more. An interesting first-hand example comes from my own work on the Sea-King helicopter radar. One of my students thanked me personally for this, as a Sea-King saved his life when he was born prematurely. This emphasised, to me, the importance of using engineering creatively as a powerful means to help others and advance humanity.



Figure 6.4: Image of a helicopter ([Cosford 2015: Farewell Part 2 by Pete \(comedy nose\) at Flickr](#) / [Public Domain Mark 1.0](#))

I promote creativity through multi-disciplinary, group projects, which, of course, also develops Industry 4.0 skills, particularly when ergonomic and human factors are given equal importance as functionality; advertising this more overtly in the UHI prospectus may entice more female students. Furthermore, I plan to develop more systematic and concerted use of role models by actively seeking women to give guest lectures. Although I believe myself to be a role model, and a mentor, I would like to take a more proactive approach to encouraging schoolgirls into FE and HE STEM subjects, for instance by better engaging with UHI's STEM Femmes project and my STEM Ambassador role. Finally, I intend to demonstrate more female-

engineered product examples, perhaps even including art-inspired design elements, in the curriculum, to better define the benefits of engineering as a career for women.

Conclusion

This chapter has highlighted the problems and challenges encountered by female engineers working in predominantly male environments, both in the engineering classroom and in industry. Although my own experience has been relatively benign, it is well known that prejudice and bias still exist, resulting in many seeing engineering careers as men-only domains. This is to the detriment of the whole profession, with insufficient engineering graduates available, retention of female engineers abysmally poor, products badly designed without female input, and ignorance of the benefits feminine attributes bring to engineering teams. Going forward into the automated era of Industry 4.0, creative multi-tasking and empathetic collaboration are likely to become the dominant skills required for the engineer of the future, and these skills are particularly prevalent in women. Therefore, it is imperative

that everything possible is done to attract more women into engineering.

Whilst little can be done to change historical bias and societal attitudes, the HE engineering environment can be made more welcoming to women. Women are proven to be inspired by an emphasis on pro-social aspects and focus on ergonomics. Incorporating these obviously in the curriculum, along with alternative teaching and assessing methods which favour feminine attributes, such as creative problem solving and group working, may make engineering more attractive to schoolgirls. Using role models more extensively, to highlight the value of women's contributions, can improve female students' confidence, and help them overcome imposter syndrome. Combined with good classroom management, to prevent "laddishness" (Stentiford 2019: 218), and pro-active gender inclusiveness policies, I believe these changes can help to reduce the engineering gender bias, to the benefit of all.

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engage, and encourage females to study engineering. Having worked for over twenty years as an electronics designer, for the defence industry, Lois maintains links with local manufacturers and is championing diversity in higher engineering education to help alleviate the difficulties companies face in recruiting and retaining skilled engineering graduates.

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Promoting autistic women in science: benefits for their own dedicated society

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Abstract

Autistic researchers clearly add to academic knowledge through their insightful and deep interest in specific subjects, yet they are significantly underrepresented. Further, autistic women scientists can be seen to be additionally disadvantaged when systemic discrimination against women and nonbinary STEM individuals intersects. There is, however, no professional association or learned society dedicated to supporting and promoting them, actionable by affecting policy changes. There are currently a few informal groups, but professional organisations wield power, inaccessible to informal groups, to advocate for their

members. This chapter, thus, investigates and discusses why autistic women scientists form their own marginalised intersectionality and how they and everyone else could benefit if such an association existed.

Keywords: Autism, professional organisation, women, STEM, advocacy, intersectionality

Introduction

The intention of this chapter is to discuss why autistic women scientists compose their own disadvantaged group (Fig. 7.1) and, therefore, should have their own professional organisation for support. I am mature, cisgender, female¹ archaeology postgraduate student with two Masters of

¹ In this article terms of *sex identity* are used by chromosomal assignment (*female* as XX and *male* as XY), terms of *gender identity* (*woman*, *man*) are used by an individual's self-identification. Third sex and third gender persons are for the moment included under *women* as a gender-marginalized group, while actively acknowledging this is an overly simplistic characterisation.

Science. I am also autistic.² I abandoned continuing both of my previous studies because of negative social-based academic experiences. When I was identified as autistic five years ago at the age of 46, I realised these negative experiences were connected to my autism and sex, and, more importantly, that I would have greatly benefited, perhaps succeeded, if there had been a professional organisation to turn to for support. Although I now receive assistance with university disability services, it is a shortfall that there is still no learned society dedicated to me and my peers. The creation of such would benefit both autistic women in STEM and the general population by an association's power to influence societal understandings and policy improvements.

² Self-identification for illnesses are preferentially given in person-first language by patients—I have diabetes—as opposed to identity-first—I am diabetic. In contrast, many individuals with an ASD diagnosis do not see their autism as separated from whom they are, and prefer identity-first terms. It continues to be a debated subject (Botha et al. 2021).

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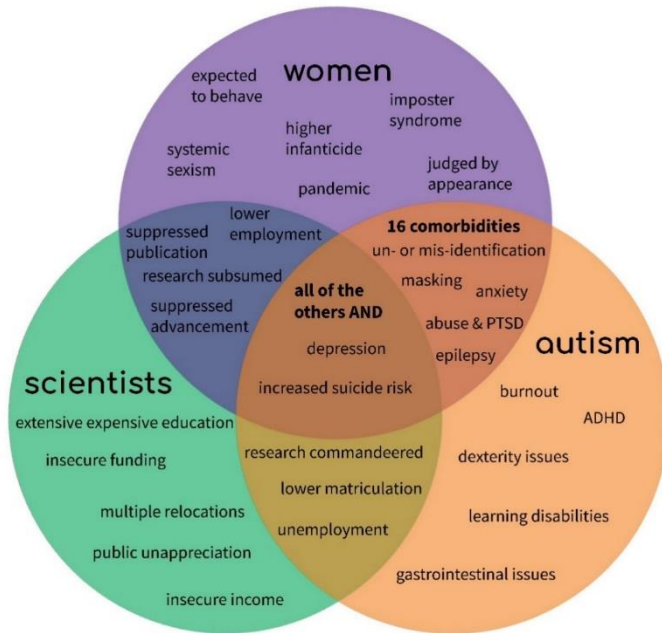


Figure 7.1:
The intersectionality of autism, womanhood and scientific interests displayed as an 'anti'-Venn diagram, rather than overlaps excluding the wider experiences they are added on top of those

First, though, what is autism? What autism *is* is an amalgam circling around 3Ds: it's a curable disease, it's a disability disorder, it's a cognitive diversity. The latest medical diagnostic regulations of the EU (ICD-11) and US (DSM-5) subsume several previous categories under Autism Spectrum Disorder (ASD). ASD is then divided into 'levels' that appear not to correspond to metadata clusters of lived

experiences (Lai et al. 2013a; Silleresi et al. 2020). Asperger's, the term often used previously for 'high-functioning' autistic academics, now under the ASD umbrella, is more accurately described as "adults without cognitive impairment [who] are able to function independently" (Lewis 2017: 2410). Many autistics themselves feel ASD is a label, rather than a way of being, and in their dialogues it is rarely used (Beardon 2017: 64; Botha et al. 2021). Here it is considered as a different cognitive processing method, arising from variable genes and experiences (Lord et al. 2020), as different from the main population—neurotypicals—as a natural variable in neurodiversity (Singer 1999).

Autism expresses as sensory, emotional and social-interaction difficulties ranging in quality and quantity across individuals (Skuse 2020). Unfortunately, these difficulties have led many neurotypicals to negatively view those whom they have been told are autistic (Sasson et al. 2017; DeBrabander et al. 2019). Not only is this an *unjust -ism* (Roark 1987: 367; Krieger 2020), it denies the advantages

of these 'differences', especially the cognitive wiring crucial to autistics' scientific breakthroughs, as "information evolves through the force of alternative visions" (Camila Pang in NAS 2020a: ¶13).

Pattern-orientated neurological wiring means 'things' blatant to autistics are apparently hidden to others until communicated via words (Happé 1999). Their viewpoints bring novel outlooks unseen by neurotypicals, through "their, often intense, emotional relations to 'natural' things and places ... with the wider more-than-human world" (Davidson and Smith 2009: 898). However, other aspects that come along for the ride with autistic wiring result in low self-esteem and/or poor communication skills. Therefore, the insights of autistics are often rejected, side-lined, subsumed or stolen (Rose 2015: 316). When adding these social issues to already oppressed STEM women, it can be imagined that there is a large body of untapped knowledge languishing, remaining unpublished.

Autistics' multiple non-normative behaviours make professional fields overwhelmingly difficult to enter into and succeed within (Hurlbutt and Chalmers 2004: 218-9; Scott et al. 2020: 870). There is a dearth of professional societies for autistic members themselves. The specialised accommodations³ needed call for a dedicated association for autistic women in science to provide a mutually supportive environment and advocacy program. It would also provide a genuine resource for the whole scientific community to gather a more nuanced understanding of their autistic women colleagues.

Expressions of autism in women

Earlier, nigh all datasets of identifiable outward expressions were derived only from men, giving the impression of a male condition, missing the female experiences (Bargelia et al. 2016: 3282). Recently research is highlighting that the female expressions of autism are significantly different than

³ 'Accommodation' is a disability-services term for extra measures granted for individuals to function equally with the main population (e.g. Hurlbutt & Chalmers 2004: 220; Zener 2019b: 149).

males. Considered research is showing that the commonly-quoted ratio of autistic women to men as 1:4 is probably actually 1:2 (Loomes et al. 2017) or even 1:1.5 when women without clinical diagnoses are included (Bargelia et al. 2016: 3281, note that many autistic women avoid diagnoses purposefully).

Lai et al. (2013b; 2015) steered early approaches to diagnostically identify female autistics by characterising three areas of differences to males: neurological, genetic and societal. For example, autistic females use different neural pathways to solve, within the same time, the same exercise in object rotation as autistic males (Stevenson and Nonack 2018). Medically however, far higher comorbidities are being diagnosed amongst female autistics, 7% comparatively to male autistics and neurotypical females (Kassee et al. 2020), with a significantly different mean of sixteen conditions to male's ten (Jones et al. 2016).

Behaviourally, probably the greatest difference is the autistic females' increased worries regarding social

interactions, again to both autistic males and neurotypical females (Song et al. 2020). They are significantly more concerned to socialize correctly, but analyse situations using external comparisons (they/them) rather than inclusive (us/we). Tony Attwood describes this, in an interview, as two key childhood differences,

“one is how girls react to being different. The other is the different expectations in society for girls. In terms of how girls react, I think one of the common ways is to observe, analyse and imitate and create a mask, which delays diagnosis for decades until the wheels fall off” (James 2017: 32-33).

Thus it is not surprising that a major reason women have been under-identified is their successful imitation of neurotypical interactions, the intentional learned behaviour of camouflaging (Hull et al. 2017; Lai et al. 2017). This functions by mimicking others' behaviours, as a set of rules, to appear "hypernormal" (May 2018: 62). Even though social behaviours may be successfully mimicked, the underlying cognitive functioning, most importantly, is still autistic (Livingston and Happé 2017).

This masking is additionally enforced by Western society's demands that women behave agreeably (Lai and Szatmari 2020). Aspergirls⁴ suffer more and remain unidentified because, with their ethical natures, "good girls are invisible" (Kim 2015: 20). The inflexibility of this submissive expectation is seen especially clearly through women identified as autistic late-in-life (aged 35+). Katherine May (2018: 61) describes her pre-identification abilities as, "I was a master, by then, of the surface appearance. I had watched, carefully, the way that other people behaved, I mimicked it precisely. I had all the social airs and graces – the encouraging smiles and the kind inquiries – and I could chase the lineage of each one of them back to the person I stole them from." Or more starkly by Navah Paskowitz-Asner as, "I was forced to adapt. I would have become a casualty if I hadn't" (2018: xi).

⁴ 'Aspergirls' is a term coined by Rudy Simone by the title of her 2010 book: *Aspergirls: Empowering Females with Asperger Syndrome*. The term was extended to 'Asperkids' by Jennifer Cook O'Toole with two books in 2012.

A non-vocal aspect of camouflaging is hiding stimming—comforting repetitive movements (e.g. hair twirling, knee jerking, humming) which actively reduces stress (Grogan 2015: 9; Suckle 2021: 755). The significance of having to hide these behaviours in the past is apparent when Dawn Prince-Hughes, two pages into one of the earliest memoirs of a late-in-life diagnosed woman, explains hiding her stress-induced stimming by "curling my toes over and over while I am talking to someone" (Prince-Hughes 2004: 2). Similarly, I 'flap' my toes alternately.

The need to appear normal is an overwhelming drive, but the costs of masking, burning enormous energetic resources, are associated with lower states of mental health (Hull et al. 2017), including increased suicide risk in undergraduates (Cassidy et al. 2020). Although, it should be remembered that the adoption of masking, in the first place, is as a coping mechanism (Kim 2015: 86); for Aspergirls "their social survival depends on it" (Kim 2015: 24). Camouflaging abilities, however, do a disservice both

for women to be identified as autistic and for them to access and/or be offered help when they need accommodations.

Successful masking means many autistic women are not identified until well into adulthood; often through self-identification, later confirmed medically. Societal judgements are the cause of many self-identified autistic women refusing a clinical diagnosis (James 2017: 151), and there are negatives encountered with disclosure (Thompson-Hodgetts et al. 2020). But many late-in-life identified women glory in the relief of an answer to the difficulties experienced throughout their prior lives (O'Toole 2018: 11; Pellicano et al. 2020). An initial and eternal benefit for most is the knowledge that 'it's not just me' (Bargelia et al. 2016: 3289) and undoing the beliefs of being "mad, bad or sad" (James 2017: 8; see also Arnold et al. 2020; Leedham et al. 2020), allowing positive self-identifications through 'belonging' to the autistic community (Kim 2015: 19; Campbell 2018: 30).⁵ With better

⁵ LGBTQIA+ examples have similar experiences (Dale 2019; Hillier et al. 2020; Kung 2020).

characterisation we can well expect the number of women identified to increase as their constellation of presentations are better understood in the medical and educational sectors.

My own experience is that when I tell neurotypicals I am autistic, it leads to rapid and greater acceptance in comparison to my pre-diagnosis life when I was simply categorized and shunned as 'weird' (see also Sasson and Morrison 2019). Many autistics who have my experience are happy to abandon masking and adamantly declare they do not wish to be neurotypical but celebrated for their differential thinking (e.g. Temple Grandin in Worsham and Olson 2012: 55). "My brain is a jewel. I am in awe of the mind that I have. I and my experience of life is not inferior, and may be *superior*, to the NT [neurotypical] experience" (Muskie in Connor 2013: 8; emphasis original). As the experiences of autistic women become better described and understood, the crippling nature of successful camouflaging, not appearing to be difficult or different, can

be abandoned to allow it to be seen that they have specific needs (Mandy 2019: 1880; Zener 2019a: 10).

The Venn diagram intersection that is autistic women scientists

The benefits of autistics to STEM development and advancements are beyond a doubt (Motttron 2011: 33). In addition to the autistic mind wiring by pattern associations, it also experiences lowered delusions of reality (e.g. Bertrams 2021), the cognitive dissonance of neurotypicals. Their observations are more precise without societal sways (Motttron 2011: 35; Grandin and Panek 2013: 131) because they 'see what is actually there' (Langdell 1978: 266; Silberman 2019: 10). With a decreased suggestibility to false memories (Griego et al. 2019: 1471), their novel findings are more genuine and reality-based—the core principle of the scientific method. They are also usually unerringly ethical (Purkis 2018: 135), autonomously generating good science. Their dedicated narrow focus is ideal to advanced scientific research (Beardon 2017: 78).

