Chapter 4
Reflections on Selected Gender Equality in STEM Initiatives in an Irish University

Michael Devereux, Elizabeth Heffernan, Susan McKeever, Julie Dunne, Leslie Shoemaker, and Ciarán O'Leary

Abstract This chapter provides an account of the journey taken by the College of Sciences and Health in Technological University Dublin over an eleven-year period, from 2010 to 2021, as it sought to address the challenges of gender inequality in STEM (Science, Technology, Engineering, Mathematics) disciplines. The start and end points for the journey are marked by the formation of the College and its eventual replacement following a reorganisation of the Higher Education landscape in Ireland and a structural reorganisation at University level. This chapter draws upon the authors' collective experience of leadership within the managerial structures of the College and the University, and leadership on specific initiatives, to illustrate how consideration of gender equality and inequality featured within the journey taken by the College over this period of time. The chapter applies a broad lens to analyse the gender profile of the College's people and practices, including its planning, its operational management, its leadership, its staff profile and its student cohorts over the eleven-year period. The chapter also focusses more narrowly on a set of specific initiatives undertaken within the College or across the University which impacted upon the College. Collectively, the two perspectives demonstrate how a STEM College evolved over an extended period of time, shaped by cultural changes and challenges and bolstered by initiatives that targeted the areas of greatest challenge. This eleven-year snapshot provides insight into a journey that has built

M. Devereux · E. Heffernan · S. McKeever · J. Dunne · L. Shoemaker · C. O'Leary (✉)
Technological University Dublin, Dublin, Ireland
e-mail: ciaran.oleary@tudublin.ie

M. Devereux
e-mail: michael.devereux@tudublin.ie

E. Heffernan
e-mail: elizabeth.heffernan@tudublin.ie

S. McKeever
e-mail: susan.mckeever@tudublin.ie

J. Dunne
e-mail: julie.dunne@tudublin.ie

L. Shoemaker
e-mail: leslie.shoemaker@tudublin.ie

momentum and has potential to continue into the future. The story communicated in this chapter will be of value to Higher Education leaders and practitioners that wish to learn from this experience and interpret the approach set out in this chapter for their own local context.

Keywords Gender equality in STEM · Academic leadership and gender equality

4.1 Introduction

Ireland has evolved to become one of the world's leading hubs for life science and technology-based industries, leading to a growing demand for graduates with expertise and innovation capabilities in the STEM (Science, Technology, Engineering, Mathematics) fields. Skills shortages have been identified as the main inhibitor to growth and development in these sectors. For example, Engineers Ireland has recently reported that ninety-four per cent of relevant employers have cited skills shortages as the main barrier for growth (Engineers Ireland, 2021). This skills shortage is significantly influenced by a concurrent gender gap in STEM in terms of both enrolment on relevant University programmes and workforce profiles (Women in STEM Ireland, 2021). Furthermore, the pipeline of school leavers entering STEM programmes in higher education has been affected negatively by a significant decline in interest in STEM subjects for Irish secondary school terminal examinations (the Leaving Certificate), a situation that is affecting young women disproportionately (Department of Education, 2020). According to the Irish Central Statistics Office, women account for less than one-third of those employed in the Information and Communications Technology sector in Ireland and across the European Union (Central Statistics Office, 2019). In addition to a recognised gender pay-gap in STEM employment, gender imbalance is particularly pronounced in senior roles in industry where just seventeen per cent of Chief Executive Officer (CEO) roles are held by women (Women in STEM Ireland, 2021).

Higher Education has the potential to play a critical role in addressing gender inequality in STEM. However, Higher Education must first actively reflect upon how gender inequality is addressed in its own sector. In Irish Higher Education, for example, only twenty-three percent of professor roles are held by women (Higher Education Authority, 2018). Positive change in Higher Education requires Institutions to take action related to the gender profiles of their leaders, staff and students. Institutions need to critically reflect upon their organisational culture and nurture a culture that places equality of opportunity and experience for both staff and students at its core. This chapter provides a case study that describes the journey that the College of Sciences and Health in Technological University Dublin (TU Dublin) undertook over a period from 2010 to 2021. During this eleven-year period, the College has evolved towards a more inclusive and diverse working and learning environment that is internally and externally engaged in promoting women in STEM. While the College has experienced much success in this period, the journey is ongoing and the

challenges of gender equality, and equality more generally, remain key concerns for STEM in TU Dublin. This is also the case for Irish Higher Education more broadly.