Clearly, their ideas should be taken seriously, and their work and achievements promoted from the outset.

However, there is a significant paucity of autistic women scientists, unequivocally magnified by the intersectionality of autism, womanhood and science (Fig. 7.2). Autistics, especially women, are overrepresented within non-matriculated school-leavers, the unemployed, and in low-skilled positions (Taylor and Mailick 2014). The main autistic emotion is fear (Grandin 2015: 9; Hanify 2016: 35-6; James 2017: 174; O'Toole 2018: 117). Autistics are remarkably dedicated and passionate about their specialties but will abandon research projects and/or academia to escape negative social environments (Attwood 2008: 294). Frequent neurotypical-autistic miscommunications and the cognitively-innate social insecurity of autistics (e.g. Fig. 7.2) can generate unendurable, unworkable environments (Harmuth et al. 2018: 36; Purkis 2018: 136-9).

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Being asked even supposedly simple questions can be the cause of all sorts of issues. For example, a common greeting such as 'How are you?' may elicit feelings of fear and inadequacy in the autistic person. What does this mean, she may ponder. In how much detail am I supposed to answer? Do you *really* want to know how I am, or is this simply another example of what I regard as meaningless verbal interaction – and, if so, how am I supposed to grit my teeth and lie to you? Last time I answered honestly (I was having a bad day, and I told you all about it), I got the distinct impression that I was telling you too much – but all I was doing was being honest in answering the question. And if you don't really want to know, why on earth are you asking? I know some kind of reciprocity is required here, but what is the desired response? Am I supposed to ask you in turn how you are, even though I am not in the least bit interested? I know that whatever I say, I'll spend the rest of the day worrying about it, and stressed about whether I have done the 'right' thing or not . . .

Or 'It's a lovely day, isn't it?' No, actually, it is not a lovely day. I have a terrible headache, I am dehydrated because it is so hot, the sun is making my head worse and I feel like vomiting. If you ask me, you are not only an idiot for thinking that there is a correlation between the sun shining and general loveliness, you are also highly patronizing in your belief that just because you are feeling that the day is lovely then I will be sharing in your own ideal. An honest and logical response, of course – but does it go down at all well? Most likely, no.

Figure 7.2: Extract of Luke Beardon's Autism and Asperger Syndrome in Adults providing an example of the autistic thought process when asked, 'How are you?' (from Beardon 2017: 26; image used with permission of John Murray Press)

The paucity of STEM women is well-acknowledged (UNESCO 2017). Within archaeology⁶, the latest statistics show that although 50% studentship has been reached, numbers in the profession are not equitable (Overholtzer and Jalbert 2021) and that gender harassment and sexual abuse is systemic (Voss 2021). Throughout STEM careers, women's postdoctoral employment (Stockard et al. 2021) and their publications are oppressed at all stages (Hagan et al. 2020). Further, women are statistically missing from late-career stages and on editorial boards (James et al. 2019; Rushworth et al. 2021). The pandemic is only making this situation worse (Buckee et al. 2020; Rakhmani et al. 2021), reflected in the March 2021 report that the years needed to achieve global gender equality has widened from 99.5 pre-pandemic to 135.6 years—an entire generation (WEF 2021: 40).

Women in positions of power can often struggle with imposter syndrome (Fig. 7.3) which "many women are

⁶ Modern archaeological techniques have advanced Archaeology to be a STEM subject (Schofield 2021: ¶8).

socially conditioned to feel; the idea that we should be grateful to have space on this earth and that we should, ideally, stay in our lanes and not cause too much trouble for the important people who are out there running things" (Day 2020: 115). Even though originally described by Clance and Imes in 1978, this still-understudied universal remark seems, according to Catherine Bennett (2020), only to be made by women, implying men simply do not experience this. The experience of imposter syndrome in women autistics seems equally unrecognised. Within the autistic literature only three autobiographies mention it, and only in passing (Abbott 2019: vi; Critchley and Critchley 2019: 57; Mendes and Harris 2019: 57).

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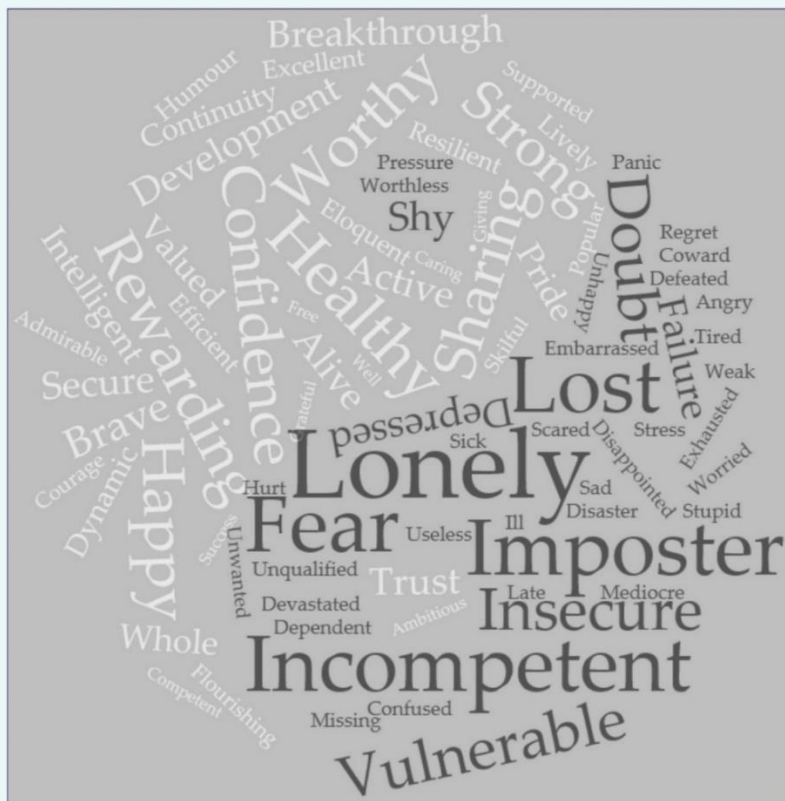


Figure 7.3: UHI scientific educational experiences create word clouds
seesawing between strong positive and negative states
(Image: Sourced from Prezi. 'Being a UHI Student'. Stuart Bence and Sarah
Pohlschneider, 2016. Reproduced with permissions of Sarah Pohlschneider.
Available at <https://prezi.com/su0ow54a2gyv/being-a-uhi-student/>)

The benefits and abilities of a learned society

Everyone could be significantly assisted by a dedicated society providing support for autistic women scientists and, equally, resources for neurotypicals to understand their colleagues. It could advocate policy changes while also being a source for genuine information. Learned societies are defined as when 'communities of practice'—a group that shares experiences—advances their learnings to the next generation (Lave and Wagner 1991). They are also key to reaching academic gender equality (Potvin et al. 2018).

A learned society could provide role models, mentors and collaborators (Glaze-Crampes 2020). For autistics to approach a known autistic lowers social interaction fears; the stressors of successful normative interactions are removed—masking is unnecessary; interactions are significantly more successful than autistic-neurotypical ones (Crompton et al. 2020). This would provide a safe space for conversation and collaboration between autistic women in STEM. Aspergirls could access real-life role

models and also engage in pre-HE research projects and pre- or early-career publications. Late-in-life identified autistic women would have a source to rethink their life goals, possibly changing career directions.

Another benefit of this society would be to remove the invisibility of this marginalised group. Internet searches for 'autistic women who are scientists' across multiple platforms return only Temple Grandin as formally-diagnosed, or occasionally include Michelle Dawson. All other search results do not answer this query. This invisibility is seen further with autism neurodiversity missing from academic biographies. Autism of scientific lay authors also goes unacknowledged. For example, the cover of astrophysicist Sara Seager's 2020 autobiography never mentions autism, while this subject is prominent in her interviews (e.g. Lourenco 2020, Szeps 2020). Only four of fourteen autobiographies by autistic women are scientists. In contrast to the above invisibilities, they explain how autism assisted their research and, as so, are a wonderful

means of helping attitudes of acceptance and inclusion (e.g. Prince-Hughes 2004; Pang 2020).

Visibility would also encourage autistics to register themselves. Through consultations with autistics, journal articles have repeatedly recommended accommodations (Gurbuz et al. 2019; Cox et al. 2020; Peña et al. 2020). Yet, accommodations are still greatly hindered in academia (Fig. 7.4). Only a third of self-identifying disability students register their need for support, with only 3% of those actively pursuing the assistance available (Love 2017: iii; see also Lillywhite and Wolbring 2019). The frustration of engaging disability services is experienced as, "It's like I have to make accommodations for *them*" (Rory Donnelly, pers. comm. 2021; see also Laxman et al. 2019). Increased registration would make autism prevalence more accurate, validating funding useful assistance. Likewise, many employers do not offer viable accommodations (Bury et al. 2020; Solomon 2020).

**The primary responsibility for arranging accommodations
at the college level belongs to the student.**

**Requiring a student with
ASD to contact the
appropriate stranger and
navigate the process of
getting accommodations
is like asking a paraplegic
to climb a flight of stairs
to arrange for a ramp.**

-Mitya Schoppe DACM, BSN, RN



Figure

7.4: Unfortunately we have to stay outside – acquiring support services and accommodations is on the onus of the student (Image by geralt; [Pixabay / Pixabay license](#))

A professional group would also have the ability to act on behalf of an individual. Autistics are gullible to dominating personalities and can easily be taken advantage of (Kim 2015: 29). A professional society has the power to act as the representative for legal action. If these behaviours of injustice become recognised in the public domain their frequency will diminish. They would also provide social

stories⁷ for autistic women that these are not acceptable behaviours. A learned society could provide a safe space for women to discuss 'This happened' and ask, 'Is this normal?'. If necessary, the association could provide a protective action to be taken.

A formalised advocacy group could assist in guaranteeing genuine autism-friendly environments. By influencing policy the society's actions can reduce biases. Both lower (Mamas et al. 2021: 6) and higher (Gillespie-Lynch et al. 2015) education institutions document greater acceptance when students are actively educated about autism. While multiple universities and businesses claim to be autism-friendly, there are few certifications by outside bodies of these claims. For instance, there is only one institution, Glasgow

⁷ 'Social stories' are written or drawn "with the intention of providing information and tuition on what people in a given situation are doing, thinking or feeling, the sequence of events, the identification of significant social cues and their meaning, and the script of what to do or say; in other words, the what, when, who and why aspects of social situations. The process of constructing a social story involves identifying an occasion where the [autistic] is confused or has difficulty understanding what they are supposed to do in a social context" (Attwood 2000: 90).

Caledonian University, having earned the UK's Autism Accreditation (NAS 2020b: 1). No US certifications could be located, nor international ones. Such assertions by the society would lower stress and encourage autistics, many of whom need significant assistance in the application process (Lei et al. 2020).

An association could choose to create an endowment. Two distinct areas could be considered: funding autistic women to engage in and enhance STEM research, at all levels of career development; funding research into autistic women themselves. For the former, pre- and early-career engagements could be mentorship programs, financial support and/or scholarships. Established-career members might be funded for sabbaticals. For the latter, many autistics wish for research to have the fundamental outset of 'nothing about us without us' (Connor 2013). The few recent studies including autistics as researchers show they are not just helpful in design and execution, but crucial (Fletcher-Watson et al. 2019; Martin et al. 2019; Searle et al. 2019). The value of their inclusion and contribution

remains under-appreciated (den Houting et al. 2021). The inclusion of these women in data sets benefits research by and about them (Mandy and Lai 2017; Strang et al. 2020). Professional organizations that advocate for their group assist in destroying unjust -isms (Segarra et al. 2020).

The association's advocacy could equally benefit neurotypicals as a resource to enhance working alongside autistic women in two ways. First, it could provide genuine autism information sources; there is a lot of disturbing misinformation out there. Second, it could encourage neurotypicals to learn autistic social skills (Beardon 2017: 21). There are now a few guides to help autistics comprehend the unstated social rules of neurotypicals (e.g. Simone 2010; O'Toole 2015). Byrne (2020), in particular, considers those unstated in educational settings. The reverse, however, has yet to happen. Neurotypicals need to acknowledge their version of social norms are not the only version (Milton 2012: 886), just as the Western view of reality is not the only reality (Viveiros de Castro 2004).

For instance, asking multiple questions in a row without waiting for the autistic person to comprehend what you are asking is intimidating; have a little patience (Kim 2015: 49). Finding the least dangerous answer requires time. An autistic's wiring will fire simultaneous answers, just like a search engine (Grandin 2000). Time is needed to process these, judge them against the assumed situation, and decide on the safest reply or to form a clarifying question (Fig. 2). Neurotypicals can also learn to translate autistic language (Beardon 2017: 47) for which a dictionary is very much needed. For example, similar to the example of Figure 6.2, if a neurotypical asks genuinely 'How are you doing?', the autistic's memorized social-norm answer of 'I'm fine' needs to be seen in the same light as a concussion patient's or your girlfriend's answer—ignore it and keep gently asking. Again it is important to iterate autistics will be overly compliant (Hanify 2016: 133), agreeing to just about anything to conclude a social situation (James 2017: 104-105).

From my own personal attempts, communications initiated by 'I think, uhm, that I, uhm, might possibly(?) have an idea' requires the neurotypical translation to 'I've collected and collated the data, I've run the results, I've searched the literature and the resultant publication is at least in outline format'. The overwhelming fear autistics experience means that you will be absolute in your findings before taking on the lethal task of discussing it with anyone else; "the *idea* of confrontation makes me feel as if my very existence is under threat" (James 2017: 158; emphasis added). The courage needed to approach with a novel idea inherently requires absolute certainty by the autistic in the thought and data; casually tossing out ideas will never occur. Confounding this is the unfortunate human negative response to novel information—cognitive dissonance in the form of resistance to change (Wicklund and Brehm 1976: 125). Nobody likes a change from the status quo⁸, but this initial automated reaction is enough to destroy the

⁸ Autistics included! See Kim (2015: 89-94) for a classic example.

confidence of an autistic woman (pers. obs.). Neurotypical colleagues need to react appropriately at these times with dissonance reduction, i.e. keep an open mind.

Starting an autistic women in science association

The above has evaluated the benefits to all for the formation of an international professional society, since one does not yet exist. Already in existence are a few formalized groups for women autistics, such as SWAN (Scottish Women's Autism Network). However at present, there are seemingly only informal chat and Facebook groups that combine the three aspects of autism, womanhood and STEM. These cannot effectively wield the authoritative powers toward equality and enacting policy changes discussed above. Autistic women scientists are a disadvantaged group warranting formalised support.

The manner and means of starting and forming an international association will not be covered in depth here, and methods vary amongst countries. One of the major

considerations to forming such a women's organization is 'Who is included?' which needs to be addressed in depth for a healthy supportive resolution. For example, the *Autistic Women's Network* has adjusted to be the *Autistic Women & Nonbinary Network*. However, even with interest increasing in the female experience, other underrepresented groups are significantly far less considered (de Leeuw et al. 2020; Giwa Onaiwu 2020). Twenty-twenty saw only low single digit publications per other marginalized identities, at most, in comparison to more than fifty for females (pers. obs.). Holmes et al. (2020) discuss how learned societies can assist in raising awareness of these further marginalized groups (see also Olzmann 2020). With this consideration in mind, it is suggested that to wield the greatest power of enacting changes, perhaps all marginalized autistic scientists should conjoin; perhaps what is needed is actually a Society for All Marginalized Autistic Scientists.⁹

⁹ SAMAS is also nicely palindromic.

With this in mind, a possible mission statement is: a learned society supporting and promoting underrepresented marginalized autistics involved in scientific endeavours by providing a welcoming, inclusive, accepting space for its autistic members while advocating and supporting their advancements in the public world.

Conclusion

Autistics' STEM contributions are undeniably significant (Beardon 2017: 114); their alternative cognitive processing has contributed global-picture realisations through precisely detailed investigations. A specific group forms their own cluster through their combination of autism, marginalized identification, and involvement in STEM. The numbers of these underrepresented scientists need increasing, supporting them within a frame of acceptance is the only way forward.

An enhanced means of supporting, engaging and promoting this group is through the creation of their own dedicated professional society, having far greater powers

of advocacy than informal groups. Such an association could promote tools for neurotypicals to understand, include and accommodate marginalized autistics in science, and engender a shared space of unity and understanding. A learned society can assist their autistic members in pursuing and following through on their advances in STEM, buoying the publication of an untapped wealth of knowledge.

As an endnote, a brief detour into new research shows what future accommodations might look like, with the example that stimming should be encouraged, rather than vilified in neurotypical interactions. Jospe et al. (2020: 6) have just described how hand movements "facilitate the embodiment mechanism, leading to better comprehension", showing repetitive movements (i.e. stimming) are *enhancing* understanding within social interactions. As such, neurotypicals should embrace and encourage these repetitive movements, recognizing they are improving the overall interaction's success. This is especially necessary as neurotypical-autistic interactions are known to be less

productive than similar-neurotype interactions (Crompton et al. 2020). Apparently, flapping my toes is not only comforting, it's helping me to comprehend what's being communicated.

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Section 3. Addressing gender balance and representation at UHI

Aiming for Awesome: improving perceptions of engineering amongst girls through a digital, STEAM based intervention

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Abstract

The University of the Highlands and Islands STEM team has worked in partnership with the Royal Air Force in order to develop a series of workshops, encouraging students to explore engineering, and in particular aerospace. These workshops have been developed with a focus on encouraging more girls to become interested in engineering, and to see the sector as a possible career path for them to pursue, with the engineering sector currently experiencing a major deficit of women in engineering roles.

These workshops have been designed to combat the perceived barriers that research has shown may be deterring girls from pursuing engineering. This chapter will outline some of these barriers before exploring how the workshops have been designed through incorporating a STEAM (Science, Technology, Engineering, Art and Mathematics) based approach, bringing in the arts into various activities, and so demonstrating the creativity within the engineering sector.

Keywords: Girls, engineering, STEAM, stereotypes, creativity

Background

The University of the Highlands and Islands STEM (Science, Technology, Engineering and Mathematics) Team works to engage with communities and schools around the Highlands and Islands region, building scientific capital, and working to develop a skilled STEM workforce aligned with business needs and economic growth in the

local area. We work to address issues surrounding equity opportunity; gender, and rural isolation, with a particular focus with regards to equity of opportunity in the Highlands and Islands area. Projects run by the STEM Team are subject to funding, with a variety of partners, both academic and external, contributing to the team's work in order to develop a range of interventions, from developing school workshops, to running the Inverness Science Festival, and delivering teacher training sessions. It is through one such partnership with the Royal Air Force (RAF) that the STEM team has had the opportunity to develop a series of workshops entitled 'Aiming for Awesome', focusing on raising awareness and interest in careers in the engineering sector, and aerospace in particular. Due to the emergence of COVID-19 in 2020, the workshops were developed with a hybrid delivery model in mind, with physical activities run using equipment delivered in kits to schools. The theory behind each activity was delivered through online videos and worksheets developed by the STEM Team. This allowed the team to have a presence in school (not possible due to COVID-19 guidelines), and also to easily reach rural

areas with relatively low cost, extending the reach of the STEM Team's presence around the Highlands and Islands.

The 'Aiming for Awesome' workshops were based upon a kit that the RAF had initially delivered to the STEM Team. The kit contained various pieces of equipment required for activities associated with a workbook, created by the RAF, with a target audience of second level primary school students (Primary 5 to Primary 7). The STEM Team was requested by the RAF to rethink these activities, in order to better engage the school students, with a focus upon female students, Black and minority ethnic students, and students within rural areas.

Four separate workshops were developed, with practical activities for the students to undertake, whilst a STEM Team member talked through how to run them, and the underlying science, via pre-recorded video hosted on a dedicated webpage on the University of the Highlands and Islands website. Each workshop explored a different area of engineering, all linked to aerospace, with the first

investigating aircraft design, the forces acting upon aircraft, and the issue of 'wingtip-vortices'. The second workshop explored communications technology, asking the student to explore the Electromagnetic Spectrum and its associated uses, from satellites, to unmanned vehicles, and RADAR systems. Following on from this was a third workshop investigating cyber security, and the development of codes through the ages, as well as the importance of random numbers and prime numbers in the digital age. The fourth workshop differed in that it focused on summarising the previous three workshops through allowing students to design, build, and fly their own bottle rockets, before analysing the rocket's acceleration using data collected from an onboard Micro:bit.

A condition of the project, stipulated by the RAF, was that the STEM Team tailor the workshops to encourage more girls to see engineering as a viable career option, thus addressing the current gender disparity within the engineering sector, that has seen only 12% of women in the engineering sector, whilst making up 47% of the UK's

overall workforce (EngineeringUK 2018). This chapter will proceed to discuss the reasoning behind this immense disparity, and the efforts that this workshop has taken in order to combat this crisis.

A leak in the pipeline

A leaky pipeline is a metaphor that is often employed when describing the loss of women throughout the academic journey toward a career in engineering, beginning in secondary school, where students begin to make choices regarding their preferred careers. It has been found that in Europe, girls first become interested in STEM at around age 11, with the average age in the UK found to be at age 11.3 (Microsoft 2017). This age corresponds with the second level of the primary school curriculum, encompassing students from P5-7, hence the Aiming for Awesome school workshops were all tailored to incorporate links from the science, numeracy and literacy areas of the Scottish 'Curriculum for Excellence' at this level, to reach these students at the most optimal age. This interest in STEM has been found to only continue until age 15-16 however,

before a sharp drop off was found, thus a window of only 4-5 years is available in which to nurture these interests in STEM amongst girls (Microsoft 2017). This leak in the pipeline is described as 'progressive' and 'persistent' by Cronin and Roger (1999), with three stages identified within this paper where women are increasingly underrepresented. The first stage, *access*, encompasses STEM at a secondary school level, followed by *participation*, where women pursue STEM at undergraduate or postgraduate level, and finally *progression*, where women are a part of STEM at a professional level. There are a number of issues regarding losing women through the 'leaky pipeline', eloquently put forth by Blickenstaff (2005). The issue of equity arises first, employing a moral argument whereby every person should have the opportunity to study and work in a field that they choose, regardless of gender. Secondly, as long as there is an underrepresentation of women in STEM, we are losing talented, intelligent women to other subjects in which to study and work. This poses a massive problem in that these women may have contributions that could greatly impact

the field of STEM if given a chance, thus in failing to recruit such individuals, we may be missing out on significant advances that could lead to the betterment of society. Finally, scientific and technical endeavours require fresh insights, and diversity of perspective in order to search for knowledge and answers to today's questions. Only through maximising diversity can we harvest such a wide range of viewpoints, which are shaped through the experiences of the individual. According to the EngineeringUK report 'Gender Disparity in Engineering' (2018), by bridging the gap in work between men and women in engineering, the UK could increase GDP forecasts by £150 billion by 2025, demonstrating the importance of combatting this disparity between men and women in this sector.

So why is there a leak in the pipeline with regards to women pursuing STEM, and in particular engineering? There are several perceived barriers for girls when considering pursuing engineering, including a lack of knowledge regarding careers within the sector, with 48% of girls in every age group responding that they knew almost nothing,

or very little, when asked how much they knew about what engineers did (EngineeringUK, 2018). It was also found that girls often had less of an understanding of the variety of careers available to them in engineering compared to the boys that were surveyed, whilst a disconnect between the girls' values, and what the girls perceive the values of those in engineering were, also proved to be a contributing factor, with girls more likely than boys to state that making a difference, being valued, and having the opportunity to be creative were all attributes that were important to them when deciding upon a career, whilst being less likely to see the engineering sector as a route to achieving these goals.

Stereotypes have also been found to have a profound impact upon the gender disparity in engineering, with numerous studies investigating this aspect, one such study highlighting that 'children have reduced interest in future academic courses and occupations that are incompatible with their academic self-concept (Denissen et al., 2007). Stereotypes prevalent within society surrounding gender and engineering have been known to influence students'

self-concept (Bem 1981). One such influence is the portrayal of those within STEM in the media, with Long et al. (2010) finding that television programmes consistently depicted those in STEM as an ‘unmarried Caucasian man who did not have children, held a high-status science position, and was likely to be portrayed as being intelligent’, with this stereotype perpetuating the idea that this type of career is primarily for men. Additionally, these stereotypes can be perpetuated by parents, who have been found to have a significant impact upon the decision making of the child when considering the pursuit of STEM (Bleeker and Jacobs 2004), and by teachers (Saucerman and Vasquez 2014). EngineeringUK (2018) investigated the stereotypes surrounding engineering, finding that higher proportions of girls to boys considered engineering to be ‘too complicated or difficult’, ‘a career for men’, ‘dirty, greasy or messy’, or ‘boring’, with these differences in attitude between boys and girls visible amongst the youngest of the survey’s respondents (age 7-11).

A STEAM based approach

STEAM refers to the educational approach that uses Science, Technology, Engineering, Art and Mathematics as access points, guiding students' exploration, discussion and critical thinking (Wajngurt and Sloan 2019). In this context, the arts include the visual arts (including drawing, painting, sculpture, filmmaking, architecture, photography ceramics), literature (poetry, drama, prose fiction) and the performing arts (theatre, dance and music) (Braund and Reiss 2019). There is significant evidence for the benefits of this interdisciplinary approach, most notably as reported by Root Bernstein et al. (2008) in which it was found that Nobel laureates (awardees of one of the most prestigious awards available in STEM) were significantly more likely to engage in arts and crafts than others in the study, with these scientists citing their hobbies as 'stimuli for their science'.

Not only does STEAM allow for the students to increase creativity when exploring various concepts in STEM, but there are several associated advantages with this

technique that benefit the students, including enhancing the chance of retention and recall of information through the creation of additional neural pathways (Land 2013), making the activity relatable and fun, and providing a means for those who identify with the creative arts to bridge the gap and to explore STEM (Segarra et al. 2018). In incorporating the arts into STEM, the level of creativity and personalisation with regards towards an activity or task increases, creating a more engaging approach to STEM education (Boy, 2013), one more inclusive, capturing the attention of those that previously showed no interest in pursuing STEM (Wajngurt and Sloan 2019).

The aforementioned study by EngineeringUK (2018), in which girls were found to have stated that “having the opportunity to be creative” was an important factor for them when considering future careers. This idea that engineering does not allow individuals the opportunity to be creative was the first to be considered when designing the Aiming for Awesome workshops. In order to combat this idea, art was incorporated into various activities, in a bid to allow the

students to utilise their own creativity, and to expand upon the task at hand, reducing the influence of the workshop presenter, and allowing the students to take ownership of the activity. The activities included in the workshops in which the STEAM educational approach was applied included investigating forces through the design of aircraft constructed from paper, in which students were encouraged to follow the iterative design process; investigating prime numbers through designing posters; creating an airbrush while investigating the Bernoulli Principle (1738); and designing a rocket through employing the knowledge gained within the first three workshops, to name but a few.

Stereotypes

Engineering, along with computer science, have often been stereotyped as “male-oriented fields that involve social isolation, an intense focus on machinery, and inborn brilliance” (Cheryan, Master and Meltzoff, 2015). The issue regarding stereotyping can be best described through the term ‘stereotype threat’, in which individuals who relate to

certain negative stereotypes can feel that they be at risk of conforming to such stereotypes, and as such this can influence their performance in this area (Spencer, Steele and Quinn 1999). It has been found however, that in altering these stereotypes, by broadening the diversity of the individuals seen to work in engineering, and by giving a greater view of what the work in this sector looks like, and the environments in which the work is done, that girls' sense of belonging can be significantly increased, along with their interest in the field (Cheryan et al. 2015). As such, the Aiming for Awesome workshops were designed to combat the negative stereotypes associated with engineering, with each workshop beginning with a short interview with a woman in engineering, discussing their work, their passions and their interests within the field, broadening the students' perceptions of what an engineer looks like, as well as the various career paths that they can follow. The wide variety of career paths that the students could pursue were further highlighted throughout the workshops, with each workshop focusing upon a specific area within engineering (mechanical engineering, cyber security, and

communications). This again links back to the survey run by EngineeringUK (2018), in which it was found that girls had less of an insight into the wide variety of career pathways available to them in engineering than the boys who were surveyed. Furthermore, at the end of each workshop, a follow-on activity was introduced, in which the students were encouraged to go and explore a woman in the engineering sector who has made a large contribution to her particular field, with the aerospace design workshop featuring Elsie Gregory MacGill, also known as Queen of the Hurricanes, who was the first woman to earn a degree in aeronautical engineering, and a prominent feminist in 20th century Canada (Sissons 2009). Following on from this, the second workshop, titled communications, in which the electromagnetic spectrum was explored, encouraged the students to research Dr. Wanda Diaz Merced, a leader in the field of the sonification of astrophysical data, and campaigner for equal access to astronomy (Royal Society 2021), with her loss of sight giving her personal experience of the barriers that students and professionals with disabilities may encounter in the field. The third workshop,

investigating cyber security in engineering, featured the story of Margaret Beedie, one of the team that had worked as part of the secret code breaking effort at Bletchley park during the Second World War. Beedie was focused upon in this workshop not only because of her important work at Bletchley Park, but also due to her links with the Scottish Highlands and Islands, having been born on Harris, and living for the majority of her life in Aberdeen (Scotsman 2014). Finally, the last of the four Aiming for Awesome workshops, in which the students are asked to design and build a rocket using the knowledge they had gained from the previous workshops, featured three influential figures of the 1969 NASA Space Project, Mary Jackson, Katherine Johnson and Dorothy Vaughn, whose work aided in putting a man on the moon on the 20th of July 1969.