The chapter first provides a description of the College of Sciences and Health, TU Dublin, in Sect. 4.2. Sections 4.3, 4.4 and 4.5 deal specifically with staffing of the College and a critical evaluation of the changes that took place, or did not take place, during the period under consideration. This includes two sections titled 'Intervention in Focus', dealing specifically with the formation of a Women Leadership in Higher Education group in TU Dublin; and the provision by the University of gender training for researchers. Sections 4.6, 4.7, 4.8 and 4.9 address the student profile and student recruitment in the College. Three further 'Intervention in Focus' sections included in this part of the chapter address the formation by staff in the College of an Irish Network on Gender Equality in Computing Education; the development of an innovative mentoring programme in partnership with industry for women on STEM programmes; and the development—as part of the W-STEM project—of a workshop for second-level schools that challenges gender stereotyping of STEM roles.

4.2   The College of Sciences and Health, TU Dublin

As Ireland's capital city and largest city, Dublin has attracted substantial investment in recent decades from multinational companies, many of whom have established their European headquarters in Dublin. The city has become a European hub for the Information and Communications Technology (ICT) industry, and—along with other Irish cities—it has contributed to Ireland becoming an important European centre for other STEM industries such as Pharmaceuticals and Medical Devices (IDA Ireland, 2021). As such, there is a significant demand for talent in STEM fields in Dublin and throughout Ireland, a demand that has informed the shaping and strategy of Dublin's newest University, Technological University Dublin.

Technological University Dublin (TU Dublin) was established in January 2019 as the result of a formal merger between three Higher Education Institutions in the Dublin region: Dublin Institute of Technology (DIT), Institute of Technology Blanchardstown (ITB) and Institute of Technology Tallaght (ITT). The new University was the first Technological University to be established in Ireland following the publication by the Irish government of its National Strategy on Higher Education in 2011 (Higher Education Authority, 2011). Through this strategy, the government proposed the amalgamation of regional clusters of smaller institutions to form Technological Universities throughout Ireland, joining the community of similar Universities internationally that 'operate at the highest academic level in an environment that is specifically focused on technology and its application' (Higher Education Authority, 2011, p. 103). Through its preceding Institutions, TU Dublin has a rich history over one hundred and thirty years of providing technical and technological higher education in Dublin, with its graduates contributing nationally and internationally to social and economic development and culture and education.

Following its formation, the academic units in TU Dublin continued to operate in the preceding structure for a period lasting until August 2021, when the Colleges that had been established in Dublin Institute of Technology over a decade earlier were subsumed into new Faculties that spanned the full University. One of these Colleges, the College of Sciences and Health, had been established in March 2010 and was replaced in 2021 with the appointment of Deans for the University's new Faculties. This chapter uses the eleven-year period of existence of the College of Sciences and Health to bound a case study that explores how consideration of gender equality and inequality shaped its journey.

Throughout the period covered by this case study, the College of Sciences and Health was comprised of six schools in STEM disciplinary areas. The College had between 230 and 270 staff at any one time during this period, including academic staff, professional services staff, technical staff and management. The College was led by a Director and Dean (a single role) and managed through a College Leadership Team comprised of the Heads of School for the six schools, a College Manager, a Head of Learning Development and a Head of Research. Each school was managed by its respective Head of School and two or more Assistant Heads of School. Academic quality assurance for the College was managed through its College Board which in addition to including all management within the College also included staff and student representatives.

The College offered thirty programmes to school leavers in Ireland, attracting between eight hundred and nine hundred students onto these programmes annually. In addition, the College offered educational opportunities to mature learners, part-time learners and postgraduate students, and had a research student population of over two hundred students at any time. Overall, the College had a population of approximately four thousand students at any point in time. The College was also a primary contributor to research within both Dublin Institute of Technology and Technological University Dublin. From 2010 to 2021 the College was one of the largest providers of professional- and industry-oriented science graduates for the Agri-Food, Pharmaceuticals, ICT and Health sectors in Ireland.