The introduction of role models, such as the women that have been featured throughout the Aiming for Awesome workshops, has been proven to have a significant effect when combatting negative perceptions around women in engineering (Kekelis and Joyce, 2014). A study by

Microsoft (2017) found that the influence of role models was in fact the greatest factor in driving girls' interest in STEM, with the second being practical hands-on experience, which again, the workshops provide, through the highly practical nature of each activity. Following on from this, teacher mentors, visible real-life applications, and confidence in equality were also found to have an impact. Additionally, through highlighting these women, who have all made massive contributions to their respective fields, the Aiming for Awesome workshops also highlighted that individuals in engineering can make a difference, and are valued for their work, with these being attributes that girls interviewed in the EngineeringUK report were found to have given salience (EngineeringUK, 2018). Assessing the effectiveness

At the time of writing this chapter, the workshops were still in development, with the hosting website currently in construction, and so it was yet too early to tell as to whether these workshops will be readily adopted by schools, with a second lockdown in the Highlands and Islands area impacting upon the students' education and putting further

pressures upon schools to make up for time lost in class. In order to assess the impact of the Aiming for Awesome workshop series on students in a shorter timescale, each set of workshops sent to schools will be accompanied by a set of questions for teachers, asking questions related to the engagement by pupils with each workshop, with a focus upon the degree to which girls and boys enjoyed the workshops, and the degree with which each gender interacted with the workshops. Again, due to constraints, this will require qualitative analysis, as no STEM Team members will be present to record this data, instead relying on teachers' responses. Due to the lack of presence of a STEM team member at the school, the quality of evaluation will be impeded, with evaluation questions minimised in order to ensure a response is given, with team members understanding that teacher time is valuable, and that too large an evaluation may be seen as 'off-putting', thus reducing the chance of any response being received. A competition accompanying each workshop has therefore been devised, with students being asked to draw and design a new type of aircraft, whilst thinking about the

concept of biomimicry as they do so, thus again allowing students to use creativity, and also linking to the curriculum once more, by encouraging students to think about the characteristics of living organisms, and how their characteristics allow them to adapt to their environments, whilst at the same time allowing the STEM Team to qualitatively assess whether the students were utilising the concepts they had learned through the workshops.

A note on intersectionality

Although this work focused primarily upon the issues in engineering surrounding gender, it cannot be ignored that within the realm of gender, lies a wide variety of further overlapping identities, including age, ethnicity, nationality, and sexuality. The overlapping of these identities can be looked at using the concept of intersectionality, a term credited to Kimberlè Crenshaw (1991). Although this project focused upon gender as the primary characteristic in which the intervention was designed to support, the STEM Team could not ignore the fact that within the area

of gender lies a wide variety of further marginalised characteristics, with the complexity of an individual's experiences with discrimination increasing with the number of markers of identity and difference (Ortiz and Garcia, 2013). The STEM Team, therefore, when designing the Aiming for Awesome workshops, worked to ensure the greatest possible representation, with the role models that the students were tasked with investigating displaying a variety of these characteristics that the students could relate to themselves, through the inclusion of women with disabilities, Black women, and a researcher from Puerto Rico. Whilst all role models were women, we ensured that the role models we selected were representing the widest possible group of characteristics amongst women, and as such, hope that these role models are representative of the widest group of our potential audience.

Conclusion

The University of the Highlands and Islands STEM Team were requested by the Royal Air Force to adapt a series of activities into curriculum-linked workshops for second level

primary students. These workshops were developed with the aims of highlighting careers within the engineering sector, whilst also focussing on targeting groups that are currently underrepresented within the sector, namely women, Black and ethnic minorities, and those within rural communities. In this chapter, the development of the workshops was discussed, primarily looking into how to tailor the workshops to be inclusive of girls, with women in the engineering sector found to be woefully underrepresented (EngineeringUK, 2018). As such, the workshops focussed upon creativity, incorporating the arts into the intervention, with this being a proven method of increasing engagement in STEM with girls (Boy, 2013; Segarra et al., 2018; Wajngurt and Sloan, 2019). Additionally, the workshops span a wide range of areas within the engineering sector, highlighting the variety of careers available in engineering, with a lack of understanding as to what engineering actually is being found to be a further barrier as to the pursuit of a career in this sector amongst girls (EngineeringUK, 2018). Finally, the introduction of a wide variety of role models, all women,

showcased that women can be successful in this field, whilst also highlighting various accomplishments made by women in the field, and highlighting the women themselves, all of which have been found to be effective methods of engaging with girls with respect to engineering, and STEM in general (EngineeringUK, 2018).

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Author bio

Blair Watson began his role of STEM Programme Coordinator in September of 2020. Blair studied Marine Science with the University of the Highlands and Islands, prior to progressing on to study a master's degree at the University of the West of England in Science Communication. He then headed up to Northern Scotland to begin his first professional role, developing and delivering school workshops as a representative of a marine charity, before beginning his position at the University of the Highlands and Islands.

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Highland Women in STEM

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Biomedical Sciences
University of the Highlands and Islands (UHI)

Abstract

'Highland Women in STEM' is a collection of 25 photographs of women who work or study in a STEM (science, technology, engineering, maths) related subject. The women all currently work in the Highlands or were originally from there. Unknown to many people, the Highlands of Scotland does in fact have a variety of STEM careers. This chapter presents the outcome of this project, the aim of which is to highlight the many inspiring women who are currently working in a STEM career in the Scottish Highlands and encourage more women to pursue a career in these sectors.

Keywords: Women in STEM, STEMInist, photography, science, technology, engineering, maths

Over the past decade there has been a general increase in the number of girls who choose to study STEM subjects and go onto pursue STEM careers. Data from WISE highlight that girls are doing just as well as boys in STEM subjects in secondary school and the same can be seen in further education. Despite these findings, women make up only 24% of the core STEM workforce. Therefore, there is a need to investigate the reasons why the number is so low post-degree. It is important to have women role models working in these roles to encourage more women into STEM courses and careers.

With this in mind, I undertook my 'Highland Women in STEM' photograph series to highlight the number of existing female role models that we already have within the region. During 2020 and 2021 I photographed 25 women who either work in a STEM career or are studying a STEM

related subject and are either originally from the Highlands of Scotland or they currently work there. Many of the photographs are of friends, two of whom I grew up with (and currently live with); a few photographs are of people I work with in the Genetics and Immunology research group at the University of the Highlands and Islands; and many of the photographs are of women I had never met before. Since this was my first time undertaking a photography project, I was nervous. At first, I rushed taking the photographs from fear of taking too long and worrying about other people's thoughts. I soon realised that although I felt intensely awkward behind the camera, I can be confident that most people are feeling the same in front of the camera.

Alongside the photographs are a selection of responses to questions that the participants chose from a large list. The participants shared so many good stories and opinions, that I found it difficult to choose what to include in this chapter. It was great to have conversations with other women from a variety of backgrounds and hear what they have to say. It was interesting to learn the various routes that women have

taken to get to where they are today. For some, they have always known what they wanted to do; others have come to where they are today in maybe a slower or less obvious way. I have learned about jobs and research that I never knew existed in the Highlands, even though this is where I grew up. The careers that are highlighted in this project are by no means exhaustive. There will be many more STEM careers in the Highlands that I have not come across, and many more women who I would have loved to be involved. The project was limited somewhat since we are in the midst of a global pandemic! Despite these tough times, a few of the participants have moved on to new and exciting things since I took their photograph which is so lovely to see. For example, Maria Luisa has finished her PhD, Nicola Chisholm has become a senior scientist in a lab in Glasgow, and Olivia Paulin - who said in her response to the questions I asked that she was looking to do begin a PhD- has done just that.

Many participants shared advice to other women thinking about pursuing a career in STEM. This was great to see

and I have included them here in the hope that they might help and inspire some readers. Events over the past few years have made me realise how important it is to make sure people recognise their own self-worth and it is up to us to make sure that happens. I am incredibly lucky to have grown up with and worked alongside many strong female role models and hope that I can be a role model for someone else one day. Through this photography project I hope to show the many inspiring women who are currently working in a STEM career in the Scottish Highlands and reimagine the typical representations of people who work in these occupations.

Maria Luisa Fiorello

PhD student, Division of Biomedical Sciences
University of the Highlands and Islands
BSc, MSc, University of Palermo

Gender equality and representation within and beyond
the University of the Highlands and Islands



Figure 9.1:

Photo of Maria Luisa Fiorello (Photo Credit: Chloe Rodgers)

What do you like about the location of your course?

Inverness is a beautiful location, filled with nature and stunning sceneries. People are friendly and welcoming and make you feel part of their small community.

When did you first become interested in your subject area?

I have always been passionate about science and human health. Since I was a little girl, I always dreamed to be a scientist. My interest in research progressively grew over the years. During my BSc in Biology and my MSc in Health

Biology, I focused my interest in the study of human biology and in the cellular and molecular alterations arising in human diseases. A few years later, I had the opportunity to start a great PhD project, regarding the relationship between diabetes and cardiovascular disease.

Kirsty Horrocks

Senior Manager Customer Quality & Statistics

LifeScan

BSc (Hons) Mathematics, Strathclyde University



Figure 9.2:

Photo of Kirsty Horrocks (Photo Credit: Chloe Rodgers)

What do you like about the location of your job?

I live in the Scottish Highlands so it cannot be beaten as a location. I have also enjoyed my online MSc where less than 10% of my classmates are from Scotland. It has been reassuring to find out that everyone has challenges with coursework no matter where they are in the world.

What do you think could be changed to better encourage more girls into your line of work/a STEM career?

There are many things that can be improved. Females make up 47 % of the workforce but less than 17% of all tech jobs. There is strong evidence to suggest that job advertising suffers from gender bias when competitive rather than collaborative wording is used. This is easily changed and should be applied to how we encourage girls into all areas of STEM.

Perrine Le Gren

Graduate Engineer

Lifescan

French “Diplôme d’Ingénieur” in Material Science, equivalent to a Master’s degree (5 years post graduate)



Figure 9.3:

Photo of Perrine Le Gren (Photo Credit: Chloe Rodgers)

How did you come to work and live in Scotland?

I had visited the country ten years ago, but never thought I would come live here, although the idea sounded great! I was looking for graduate job offers in the United Kingdom and found out about the LifeScan graduate program. I didn’t know the company and I was very interested by the job

description and the possibilities of exploring various parts of a business.

What do you like about the location of your job/course?

The Highlands is a lovely place to live in but especially all the people I have met make this place a good environment to work. Finding a job is important, but my priority was to find the job that would make me want to go to work with a smile on my face every day. This is what I found by moving up here. Working in the medical industry, I am proud to say that my work has an impact on some people's everyday life.

Saoirse Walker

Statistician

LifeScan

MA Economics, University of Edinburgh



Figure 9.4:

Photo of Saoirse Walker (Photo Credit: Chloe Rodgers)

When did you first become interested in your subject area?

In school, I was fortunate to have enthusiastic and supportive teachers. As GCSE and A-Level options came up, I kept choosing subjects I enjoyed and that is how I decided to study economics at university and ended up in my current role as a statistician.

What's the best career decision you've ever made?

Getting work experience/internships early on. They are a great way to get a taster of different industries and job roles and helped me find a sector I enjoy working in.

Shraveena Venkatesh

PhD student, The Rivers and Lochs Institute

University of the Highlands and Islands

Master's degree in Marine Biodiversity and Conservation,
Ghent University, Belgium

Bachelor's degree in Zoology, Botany and Chemistry, Christ
University, Bangalore



Figure 9.5:

Photo of Shraveena Venkatesh (Photo Credit: Chloe Rodgers)

When did you first become interested in your subject area?

I developed an interest in marine animals when I was about 12 years old. I spent time at beaches collecting shells, following crabs and wondering what other animals lived in

the vast oceans. I watched a lot of documentaries about marine life and read a lot about the most charismatic marine animals too. While doing my bachelor's and master's degree this passion of mine strengthened.

What do you love about your course?

My favourite thing about doing a PhD is that I learn something new and interesting every single day. It's been a very exciting and rewarding journey so far. In the office and lab, there are other PhD students and researchers working on various subjects, each bringing a different perspective to our daily discussions and conversations and teaching me something new. Several of them are intelligent, capable, young women, successful in their fields, which makes it a very inspiring environment to be in.

Philomena Halford

Research Technician, Genetics & Immunology team
University of the Highlands and Islands
HND Biological Sciences, Abertay University
BSc Life Sciences (Hons), Open University



Figure 9.6:

Photo of Philomena Halford (Photo Credit: Chloe Rodgers)

Were there any particular individuals who inspired you to do what you do?

My higher biology teacher. I believe a good teacher is crucial, nothing will put a student off more than a teacher or lecturer who has lost their interest in their field and in their students.

Are there any standout moments/points of your career?

Being involved in work which led to published scientific research and having a research paper published. Also, hearing student's feedback, telling me they finally "get it" with a difficult scientific concept. When a student is accepted to the course they have so wanted to do or have achieved their academic goals.

Nicola Chisholm

Scientist

Scottish Water

BSc (Hons) Biochemistry & Pharmacology, University of
Strathclyde



Figure 9.7:

Photo of Nicola Chisholm (Photo Credit: Chloe Rodgers)

What do you love about your job?

I love that my job is a service to public health. When I tell people about my work, they are often amazed as they never realised analytical scientists are required and exist in the water industry. Most people don't know about the essential quality control testing that is ongoing every day to enable

safe drinking water. It's a rewarding feeling knowing you're doing something to support society.

What do you think could be changed to better encourage more girls into your line of work/a STEM career?

Growing up your stereotypical scientist was often a 'geeky' man working alone. It's important that we break this stereotype. It's necessary that from a young age schools focus on bringing science into the classroom and that society makes a conscious effort to portray female scientists in textbooks, online, on television, wherever!

Nicole Brace

PhD student, Division of Biomedical Sciences

University of the Highlands and Islands

MRes in Biomedicine, UCL

BSc (hons) in Biochemistry, the University of Manchester



Figure 9.8:

Photo of Nicole Brace (Photo Credit: Chloe Rodgers)

What do you love about your job/course?

I love being in the lab, I find that time flies by and enjoy the excitement of planning and conducting experiments. Although it can be very frustrating when experiments do not work it is often thought-provoking and interesting when they do. I also like the idea that my research could potentially

lead to advances in health and have a positive impact on the world.

Are there any standout moments/points of your career?

I have been lucky enough to attend both national and international conferences during my PhD. In addition to the joy of travelling and networking that accompanied these, I received the early career researcher award at the Scottish Metabolomic Network symposium in 2018 and the Christopher C Harris travel award at the Bioactive Lipids in Cancer Inflammation and Related Disease conference in 2019. These awards have provided me with the confidence and drive to complete my studies and aim for a successful academic research career.

Dr Antonia Pritchard

Senior Lecturer (Genetics and Immunology of Melanoma)
University of the Highlands and Islands
B.Med.Sc, University of Birmingham
PhD, University of Birmingham



Figure 9.9:

Photo of Dr Antonia Pritchard (Photo Credit: Chloe Rodgers)

Have your studies/work taken you to any exciting places?

After finishing my PhD in 2005, I had the opportunity to undertake a post-doctoral research position in Australia. I thought I'd be out there for a couple of years, but it turned into 12! It was one of the best decisions of my life and shaped who I am as a researcher, how I approach my work

and taught me the power of a strong network of likeminded researchers around the world.

Were there any particular individuals who inspired you to do what you do?

I have been working as a melanoma researcher since 2012. In 2019, a post-doctoral researcher in my group was diagnosed with a particularly aggressive melanoma and sadly despite all the amazing recent research advances in melanoma treatment, she succumbed to her disease just 11 months after her diagnosis. After being with her through her illness, I have a different insight into the importance of research and am inspired by her every day to keep going to understand this terrible disease.

Naomi Rodgers

MSc Health Psychology Student

University of Stirling

BSc (Hons) Psychology, University of the Highlands and
Islands



Figure 9.10:

Photo of Naomi Rodgers (Photo Credit: Chloe Rodgers)

What do you love about your course?

I like that the course was designed to help you gain the skills that are required to work in academia, or as a Health Psychology Practitioner. I found the course content was engaging and particularly relevant to the Scottish Health Context. The team at Health Psychology Stirling are also a lovely bunch!

What words of encouragement could you give to other women in STEM?

Rise to the challenge, be your unique and awesome self. Do what is actually right for you, not what society implies is right for you. It is ok not to know where you're heading. What is important is that you embrace and reflect on each experience that comes up. Although I have a good idea of what career I want to achieve, the journey to that career will be just as important. Be adventurous, creative and think about what transferable skills you can gain that will help you within STEM.

Tracey Cruickshank

Customer Services Manager – Learning and Information
Services

University of the Highlands and Islands

BA (Hons) Business Studies, Napier University



Figure 9.11:
Photo of Tracey Cruickshank (Photo Credit: Chloe Rodgers)

Were there any particular individuals who inspired you to do what you do?

When I first fell into an ICT role, the team I worked in was 70% women, which was (still is) very unusual, including the head of the department and all the line managers. They were a fierce group of women who all encouraged me.

**Are there any standout moments/points of your
career?**

Being the only female in a team of 46 technicians responsible for implementing Unix projects for a blue-chip organisation, and the first female that team had employed.

Stephanie Byrne

Graduate Process Engineer

LifeScan

Chemical Engineering, University of Strathclyde



Figure 9.12:

Photo of Stephanie Byrne (Photo Credit: Chloe Rodgers)

When did you first become interested in your subject area?

Throughout school I always wanted to become a doctor. However, after completing a placement at a hospital in my fifth year of high school, I decided it wasn't for me. This was very daunting as I had to go back to the drawing board to decide my career path with little time to decide. I started

with the basics; I always loved Maths and Chemistry, so I scanned university brochures looking for potential matches. That was when I came across Chemical Engineering. I didn't know much about this course but after attending an open day at Strathclyde University, I was sold!

What do you think could be changed to better encourage more girls into your line of work/a STEM career?

I think it's important to increase the visibility of many STEM courses/career paths at a younger age allowing young women to explore the extensive range of options available and choose a path that complements their skillset. This may help to eliminate the misconception that all engineers need to be 'hands on' and good with tools which is something which can put some young women off engineering.

Sophie Macleod

Graduate Engineer

LifeScan

MEng Architectural Engineering, Heriot Watt University

Gender equality and representation within and beyond
the University of the Highlands and Islands



Figure 9.13:

Photo of Sophie Macleod (Photo Credit: Chloe Rodgers)

What do you like about the location of your job?

After studying in Edinburgh, this job in LifeScan allowed me to return home to Inverness and be back in the Highlands enjoying the outdoors and getting to spend time with family.

Was there a moment where you knew you were going to go on to what you are doing today?

Absolutely not! I went to university to do a degree in Architectural Engineering. I expected myself to be in a job in the construction industry or building design. I never imagined I would end up working for a medical company. I

didn't feel fulfilled by a career in building services after completing a work placement and wanted a new challenge. The graduate programme at LifeScan gives me new experiences every day and allows me to explore various job roles throughout the programme.

Olivia Paulin

Pre-registration Pharmacist
NHS Highland
Pharmacy, University of Strathclyde



Figure 9.14:

Photo of Olivia Paulin (Photo Credit: Chloe Rodgers)

Are there any standout moments/points of your career?

When I was 19, I went to Melbourne for a three-month research internship at Monash University, where I investigated novel ways to ameliorate the dose-limiting nephrotoxicity of polymyxin antibiotics. This experience proved invaluable as it gave me my first glimpse into life as

a researcher, spurring me to pursue this career path after university.

What are your future goals?

I am currently completing my pre-registration training year at Raigmore Hospital but am also in the process of applying for PhDs in the field of infectious disease. Overall, I hope to obtain my doctorate and help to contribute to the increasingly important research currently being undertaken to tackle antimicrobial resistance.

Mairi Stewart

STEM Programme Coordinator

University of the Highlands and Islands

BSc (Hons) Ecology and Conservation, University of St
Andrews



Figure 9.15:

Photo of Mairi Stewart (Photo Credit: Chloe Rodgers)

What do you love about your job?

My role within UHI is to run projects that promote Science, Technology, Engineering and Maths to young people in the Highlands. This can involve anything from running STEM activities in schools, to providing loans of STEM equipment and training school staff on different areas of the STEM curriculum. My favourite bit about my job is being able

show young people how fun and exciting STEM subjects can be!

What advice do you have for other women to be successful in a STEM career?

My advice to anyone starting out is to not be scared to change your mind! I have had lots of different jobs since I graduated and had no idea the job I do now even existed when I was at university. Try as many different things as you can until you find something that you really are passionate about.

Kirsty Pryer

System Administrator & Managing Director

Calico UK

HND in Administration and Information Management, Inverness
College



Photo of Kirsty Pryer (Photo Credit: Chloe Rodgers) Figure 9.16:

What do you think could be changed to better encourage more girls into your line of work/a STEM career?

This is something that needs to be encouraged by schools and families from as young an age as possible. Having girls being led into having an interest in computers and technology in primary school is essential. In the Highlands

there's almost no computing on the curriculum in secondary schools. That fundamentally has to change so that the subject choices are available for all students. I initially found out about the STEM Ambassador scheme via Girl Geek and it's been my deliberate intention to put myself out there as a woman in a STEM career.

What words of encouragement could you give to other women in STEM?

I think there's an unconscious bias in us, that it's the role of men to take up STEM related careers, while women do those more 'caring' jobs. We have to challenge those views. It all comes down to confidence. You are good enough for the course, you are good enough for that career choice. Just go for it!

Ellen Torrance

Optician

Specsavers

BSc (Hons) Optometry, Glasgow Caledonian University



Figure 9.17:

Photo of Ellen Torrance (Photo Credit: Chloe Rodgers)

What are your future goals?

I would really like to do something to encourage equal access to eyecare across the globe. Cataracts are still the world's leading cause of blindness; something that takes 15 minutes to solve in this country.

What words of encouragement could you give to other women in STEM?

Women are resilient in nature – there is still much subtle and unconscious bias facing us in all aspects of life, but with perseverance and more representation in the STEM field, we can transform the scientific landscape in the decades ahead and contribute so much positivity and knowledge to the world.

Gender equality and representation within and beyond
the University of the Highlands and Islands

Celia Delugin

PhD Student, The Rivers and Lochs Institute

University of the Highlands and Islands

Degree in Agronomy and Agro-ecology, National School for
Agronomy and Food Science (Nancy, France)

Master's Degree in Ecosystem Management, University of
Lorraine (Nancy, France)

Research project on eutrophication of alpine lakes, Alpine
Centre for Research of Trophic Network and Limnic
Ecosystems (Le-Bourget-du-Lac, France)



Figure 9.18:

Photo of Celia Delugin (Photo Credit: Chloe Rodgers)

**What advice do you have for other women to be
successful in a STEM career?**

Sometimes, you might feel like you do not belong, a lot of us feel the “impostor syndrome” at some point in our career. Do not let your inner saboteur stop you from doing what you want to do. Try to surround yourself with good and supportive collaborators, get involved in new projects, don't be scared to step out of your comfort zone, offer your unique perspective and support other women!

What do you love about your job/course?

I love the interdisciplinary aspect of my project. My background is essentially in natural sciences, but I've always had a strong interest for the social aspect of conservation. I remember looking for PhD projects in Scotland, and I fell in love with this one! I am surrounded by an amazing group of women here in Inverness, involved in many different projects. It is so rewarding to be able to share our research, hear feedback and discover other fields within the Institute. I am lucky to be part of such an amazing and dynamic team.

Charlotte Pritchard

Government vet (officially, Senior Veterinary Inspector)
Animal and Plant Health Agency
Bachelor's in Veterinary Medicine and Surgery, University of
Edinburgh
Masters of Science by Research, Bangor University



Figure 9.19:
Photo of Charlotte Pritchard (Photo Credit: Chloe Rodgers)

What are your future goals?

I would like to specialise in field epidemiology (endemic and exotic diseases) and become a Veterinary Adviser at some point down the line. It would be interesting to have the chance to influence policy as well as working in the field.

**What do you think could be changed to better
encourage more girls into a STEM career?**

Name five famous female scientists. Hard, isn't it? I think that we need more female representation – from the history we teach in schools to the people we choose to print on our bank notes. There should be no gender default for a career in STEM.

Chloe Cuthbertson

Statistical Programmer

LifeScan

BSc Mathematics, Heriot Watt



Figure 9.20:

Photo of Chloe Cuthbertson (Photo Credit: Chloe Rodgers)

When did you first become interested in your subject area?

At school learning maths always came quite naturally to me, which I think really helps with enjoyment of a subject! However, most of the way through high school my favourite subject was PE and I intended to go on to study sports science, without really having a particular career in mind. In

sixth year, whilst researching possible careers, I realised just how many options are open to maths graduates and this persuaded me to choose a maths degree instead.

What words of encouragement could you give to other women in STEM?

I would really encourage any young women, particularly those who leave school undecided on what career they would like to pursue, to consider further study or jobs in STEM-related disciplines. It really does open a world of opportunities. My degree is in maths and it did not include any programming at all, but it allowed me to get in the door as a statistician at LifeScan which gave me a chance to try my hand at programming. It was something I had never even considered, but now I am a Statistical Programmer and whilst I still do other things, programming is definitely my favourite part of the job!

Daria Antipova

PhD student

University of Aberdeen

MBChB Medicine, Siberian State Medical University

MSc, UCL



Figure 9.21:

Photo of Daria Antipova (Photo Credit: Chloe Rodgers)

Was there a moment where you knew you were going to go on to what you are doing today?

I was researching ageing of the human brain during my master's course, which inspired me to do a larger project. As a result, I applied for a PhD to study whether ultrasound of the head could be helpful for detecting blocked vessels and bleeds, which means life-saving treatment could be given sooner. This would be particularly useful to people living in remote and rural areas, far from hospitals.

What do you love about your job/course?

What I like the most about my work is that it has practical application and could make a real difference to healthcare.

Dr Evelyn Gray

STEM Projects Coordinator & Inverness Science Festival
Coordinator

University of the Highlands and Islands

BSc Hons Human Biology, Aberdeen University

PhD Orthopaedic Surgery, Edinburgh University



Figure 9.22:

Photo of Dr Evelyn Gray (Photo Credit: Chloe Rodgers)

What's the best career decision you've ever made?

A lectureship in Dubai. This offered an opportunity to develop a general biological/science course that all students no matter their area of study, had study for one semester. This was demanding but developed my lecturing, science engagement and coaching skills. Designing a

course aimed at students from across the faculties was challenging but opened my eyes to the cross curricular nature of science education, covering the subject matter whilst attempting to relate a proportion of the course work to the students' own interests and experiences.

What's the worst career decision you've ever made?

Moving to Dubai! Whilst I loved the challenge of the lectureship this took me out of the research world. After a break of eight years, I found it impossible to move back into this field. I remained in science engagement but feel that a career break (for whatever reason) in research makes it very difficult to re-establish oneself. I did enjoy my career in the Middle East but on reflection would have preferred to combine a research career with an opportunity to lecture: moving into lecturing and course development and out of academic research was the worst career decision I have made.

Kirsty Campbell

Graduate Scientist

LifeScan

MSc Pharmacology, University of Dundee



Figure 9.23:

Photo of Kirsty Campbell (Photo Credit: Chloe Rodgers)

When did you first become interested in your subject area?

In my final years of school my favourite subjects were biology and chemistry, and I was particularly interested in human biology. I went to the University of Dundee for a

Biomedical Science degree and learnt about the function of the human body in both healthy and diseased states. As I progressed, I became particularly interested in metabolic disease (mainly diabetes and cardiovascular health) and as part of my honours and masters project was able to investigate these in a lab setting, which introduced me to various methods used to investigate these diseases. This hands-on experience helped better my understanding and develop analytical skills.

What do you love about your job?

Currently, I am on a graduate programme at LifeScan. LifeScan manufactures glucose monitoring products to help people manage their diabetes, so given my previous experience in diabetes research, it seemed like an ideal company to work for. The graduate programme consists of four six-month rotations which allows you to experience many aspects of business.

Lisa Munro

Technical Manager

Norbord Europe Ltd.

Meng Chemical Engineering, University of Strathclyde



Figure 9.24:

Photo of Lisa Munro (Photo Credit: Chloe Rodgers)

What words of encouragement could you give to other women in STEM?

I still work in an extremely male-dominated environment, with only four females out of 120+ onsite! It might not be for everyone. But it feels great to get stuck in, and I would encourage each any girl who is considering a STEM career to absolutely go for it! The opportunities of different roles in

different industries are endless, so many skills are transferable, and it makes a real difference looking forward to future society. Nothing is off limits.

What are your future goals?

My goal is to become a chartered engineer with the IChemE in 2021 - my application has been submitted! I also aim to develop my team into a different direction than has been taken before, and help my company become the industry leaders in innovation and development of products.

Amy Macleod

Statistician

LifeScan

BSc Mathematics and Statistics, University of Strathclyde



Figure 9.25:

Photo of Amy Macleod (Photo Credit: Chloe Rodgers)

When did you first become interested in your subject area?

I enjoyed maths from when I was in school, mainly because I was good at it – but it was not until I was at university that I discovered just how much of the world is impacted by maths and mathematical theory, this is when I developed a real interest in the subject.

What do you like about the location of your job?

My role is based in Inverness and I love being based in the Highlands; it enables me to spend my free time doing what I enjoy most, exploring the beautiful sights and being outdoors. I get to work in my desired industry and live in my favourite location, providing me with the perfect work/life balance.

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Author bio

Chloe is a final year PhD student at the University of the Highlands and Islands. Her research is focussed on the role of the humoral immune response to melanoma. Prior to studying in Inverness, she received her Honours degree in Biochemistry and Pharmacology in Glasgow at the University of Strathclyde.

In her role as an EQUATE STEM champion, Chloe is keen to promote science, technology, engineering, and maths (STEM) as a career path for women. With an aim to show

people the many inspiring women who are currently working in a STEM career in the Scottish Highlands, she has embarked on a photography project that reimagines the typical representations of people who work in these occupations.

Gender Studies: Library provision and support via a Gender Studies 'Libguide'

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Abstract

Library provision for Gender Studies varies across universities. This book chapter is designed to show how a 'Libguide' – in this case a collection of Electronic Resources (eResources) in the subject area of Gender Studies, can be compiled from existing eResources held by or available to the University, when a Gender Studies course does not formally exist in the University.

Keywords: eResources, electronic resources, library, eBooks; eJournals, gender studies

Background

The Gender Studies libguide (<https://tinyurl.com/yrnsvz6p>) and this eBook chapter are the outputs from the author's presentation at the University's International Women's Day event in March 2021. The organisers of the International Women's Day event wished to show how the University Library Service could support colleagues in addressing the theme chosen by UHI: Gender in the curriculum. The presentation given by the author, the University's Electronic Resources (eResources) Manager, focused on library provision and support for 'Gender Studies' in the current university curriculum, showcasing the materials in the newly developed libguide as examples. The author demonstrated some of the library and freely available content already available to colleagues and showed how some simple search strategies could be used to source appropriate materials for teaching and learning and research.

The topic of Gender Studies was chosen by the author of the libguide as 'Gender Studies' is a broad term which

covers many interdisciplinary fields, as noted by Woodward and Woodward (2015). Even though the University does not have a specific Gender Studies course the guide's author felt that a Gender Studies libguide would highlight the interdisciplinary nature of the topic. The author hoped the guide might encourage the University to embed elements of gender studies in modules across the University curriculum, more so than may already be happening. The guide was developed by the author of this chapter, the University's eResources Manager, who has nearly 25 years of experience (as of 2021) in supporting students, researchers and academic staff in finding and using materials appropriate for their subject areas.

The university library service

The university library service provides and facilitates access to materials including: print and electronic books (eBooks), electronic journals (eJournals), and electronic content (eContent) e.g. reports, maps and audio-visual materials. It does so, in the first instance, via the web pages

of the University library service <https://tinyurl.com/p4keassr> via a variety of routes including Libguides' - <https://tinyurl.com/ym932jwx> a tool which is used to create and manage web pages.

Gender Studies Libguide

What is a Libguide?

A Libguide is a third-party tool that can be used to curate and share information via web pages - in this case via a subject guide on 'Gender Studies'.

The tool makes web pages easy to create in a user-friendly format and can be adapted to any subject area. A libguide is a useful tool for libraries and institutions because using the libguides tool to create content does not require staff to have an in-depth knowledge of HTML to create information pages. Libguides are flexible – for example web links can be added, links can be drawn from other guides already created, videos can be embedded, and the layout can be easily changed to suit the university style or to produce a

coherent style across different guides. They can be created to appeal to different learning styles and can be more visually appealing than a standard reading list or web page.

A libguide is a useful tool for getting gender into the curriculum because it is created as a series of short web pages, with content that acts as a starting point for discussion about gender studies and the topics this subject area covers. Students are not faced with a long reading list or left wondering where to start looking for information on the subject. Students and staff have their attention drawn to resources that already exist in this subject area and the libguide can promote engagement with subscribed and freely available resources in this subject area. This is important as staff as well as students are often not aware of the resources available to them in subject areas, and the guide, or sections of the guide, can act as an aide memoire to the subject area. The guide could also be used to encourage users to think about entrenched attitudes in the subject area, by pointing out materials that could challenge those entrenched attitudes.

The guide can be easily adapted to accommodate more pages, or different content, meaning academic staff can work with library staff to source appropriate materials to appear on the guide. The creation of the guide can therefore be an iterative process between the academic staff and the librarian, responding quickly to changes made by academic staff to their modules, to the overall course design or to the inclusion or removal of new materials as they become available or discontinued. Academic staff can embed links from the guide into the modules or weekly learning in the Virtual Learning Environment, as well as easily refer students to materials in the libguide in their lectures or assignment notes.

In creating a libguide designers should think about the course level(s) of the students they are aiming at, as well as the topic and subject areas that the guide might be used in. The guide should be visually appealing and have a layout that is easy to follow. It should contain a mix of copyright cleared content e.g. books, journals, websites, images and audio-visual material. Libguide authors and

their collaborators should think about the format, and formatting of the guide and the number and types of resources per page on the guide. There can be links from the guide to other pages of the library website where appropriate e.g. general information about accessing eBooks or eJournals, or borrowing rights for print books. It is important to keep the information as succinct as possible to encourage the user to explore different pages of the guide.

About the university 'Gender Studies' guide

The Libguide concentrates on highlighting gender studies materials within sociology and science, along with examples from other topics. Sociology and Science were chosen by the author of the libguide for reasons of intellectual curiosity on the part of the author. The author is aware that the University has several courses and modules in these areas and wished to demonstrate to university staff and students how resources incorporating gender studies could be used within these two subject areas. These

subject areas are also broad enough to allow the library to highlight individual items and collections covering gender studies and to show where there might be gaps in provision.

The Libguide, as it has been developed up until the date of the presentation, is designed to be a starting point for the University to highlight eContent which could be used to embed Gender Studies into the curriculum in different subject areas. The guide is considered a 'work in progress' and the eResources Manager welcomes collaboration with University staff in the continued development of the guide, or any guides that may develop as a result.

Structure of the guide

The guide is split into 5 main web pages: 'Home', Gender Studies: Science, Gender Studies: Sociology; eCollections and 'Other Resources'.

- 'Home' – the home page of the guide where an explanation is provided for the reason(s) this guide was created.

Gender Studies: Science and Gender Studies: Sociology are pages created with subpages – for eBooks and eJournals.

- The eBooks and eJournals sections are split into two sections: individual items (eBooks/eJournals) and collections of said material, that specifically cover Gender studies in either Science or Sociology.
- eCollections
There are three subpages: eBooks Collections, eCollections and eJournals. The eBook and eJournal collections contain materials which are in full text but are not specifically tied down to their Gender Studies collections. They are designed to provide examples of resources held by the university, or available via open access, that might hold materials which could be used to research the topic of Gender Studies.

- 'Other Resources'

This page is a mix of reports, videos, societies', links to government websites, that could be included in the field of gender studies. As with the other pages it is not intended to be exhaustive.

Curating the guide

Throughout the guide there are materials highlighted which are focussed on particular topics within Gender Studies, but there are others that cover gender studies in broader aspects and could be used irrespective of specific modules.

The geographical focus of the content is not limited to examples from the UK alone, or only from UK publishing houses. In the Science web pages materials highlighted include content on medicine, sexual violence and psychology to reflect some of the topic areas where gender studies materials exist. In the Sociology web pages some of the materials highlighted were chosen to reflect the roles and challenges of women from the UK and elsewhere in the

world. For example, women directors in China and India, taxation as it relates to women in Australia, the journal 'Gender and Research'- a non-English interdisciplinary journal of gender studies and feminist theory. Journals were not confined to the English language, as there are free translation tools that can be used (to varying degrees of success), to read journal articles not in the English language.

The gender focus of the materials recognised that the Libguide has been developed for International Women's Day, and as such much of the highlighted content focuses on women and their roles, struggles and successes in society. However, given that women live alongside men and that men have roles, struggles and successes in society, there is content in the guide that relates to the male experience of aspects of life, and the support they can provide women in their lives. For example there is an eBook on male survivors of wartime sexual violence, and there are links to societies that support men and women experiencing domestic abuse. There are also links to

journals that investigate topics linked to gender studies where the journals topics are not gender specific.

Alongside general internet searches the author investigated the public facing libguides from other institutions that have been created to support Gender Studies. For example, eCollections held by institutions that were the same as those held by the University and that are already used by staff and students in their modules. The author did not copy any guide in its entirety as the guides are specific to their own institutions. The author also gratefully acknowledges the support of University non-academic colleagues in pointing the author in the direction of websites that were subsequently used in the guide. Further, the author found that the University's staff training module, 'Gender Based Violence', was useful in providing suggestions to the author on the subject areas and topics that the guide might cover.

Although the university library service has academic collections that are subject specific e.g. Sociology, Crime, Psychology, Education, Medicine as well as generic

collections the library service has no eResources collections that specifically focus on Gender Studies. The author felt that searching subject specific collections would suggest to users that these were the only ones that could assist them in their research and provide a narrow focus for their research. The author used generic collections to highlight the 'hidden content' could be found through them that researchers might not be aware of. The collections that were investigated included both subscribed to and open access collections.

Curating the content: searching for and highlighting the materials

The author identified resources for the Libguide using a mix of 'keyword' and 'subject' searches on the eResources platforms then modifying the searches from the results.

Although eResources collections vary in aspects of their design there were some general rules applied for limiting or expanding the results from the searches. A 'basic' search was done in the main search box of each collection. When

the results were obtained the author reviewed the search expanders and limiters that are on either side of the screen. These included, but were not limited to, subject areas, publication years, languages, geographical locations, available (owned, subscribed or Open Access) or unowned. The author viewed the abstracts of the (un)available content to briefly review it and assess whether it might be worthwhile adding it to the libguide or highlighting it in the presentation. The author demonstrated these search strategies as part of the presentation.

Using the 'Advanced Search' allowed the author to be more specific from the start, as limiters and expanders are provided on that page, although not necessary to the extent that they appear once the search had been undertaken.

The results of the searches were assisted, or otherwise, by the quality of information that was available in the records that are being searched. The more information there was in the searchable fields about the content of the item, the

more likely it was that potentially useful items for the libguide were highlighted.

Using the 'Keyword' search, the author searched through the title, source and contents information of the item to produce results.

For eBooks the author investigated collections that consisted solely of eBooks, for example Oxford Scholarship Online, and also investigated collections that consisted of a mix of eBooks and eJournals. The author wanted to highlight that individual eCollections combining eBooks and eJournals could be used to search for eBooks as well as eJournals. For example, the author searched the Science Direct collection, a subscribed collection that is typically thought of as being predominantly eJournals using the phrase 'gender studies'. The author combined 'Gender Studies' with the subject 'Sociology' from the choice of subjects provide and narrowed the resources to eBooks, which provided just over 1900 full text and abstract eBook chapters. These results were available because the

institution is currently subscribing to an eBooks collection on Science Direct. A link to this search is contained in the guide in 'Sociology -eBook Subject Collections' page.

A similar type of search was done with eJournals, where the author searched for eJournals in eJournal only collections. The eJournal collections investigated for the guide are a mix of full text, full text and abstracts, and abstracts collections. For example in the Science web page the author highlighted BioMed Central, an open access platform, where the search was structured around the terms 'women and gender', producing over 99k articles as well as searching in collections that included eBooks and eJournals combined.

The 'keyword' search could produce many results, but not all of them were necessarily relevant to the topic being investigated. The author highlighted the results of searches and also highlighted individual items in the guide which the author felt would draw attention to interdisciplinary areas covered by 'gender studies'. Using the 'Advanced Search'

to combine search terms in the keyword search or to use the Subject Search allowed the author to narrow results. The author also used other terms to search for materials e.g. gender identity, gender expression, women's studies, men's studies, feminism, gender equality, transgender, women and health.

The author searched collections that were a mixture of full text and abstracts to highlight appropriate resources that could be found via both types of materials and to point out that subject terms, or keywords that might need to be used, could differ between collections. The author highlighted particular resources in the libguide to show how it is possible to narrow collections down to searches within particular publications, publication years, content type e.g. conference paper, video segment, reference work, if they are available in the collection, as well as searching through the more standard article or book content type and to highlight the availability of unowned, but potentially useful, content.

For example, using the term, Gender Studies, in the Springer eBooks and eJournals collection held by the university, and ordering by 'relevance' as opposed to date of publication, approximately 781,000 results were found by the author, including preview articles. These was narrowed down by content type e.g. articles, taking the results to approximately 495,100. The author then narrowed it by discipline e.g. Medicine & Public Health, taking the results down to approximately 271,900 articles. Then by sub-discipline e.g. Public Health, to approximately 42,200 articles and then by language e.g. English, taking the results down to approximately 41,800 articles. Searching for gender studies and sociology, and using the same limiters as previous, brought the search down to approximately 7900 articles.

The author created stable links for these 'micro-collections' (collections within collections) either by using the stable link provided for the result or modifying the link in the browser. The author chose individual items from within these collections, eBooks and eJournals, to highlight the

interdisciplinarity of the subject, 'Gender Studies', and to inform researchers of possible topics for debate in their research.

The author decided to highlight the diversity of eResource materials of different media e.g. images, videos, reports, organisations that are available to users in this subject area – both freely available on the internet and via subscribed collections. Assessing the quality of materials from these sites was done by investigating the publishers of the materials. The author considered possible biases and legitimacy of the publishers, cross checking them against sources containing more information about them and checking them, as far as was possible and reasonably practicable, for accuracy and content availability. With any of the freely available resources on the internet the author was aware of the need to read any Terms and Conditions and Privacy Statements for these resources before the decision was taken to highlight them. If the author was not comfortable with the terms and conditions the resources were not highlighted.

Links to freely available documents reports, societies, organisations, images and videos, from within Scotland and elsewhere were sourced with the intention of being examples and not exhaustive lists. They are intended to highlight work being done or issues being faced by women countries in different parts of the world either currently or historically, in rich and poor countries. The author recognises that these pages, along with others in the guide, are appropriate for further development.

For example, under 'Other Resources' the 'Government Departments/Organisations' page highlights organisations - the role of the Scottish Government, the European Parliament and the United Nations. The role that poverty can play in stifling women and children's access education and employment was explored in examples highlighted in documents in 'Other Countries-Reports and Articles' – again, taking examples from the UK and the wider world. Links in 'Other Countries, Societies and Organizations' were chosen, in part, to reflect the role played by men in supporting women in society and education, as well as

highlighting challenges faced by men and women who have suffered from or are suffering from gender-based violence.

In 'Other Resources – Videos' the author chose materials that reflected difficulties faced by women historically and currently. The author reviewed a University subscribed video collection, when reviewing possible audio-visual materials, linking to an example in the guide. This allowed the author to gain access to subscribed licenced materials, held by companies such as the BBC, that might not otherwise be available. Outside of the subscribed materials the author used a documentary from the BBC iPlayer to note to users the possible restrictions imposed by providers on access to their content – the BBC iPlayer only permitting access to materials if the user can evidence living in the United Kingdom. The author also sourced freely available videos via avenues including You Tube and news outlets - UK and/or international – to highlight current challenges faced by women in developed countries and in a war-torn country. Images were taken from sites requiring a username and password and from sites feely available to

researchers. The author acknowledges the lack of images in the guide – this was due to the author being unsure which images would be appropriate in a public facing guide.

How the content is/has been sourced

In so far as is financially practicable the University library eResources are sourced to suit the needs of the courses taught, and the research conducted, at the University. To achieve this the eResources Manager works with library colleagues, academic staff, the University Research office, and eResources suppliers to obtain knowledge of eResources required and to then obtain and provide access to appropriate eResources content. Examples of these eResources are highlighted in the guide.

Broadly speaking there are four main routes that eResources content is sourced: outright purchase, subscription, open access (<https://tinyurl.com/3pyrnzcf>) and freely available. The eResources Manager obtains materials for use by the University via the SHEDL purchasing consortium <https://tinyurl.com/52ck8kuv>, and

JISC Collections <https://tinyurl.com/hu2mwhsb>, with advice and guidance from APUC <https://tinyurl.com/493k592f> . Subscriptions and purchases are also made directly with University approved suppliers, where those suppliers do not provide the resources via SHEDL or JISC Collections.

As noted above the eResources Manager has also made use of freely available resources, including reports and audio-visual materials, for this guide. As with any of the freely available resources on the internet the author was aware of the need to read any Terms and Conditions and Privacy Statements for these resources before the decision was taken to highlight them. If the author was not comfortable with the terms and conditions the resources were not highlighted.

The eBooks highlighted are provided by the University via two routes (regardless of whether or not they are Open Access) - aggregators and publisher direct, both as eBook collections and eBooks within journal collections. Aggregators provide access to content from multiple

publishers and publishers provide direct access from their own platforms. The eJournals and newspapers highlighted are made available in similar ways to eBooks, as either individual titles or collections e.g. via aggregators, direct from publishers or via Open Access channels. The primary source materials highlighted include collections that have memoirs, images, letters, maps and audio-visual materials, all obtained from a variety of locations. Other materials highlighted in the guide including freely available material such as newscasts, documentaries, reports and societies were chosen for the reasons as detailed above.

Conclusion

The author developed the Gender Studies libguide to show University staff and students some of the electronic resources that already exist for this topic in the areas of science and sociology. The contents of this libguide can be used to create reading lists for these subject areas and the author hopes the libguide will be a starting point for further discussion of this topic within the university. This book chapter is designed to act as an *aide memoire* for delegates

at the International Women's Day event held by the University who saw the author's presentation and explain to viewers of the libguide how the content was chosen. The author hopes for engagement from the University community in the further development of the guide.

Acknowledgements

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Author bio

With nearly 25 years of experience in working in Academic libraries the author has been the Electronic Resources Manager for the University since 2005. During her time at the University the author has represented the University on committees at a Scottish and national UK level, including

SHEDL and JISC Collections. Prior to that she worked as a librarian in further education. Her undergraduate degree (from the University of Edinburgh) is in Classics and Medieval History and she has a Masters in Information and Library Management from the University of Northumbria. Her professional interests include eCollections procurement and availability, along with open access publishing.

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In the Menority

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Abstract

Increasing representation of men in counter-stereotypical disciplines can advance causes of feminism by destigmatising normative gender roles. The Scottish Funding Council introduced the Gender Action Plan for higher and further education institutions (Scottish Funding Council 2016), reflecting their ambition for no subject area to have more than 75% of any gender by 2030. At the University of the Highlands and Islands (UHI), most of the main subject areas showing male under representation are in one of the 6 academic departments, the UHI Applied Life Studies (ALS) Subject Network (SN). The ALS Gender Action Plan shows an average female student representation of 93% over the last 5 years. Various initiatives to address this gender imbalance have included the use of promotional material using counterstereotypes, for example, photos and videos on website, creating men only classes, as well as using male role models at open days and male Personal Academic Tutors. One of these successful initiatives which has been completed, will be

presented in this chapter as a case study and describes the design of a male only Children and Men in Practice (CHAMP) further education course which could allow progression onto the Higher National Certificate Childhood Practice which meets the registration requirement with Scottish Social Services Council to be an Early Years Practitioner.

On completion of the CHAMP course, in year 2019 the whole cohort (n=12) progressed on to positive destinations of further study and saw a 75% rise in males (compared to the previous years) on varying early years courses. Throughout the course interesting observations were made, including that the male only cohort appeared more interactive, questioning, and debating in a way not previously observed from mixed gender cohorts or female only cohorts. Recruiting more men into early years practice is important to promote gender balance and equality, but the quality of the practice must promote gender flexibility, and further challenge traditional gender stereotypes. This needs to be promoted in the childhood practice courses

provided to students and the Continuous Professional Development training made available to current practitioners.

Another initiative which UHI has just recently designed, is the 'Minority Men' project which has student champions helping to promote men into courses which are stereotypically associated with women. This will only be briefly described since it is in its early stages.

Keywords: Minority men, childcare, early years, CHAMP, gender flexibility, further education, higher education

How does supporting 'minority men' further women's equality?

It may seem strange that Minority Men, feature in an e-book celebrating International Women's Day. However, increasing representation of men in counter-stereotypical disciplines can advance causes of feminism by destigmatising normative gender roles. A world which sees

nursing, childcare and teaching as 'women's work' is problematic, and as a public institution we have a duty to challenge such stereotypes where we can. To do so, visibility, and engagement with the student body and staff networks is essential, to ensure that the activities meet the needs of these groups and permeate all aspects of UHI's operations.

There appear to be two main barriers to improving gender balance in all areas of work: firstly, society's views and then secondly the pre-work education system from early years to senior phase. How does society value occupations which women usually dominate? Block et al. (2018) found that men are inclined to see healthcare, early education, and domestic roles (HEED) as less valued by society and not eligible for higher salaries, and that this is associated with having less focus on caring for others (communal values). Women account for 70% of the health and social care workforce and deliver care to around 5 billion people worldwide. Despite some progress, women remain largely segregated into lower-status and lower-paid jobs. The

World Health Organisation undertook a gender and equity analysis of the global health and social workforce (2019) and proposed that investing in the global health and social workforce could improve gender equality and empower many more women by enabling access to better education and income (WHO 2019).

Scottish Funding Council (SFC) introduced the Gender Action Plan for higher and further education institutions in 2016. Their ambition by 2030 was to ensure no more than 75% representation of one gender in any given subject. Currently the main subject areas showing male under representation include Child Care Services; Hairdressing; Beauty and Complementary Therapies; subjects allied to Medicine; Psychology; Social Studies; Nursing and Training Teachers. Many of these disciplines are in the UHI Applied Life Studies (ALS) Subject Network (SN), which is one of 6 academic departments in the university covering the Highlands and Islands and includes 9 colleges from Shetland to Perth. The ALS Gender Action Plan shows an average female student representation of 93%. Various

initiatives have included the use of promotional material using counterstereotypes, for example, photos and videos on the UHI website, creating men only classes, as well as using male role models at open days and male Personal Academic Tutors.

Gender stereotypes in the early years

Early Learning and Childcare (ELC) is a discipline in its own right and prepares practitioners in terms of employment and professional roles. The Early Learning and Childcare sector is one of the main aims for the Scottish Government to improve and develop, where they are striving for Scotland to be the best place to grow and learn. The care for children in Scotland is from Pre-Birth through to 18 years, however the workforce for this particular study was aimed at the Pre-Birth to 12 years age range and is largely dominated by a 97% female workforce (Scottish Funding Council, 2018). Although children arrive at Early Learning and Childcare settings with gender stereotypes already formed, more will be imprinted upon them while in these settings (Bennet et al. 2020). However, the importance of Early Learning and

Childcare was evident in Scotland in the publication of 'A Blueprint for 2020: The Expansion of Early Learning and Childcare in Scotland'. As well as increasing opportunities for more pre-school children to access free Early Learning and Childcare, the vision was also to recruit and retain highly qualified staff and to help improve gender balance across the sector, which in turn could help shift gender stereotypes. This included an aggressive marketing campaign using social media.

Children arrive at an ELC setting with gender stereotypes already formed. The advent of ultrasound scans seems to have brought the unintended consequence of bringing a gendered world to our children even sooner. In the 1970's, for example, a parent would not have known the sex of their child and in turn children were generally dressed according to age and not sex (Davis 2020). Now, in many cases, around 58% of parents choose to find out (Barnes 2013) the sex before birth. Children are surrounded by gendered colours, clothing, furniture, and toys from birth. Not only that, but the parent has also created a gendered

relationship with the child (Barnes 2013). The recent trend in gender reveal parties is just one example of how the stereotyping process begins. This is at a time when a child makes the most neural connections, over a million a second between birth and 3 years old (Harvard University 2021). As Rippon (2019) suggests, the evidence that the male and female brains are different in these early years is barely apparent. It is the social world around the child that is gendered, therefore influencing boys and girls to replicate that difference. The fact that boys and girls are treated so differently in the early years has multiple consequences. Self-perception, career choices, exam results, mental health and relationships are all affected in some way.

The progress being made pushes back against a rising tide of gender stereotyping and gendered practice in education, family, and wider society. Although we currently live in what could be described as a more equal or fairer society than ever before, gender stereotyping continues to be pervasive. According to a recent study by the Fawcett Society, gender stereotyping can severely limit a child's potential and cause

lifelong harm, such as women having a negative impact on their own parents' skills and males viewing women in 'stereotypical' roles (The Fawcett Society 2020). You need only go into your local supermarket clothing section to see the pink and blue divide as well as the messages that are sent to our children about their capabilities based on gender. Some extreme examples being, 'I'm too pretty to do math' and 'Future Boss'. Over 70% of parents in the Fawcett Society study had observed similar differences in the way their children were treated based on gender.

It is whether this is recognised and if something can be done about this in these vital early years that is the question. The same study also concluded that almost half of the early years work force had not had any type of training in recognising and challenging stereotypes (The Fawcett Society 2020). Creating a more equal, flexible and appropriately trained early years workforce could go a long way in reversing the harm.

Warin (2019) discusses the importance of having a gender balance in all sectors, however, notes it is imperative that we (academics) don't attract men into the workforce to take on the 'male roles' such as rough and tumble activities but to demonstrate a gender flexible society where all genders can undertake all roles. This is further explored by Spence and Clapton (2018) who discuss that although men and woman may be different in gender that everyone has complimentary qualities and talents. They go on to further explore the importance of having that positive male role model in a child's life to show a positive caring role in a child's early life.

Brody, et al (2021) noted the misconceptions from others when viewing the workforce can impact on male and females entering the profession, as the sector can be viewed as 'babysitters' and unprofessional. Xu, et al (2020) went on further to discuss the cultural differences of the male role that can be seen within Scotland society. They noted the importance of respecting the culture patterns and

to consider this when challenging that proposed gender sensitive changes within the workforce.

Undoubtedly, a period of great change in ELC in Scotland is being witnessed. The Scottish Government's implementation of 1140 hours of funded childcare in year will see children attending ELC settings for longer than ever before. How those children are exposed to gender, the experiences available to them and what they witness in terms of gender roles will play an important part in the trajectory of their lives, and the future Scottish workforce. It has been suggested that the earlier a child enters ELC the more chance that gender stereotypes are imprinted upon them, further limiting their potential (Bennet et al. 2020). Children can become more quickly inducted into same gender play as well as avoiding other gender play. Furthermore, if this is not challenged children can continue the cycle by policing non-stereotypical behaviour (Skočajić et al. 2020). Challenging gendered practice, however, appears to be problematic. Simply introducing more men into the early years workforces is only part of the answer.

Holland (2003) discovered that practices in ELC across England designed to promote gender equity, a zero-tolerance approach to war, weapon and superhero play may have been entirely counterproductive, producing poor outcomes for both boys and girls. As the gender dominance in the workforce is addressed, it appears that the dominance of gendered practice also needs addressed.

The rise in children attending ELC settings is coupled with another development in Scotland, the incorporation of the United Nations Convention on the rights of the Child (UNCRC) into Scottish law. Equality of opportunity for all is at the heart of this document, yet our gendered approach to the early years does not produce equality of opportunity. It limits the outcomes available to our children, causing long term harm to both boys and girls. Could what has become the norm become unlawful? Addressing the gender dominance in the ELC sector is, therefore, a crucial element in producing better outcomes and opportunities for our children.

As a result of the imbalance in gender across varying sectors of the workforce in Scotland, The Scottish Funding Council (SFC) developed the Gender Action Plan (Scottish Funding Council 2016) to address gender imbalance across subject levels at Universities and Colleges. The Men in Early Years Challenge fund was initiated to combat imbalance within the early years' workforce. The main aim of the fund was to combat the imbalance of men applying for and completing childcare courses, and for colleges to look at new and innovative ways of challenging this throughout Scotland (Scottish Funding Council 2018).

The fund based this on results of the European Commission's data (2014), which found only 2% of the early years workforce in the United Kingdom were men (Scottish Funding Council 2018). Further data of British statistics in 2019 noted although there was an imbalance of gender in the teaching workforce (94% female to 6% male); this was fewer in the ELC workforce which consisted of 96% female to only 4% male. Although this data demonstrates a rise in the percentage of males, there is still a large imbalance

across the sector which needs to continually be addressed and the reasons for this to be examined.

Case study: gender dominance in childhood practice

The case study: *Gender Dominance in Childhood Practice* aims to explore why early years and childhood practice is largely dominated by a 97% female workforce (Scottish Funding Council, 2018). Despite positive promotion to encourage women into STEM subjects, the progress in attracting men into early years practice is slower paced. Denmark currently has much higher numbers of men working in the early years (Scottish Funding Council, 2018). Much of this practice is focused on outdoor play and learning which may explain the above average percentage of men working in ELC compared to the UK. If equality and diversity in early learning and childcare are valued, then the flexibility of practitioners' skills and qualities rather than the division of practice due to persistent stereotypical gender roles and attitudes should be focused on.

The case study highlights the action taken by the University of Highlands and Islands (UHI) to promote men in childhood practice, through the delivery of a men-only, Children and Men in Practice (CHAMP) course, and will outline some of the considerations in initial planning of the programme, interesting observations and findings relating to the progression of male students to further study in childhood practice within UHI.

The case study also discusses the impact of gender dominance and resulting traditional stereotypes on children and young people, and the Early Learning and Childcare (ELC) workforce. It will provide an insight into how UHI will continue to further promote gender balance and flexibility in early years, through the suite of Childhood Practice courses which are provided by UHI academic partners.

How is gender dominance being addressed at UHI?

The University of the Highlands and Islands (UHI) undertook a small-scale primary research project to

consider how they could develop a programme to encourage men into the childcare sector. The project was undertaken towards the end of 2018. The initial data was collected through survey methodology. The survey was carried out during varying open days within UHI, where males from a range of ages were asked for their thoughts on males working within the ELC sector and was this something that interested them. The questions aimed to gather qualitative information to gain insight to the opinions of a variety of males and how the CHAMP programme could be taken forward. The analysis of the data found key aspects deterring men from joining the sector. Some factors included '*intimidation of joining a female dominated workforce,*' '*fear of ridicule from family and friends*' and other negative connotations associated with men in childcare. Bartlett (2015) similarly identified factors that may explain low participation by men in fields related to early years and childhood practice. These factors included concerns over negative attitudes by parents/carers, colleagues, and peers; a lack of information about careers

in childcare and few training courses marketed to attract men into the sector.

As a university, staff at Inverness College UHI considered how some of these stigmas and concerns could start to be addressed and it was decided to design a male only Children and Men in Practice (CHAMP) course. The aim of the CHAMP course was to attract male applicants, marketed to a wide age-range, for those interested in a second career and/or a career change. A balanced workforce that is diverse in age as well as gender would benefit children and young people (Bartlett 2015). The delivery model followed a series of twilight sessions to cater for applicants that were in current employment with the aim of emphasising transferrable skills (Bartlett 2015).

Much thought took place prior to delivering the CHAMP course on whether a men-only course would further promote division based on gender. However, it was agreed that this would provide the support required for men as a minority group, considering a career-change. Research

carried out by Del Pinal, et al, in 2017, found that to progress in a non-gender stereotypical role, the non-dominant often feel they have to work harder to prove their abilities within the sector. Therefore, it was felt that having a male specific introductory class would allow confidence within a female dominated sector to be built. This approach was also supported by Burn (2016) who set up a male-only support group for BA Primary Teaching students as a minority group and, EECERA that further promoted the importance of single-sex groups co-existing alongside mixed-sex groups for training on gender sensitivity (cited by Warin 2019).

Furthermore, Brody, et al. (2021), noted it is imperative to have gender sensitive approaches to encourage men into the workforce to develop their understanding of the role. It was felt that through having a men only class this would allow for the flexibility and sensitivity without the fear of judgement or having to try and prove their abilities within the workforce. However, it was important to be mindful of how this was being delivered as, at the time, the lecturing

team were female dominant. Del Pinal et al. (2017), note how academics often unconsciously deliver with gender bias in gender dominated sectors and a thoughtful pedagogical approach had to be considered by all.

Being a minority group in a female-dominated field it was important to provide a safe learning environment for male students keen to move into childhood practice. By providing a men-only course a 'critical mass' would be created, which may reduce the sense of identity threat experienced by minority groups, making participants feel more accepted. This sense of belonging would prepare them for taking the next step in enrolling onto a Childhood Practice course which is traditionally female dominated.

The next step was to market the course. Having secured over £20,000 the SFC, the Men in Early Years Challenge Fund was made available for the delivery of the CHAMP programme across the UHI network, with the university's marketing team moving into action to promote this across Scotland. It should be noted that the geographical spread

of the 14 partner colleges which sit within the UHI was instrumental in the securing of funding from the Scottish Funding Council, as all the most remote and rural areas have access to a campus to support their learning. However, the biggest concentration of applicants was in one of the largest conurbations, with several single figure applications across the rest of the college network. The staff experience in delivering remotely became critical to ensure equality of access for all, and virtual classes were used in support of a blended learning approach.

The promotion of the course initially started in local newspapers, which was felt as the most appropriate and had the widest distribution in the Highlands and Islands area. This led to approaches from BBC Radio Scotland, and a live piece on Good Morning Scotland in January 2019. In the interview there was also discussion with a male early years' worker from Edinburgh who shared his positive experience in becoming qualified. Shortly after that, there were follow up sessions with BBC Scotland and Talk Radio in London. These were valuable experiences for the

promotion, but were, in retrospect, simply promoting what was being delivered, and did not start to dig enough into why we needed to deliver it all. There were some useful discussion topics that could have been further explored, for example that only men will provide 'rough and tumble play', identified as something that 'boys need' to do. That was alongside the comment that women provide the gentler, nurturing development required. It needs to be noted that these comments were from women, tapping into men's assumptions, so perhaps future questions should be redirected on barriers towards women.

Recruitment of 12 males for the first cohort, although low in number, was a 100% increase from usual enquiries. A gender diverse delivery model of the CHAMP course was supported, whereby the male-only group were able to participate in joint-sessions alongside the female-dominated Higher National Certificate in Childhood Practice group. This was a group of students undertaking the relevant qualification to work at practitioner level within the ELC sector. One of the joint sessions was based on training

for STEM subjects within the ELC sector. This led to valuable discussion on gender roles, which initially was observed to reinforce gender differences however, this gave tutors ample opportunity to raise awareness of gender sensitivity and to discourage re-gendering attitudes with students.

In the attempt to promote gender balance of male and female practitioners in the early years' workforce, we need to ensure that heteronormative assumptions on skills and qualities are not reinforced through a gendered division in practice. Tembo (2021) explains that we need to move beyond the complementary gendered approach to meeting children's needs. Early years practice requires a versatility of skills and qualities, regardless of male or female. However, research has shown that limiting gender stereotypical attitudes can still exist in both male and female practitioners, even in early years settings with an above average representation of men in practice (Warin 2019). This emphasises the requirement of specific gender-sensitive training to counteract gender-blindness and

encourage more reflexive approach with childhood practice students, as well as the existing early years workforce.

Scotland's national practice guidance 'Realising the Ambition; Being Me' (Education Scotland 2020) promotes the importance of the interactions, experiences, and spaces which are created for children. It emphasises a child-centred approach to meeting children's needs. By creating a workforce that is aware of unconscious bias gender stereotypes can be challenged, promote gender flexibility in practice and ensure that the practitioner is the type of role model that a child needs at that time in their life, regardless of the gender. This approach supports the wider issues relating to LGBT+ equality. Tembo states that 'holding onto the promise of heterosexual childhood is a normatively problematic desire when we recognise the consequences for many children of *not* fulfilling the lives that are, whether consciously or not, assumed of them' (2021: 191).

Upon reflection

Throughout the course interesting observations were made, including that the male only cohort appeared more interactive, questioning, and debating in a way not previously observed from mixed gender cohorts or female only cohorts. This is an area that has been identified to explore through further research as there were too many variables to validate the findings. On reflection of the overall programme, it became important that Inverness College UHI incorporate a focus on gender flexibility within the CHAMP course delivery, as part of the wider emphasis on promoting equality and diversity in childhood practice. In the action to promote gender balance it is important that 'quality over quantity' is emphasised. Recruiting more men into early years practice is important to promote gender balance but the quality of the practice must promote gender flexibility, to promote equality and further challenge traditional gender stereotypes. This needs to be promoted in the childhood practice courses provided to students at

UHI and the Continuous Professional Development training made available to current practitioners.

On completion of the course, the whole cohort progressed on to positive destinations of further study and a 75% rise in males (compared to the previous years) on varying early years courses, which included the Higher National Certificate in Childhood Practice, enabling practitioner level qualification. Bartlett (2015) suggested a range of ways to address the lack of demand of men in early learning and childcare. Some of these included the promotion of Schools courses as pathways into early learning and childcare and utilising positive images of both women and men in promotional materials, with messages targeted towards men. Inverness College UHI are currently working towards promoting the Foundation Apprenticeship in Children and Young People with a focus on attracting more male school pupils from the senior phase. International links have been forged between Inverness College UHI and Woods and Waves Outdoor Nursery based in Vancouver.

However, this needs to be an ongoing research process as current research from Brody et al (2021) looked at the high dropout rate of both male students and males within the workforce. They noted within the sector males can often move on to further career progression such as teaching due to being valued in the workforce (as previously noted) or a higher paid job. Although Gender Equal pay is continually being challenged within mixed gender workforces, the caring sector (which around 75% of the workforce is female) is still one of the lowest paid workforces (Devin and Foley 2020). Although Brody et al. (2021) note this is not the only aspect that challenges men remaining in the sector it can contribute to the lack of value within the sector and not being viewed as professionals, despite occupying a highly professional role.

The Gender Action Plan: annual progress report from the Scottish Funding Council (2019) showed through their latest data review: since 2012 there has been a 1.5% overall increase in males entering the early years workforce, with 6.1% of the early years workforce in

Scotland being male. Although this demonstrates there is a long way to go with challenging the status quo within the workforce, with continued development within today's society, it is hoped to see the positive changes for our youngest children and our future generations. The aim is to work in collaboration to promote the diversity of opportunity that exists in a career in early learning and childcare, but also to champion the skills and qualities of the versatile practitioner regardless of gender.

How can UHI Minority Men programme help embed gender equality across the university partnership?

Given some of the difficulties described above in relation to attracting and retaining men into counter-stereotypical disciplines, it is apparent that we need to draw on the experiences of UHI's own male students within the Applied Life Studies (ALS) Subject Network (SN) who are in the minority, to find out what we are doing well and where we can improve. As such, the university has just designed another initiative, the 'Minority Men' programme, to help

provide relatable role models for men and boys across the region, and to develop relationships that allow the sharing of this mission with employers and the wider sector.

UHI have recruited seven Minority Men Student Champions positions to follow in the footsteps of award-winning 'UHI STEM Femmes', who were student champions and encouraged and supported women into STEM related courses thus raising aspirations and visibility of students in counter-stereotypical subject areas. UHI Minority Men represent subjects including childcare, nursing and psychology. The group will work with staff champions, looking to communicate with staff, students and employers to build a remit which challenges societal norms and under-representation at all levels, from pre-school to employment. Key goals are to increase visibility, confidence and engagement among students, staff, schools and employers, raising the profile of counter-stereotypical disciplines across the region and ultimately increasing applications from men to study in these areas. The university intends to scale up the champions programmes

by visibly engaging with other colleges, universities and organisations to collaborate on communications, events and projects to further gender equality across society.

Way forward

Despite various initiatives to help promote female-dominated careers to men, the challenges of society's views and a pre-work education system which perpetuates gender stereotypes may render Scottish Funding Council's aspiration to eliminate serious gender imbalance in all subject areas by 2030 over-optimistic. Often staff have not had any training in recognising and challenging stereotypes, so it is vital that higher and further education institutions promote this in their courses, both to prepare students for the modern workplace, and produce more male graduates, helping create a more equal and flexible workforce.

By working together across the UHI partnership, and collaboratively with schools, employers and the wider sector, it is believed that programmes and initiatives can be

designed that can achieve meaningful change, not only at UHI, but across the region and society.

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Author bios

Emma Sinclair, Lecturer Childhood Practice, Inverness College UHI, has worked as an Early Years Practitioner, Manager and Trainer prior to taking up a position as Lecturer in Childhood Practice at Inverness College UHI in 2018. Emma embeds her knowledge of Early Years practice into supporting students moving into the field of childhood practice. Emma has a particular professional interest in outdoor play and learning for children and young people and in promoting gender equality, balance, and flexibility in Early Years.

Julie Jones, Lecturer Childhood Practice, Inverness College UHI, has worked in the Early Years sector since the late 1990s and throughout this time has seen a continued drive to see a balance in gender in the workforce. Since starting with UHI as a lecturer in 2016, she has continued to strive to see a positive change in the gender of the trainee Early Years workforce to ensure we portray a gender diverse society for those in their earliest years of life. Julie is hoping to bring about positive change that people are not defined by their gender but the amazing skills and attributes they can share with others.

Alastair Davidson, Lecturer Childhood Practice, Inverness College UHI has worked in the outdoor education sector for almost 20 years, focussing on early education and outdoor nurseries latterly. Joining UHI in 2019 as, coincidentally, the first male to lecture in Early Years at Inverness College UHI, he specialises in outdoor learning and promoting a child-led, play based approach. With a background in education for sustainable development, he attempts to bring together these themes.

Stuart Hall, Equality and Diversity Advisor, Executive Office UHI, joined UHI in early 2019 as Equality and Diversity Advisor, after previously working at Perth College UHI, University of Exeter and Robert Gordon University in Aberdeen, as well as 8 years with NHS Scotland. He established and leads on UHI Minority Men and UHI STEM Femmes student champions programmes.

Stuart's role at UHI involves ensuring the university meets Equality Law and Scottish Funding Council requirements in respect of equality and diversity. To ensure UHI's requirements are met, he consults with individuals and groups of staff and students who face particular barriers, in order to help build opportunities for under-represented groups and contribute to a friendly and inclusive learning and research environment.

Stuart would welcome contact from anyone who would like to discuss equality and diversity at UHI and is always looking for opportunities to collaborate.

Heather Keyes, Head of School, Care, Health and Wellbeing, Inverness College UHI has been with Inverness College UHI since 1999, working initially as a lecturer in early years and currently Head of School for Care, Health and Wellbeing. Heather's previous roles include working in NHS boards across the UK.

Heading a curriculum which includes studying for roles that are often imbalanced in gender, the need to create study situations for under-represented groups has always been a focus for the school. The team successfully led a bid with academic partners to secure SFC funding specifically to address enhancing the number of men working in early years settings. Work continues on this project and has also led to links with the other successful bidders from West Lothian College.

Fiona Skinner, Subject Network Leader Applied Life Studies Executive Office, UHI has worked for UHI for over 20 years, starting as a lecturer in psychology and then as a senior lecturer health for Inverness College UHI before

becoming Subject Network Leader 10 years ago. Fiona worked in mental health research before then. Men have always been in the minority in her work both in health research and education. The Subject Network has over 90% female students and similar percentage for staff so increasing the number of male students and staff has been a focus of the Subject Network through the SFC Gender Action Plan. Various initiatives include the use of promotional material, for example, photos and videos on website, offering counterstereotypes, men only classes as well as male role models at open days and as Personal Academic Tutors.

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Closing thoughts

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When I initially saw the contents for this book I was struck by how the female authors are drawn from different departments across the University- from academics, to librarians, professional support staff to PhD students and student association officers. It is heartening to see such broad female representation across a higher education institution; institutions that were largely inaccessible for our mothers and grandmothers. I certainly echo the thoughts expressed by Natalie Jester in the foreword that women can currently claim their educational space thanks to the women before them who have carved out this space. In their own way, each chapter connects with the theme for this year's International Women's Day #Choosetochallenge: challenging masculine conceptions of academic leadership,

challenging the notion of what qualities are to be found in a 'typical' engineer, scientist or early years practitioner; challenging hierarchical notions of pedagogy and teaching practice. It is by challenging stereotypes that we can start to achieve equality for women in the University and beyond.

And of course, gender stereotype can be harmful to men too and we see in one chapter how the under-representation of males in Early Learning and Childcare has also been tackled in order to challenge the stereotype of care work as 'women's work'. Achieving gender equality within the Early Learning and Childcare setting is doubly important, not only as a workplace where gender imbalance is rife, but where young children may learn harmful gender stereotypes. Recruiting men is part of the answer, but 'ungendering' this setting is also crucial, including dispelling assumptions that male and female carers can have different functions; that 'rough and tumble' play is only for the males, for example.

The variety of initiatives described in these chapters largely fit within the two strategies (characterised by Lois Gray in her chapter) as “exclusively female (or male) incentives” and “role models and supportive strategies”: the Aurora Programme, Women’s Network, Autistic Women in Science Society and CHAMP programme focus on supporting and promoting women, and men, in a single sex environment, to allow them to develop unimpeded by the pressures which would normally occur within a mixed environment dominated by the other sex. The feminist curriculum, Libguides, STEM and STEAM initiatives and Minority Men provide role models and curriculum approaches and content that offer a fairer and more representative way of approaching and disseminating knowledge. These two strategies (single sex environments, role models and supportive strategies) are both vital. Where female role models have a positive influence in attracting women to areas of work and study perceived previously to be the sole preserve of men, female-only spaces are a vehicle to upskill and embolden women in order that they can flourish within their work and study.

But of course, systemic issues still persist. What the chapters in this book describe are great strides towards what Natalie Jester in her foreword describes as substantive representation: where a group's interests are represented, and we can certainly see how these initiatives and the work of individuals represent and foreground the interests of women in academia. What we have yet to attain is descriptive representation: where the institution resembles the society from which it is drawn, and we have not yet achieved the gender balance within the professoriate, senior management or PG student population that is representative in this sense.

What remains to be done? A hint is given in Ann Tilbury's chapter when one of the recommendations for improving the impact of the Aurora programme, and attracting women into leadership positions is to move "beyond approaches preoccupied with 'fixing the women'". It is organisational cultures, structures, practices, and behaviours that need to be changed to include (or at least not exclude) women, rather than women that need to adapt to cultures, structures

and practices that were never designed to accommodate them in the first place.

One of the two chapters in this book which talk specifically about men dealt with the issue of the lack of men in the childcare and early years sector due in part to the societal view of this work as of low status. It is no coincidence that care work is more often than not work of low pay and low status- when this same work is undertaken in a domestic setting it is unpaid and overwhelmingly done by women. These unpaid carers (of children and sick and elderly relatives) are some of Caroline Criado Perez's 'Invisible Women' because their (unpaid) work is not acknowledged, and as a result the male-dominated (paid) workplace is built to suit those unencumbered by such caring responsibilities, who are usually men. We find so often that prestigious and high-paid roles are full-time, inflexible, involving long hours, with no possibility of job sharing etc., and this is no less true of the academic environment than any other sector.

I am hugely inspired by the efforts described in each of the chapters of this book and they have no doubt assisted with the quest for gender equality at our institution. But challenges remain, and I call on all colleagues as individuals and teams to foster a culture that supports equality and does not just pay it lip service.

Author bio

Dr Heather Fotheringham is Evidence-Based Enhancement Lead at the University of the Highlands and Islands (UHI). Based within the Learning and Teaching Academy, her role involves working independently to use data and evidence to inform enhancements in learning, teaching and student support and promoting and encouraging the use of evidence-based approaches amongst academic staff. Heather leads on university-wide strategic initiatives to help develop a data-driven culture including the university's work for QAA Scotland's national Enhancement Theme, and management and analysis of student feedback surveys including the National Student Survey (NSS).

Heather studied philosophy at the University of Leeds, and held teaching and research roles there after her PhD studies. She then moved on to the Higher Education Academy (now AdvanceHE) in the Evidence-Informed Practice team before relocating to the Highlands in 2009.

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