4.3   Staffing, Recruitment and Promotion in the College

While the gender profile of academic staff in the College of Sciences and Health has remained consistent over the period being reported upon, with between forty-five and fifty-five per cent of academic staff from both genders at any point in time, the gender profile of senior positions in the College has seen a more substantial change in this period. As TU Dublin (and Dublin Institute of Technology prior to the formation of TU Dublin) is part of the Technological Higher Education Sector in Ireland, the academic staffing of the College is organised according to a linear progression route from Assistant Lecturer; to Lecturer; to Senior Lecturer I (a senior teaching position); to Senior Lecturer II (an academic management grade at which the roles of Assistant Head of School, Head of Learning Development and Head of

Research are positioned); and Senior Lecturer III (an academic management grade at which the role of Head of School is positioned). In 2010, 76% (n = 13) of the Senior Lecturer I positions in the College were held by male academic staff and 24% (n = 4) were held by female academic staff. By 2021, the gender profile at this grade had become 50% female (n = 8) and 50% male (n = 8). At management level in the College, the aggregated counts for staff at the Senior Lecturer II and Senior Lecturer III grades were 71% male and 29% female in 2010. By the end of the case study period in 2021, the gender profile at this grade had become 45% male (n = 8) and 55% female (n = 11). The College Leadership Team, described in the last section as having ten senior members from management grades in the College, has remained at 30% female (n = 3) and 70% male (n = 7) during this period of time.

The changes that have taken place in the College, or that have not yet taken place, are features of a journey that is ongoing. In 2010 the gender profile of the College was typical for an organisation that had concerning issues regarding gender equality and inequality. Although the overall gender profile across all staff was balanced (with greater than forty per cent of each gender represented) a significant imbalance was evident at senior academic and academic management roles. At this early stage it was recognised by the College leadership that there was frequently a dearth of applications for senior roles in general, with a particularly low level of interest being expressed by female staff in promotion to either Assistant Head of School (SLII) or Head of School (SLIII) roles. Through consultations with staff it became obvious that the culture of succession at that time was dominated by a perception that candidates were already identified for these positions prior to interview and in that context there was little value in competing for senior positions. In consulting with a range of female staff to try to identify roadblocks to applications, issues such as family commitments versus commitments of the roles, and other elements of the non-attractiveness of Head of School and Assistant Head of School roles also surfaced.

In the period from 2010 to 2021 the gender balance across management roles within the College has progressed in a positive direction, resulting in a viable pipeline of female applicants for senior roles within the new TU Dublin Faculties. The transition from the situation apparent in 2010 to that seen in 2021 was due to significant cultural and organisational changes. These included the cultivation of effective channels for communication for staff, students and other stakeholders and fostering an open and consultative culture in the College. In an open, trusting environment underpinned by inclusion and empowerment, the College sought to address the perceptions of staff regarding recruitment and promotion opportunities and encourage female staff to engage with the national- and University-wide supports that were being put in place (see Dunne et al., 2021 in this volume). In addition, transformative interventions and initiatives introduced within the College and TU Dublin more broadly have contributed to the progression of the College's approach to enhancing its gender equality profile during this period.

TU Dublin's human resources processes underwent significant change during this period, both for recruitment and performance management. Recruitment processes for all new appointments were transformed through the introduction of unconscious bias training for all managers who participate on recruitment selection panels; the

introduction of mandatory gender balance on all interview panels; and the provision of effective feedback from interviews. The introduction of mandatory performance management and development for staff accompanied this change, leading to the development by staff of individual Personal Development Plans leading to Team Development Plans. Through this approach to planning, the College and the University were able to set and review targets that drew from individual experiences and goals. In 2018, Dublin Institute of Technology (of which the College was part at that time) was successful in its application for the Bronze Medal Award under the Athena SWAN programme (see Dunne et al., 2021 in this volume for further discussion regarding Athena SWAN). This award was made in recognition of commitment to advancing gender equality for women in STEM through organisational and cultural change.

Within the College, a new College committee structure was developed to engage and involve the wider College community in implementing the College strategy, and to encourage and facilitate inclusion, collaboration and sharing of resources. This committee structure acted as an effective channel of communication for staff, students and other stakeholders and fostered an open and consultative culture in the College. The College required that the membership of all College committees was gender-balanced, and set out this requirement in the terms of reference for the committees. The College introduced an expression of interest approach for membership of these Committees, replacing a nomination-based approach in which female staff were often under-represented.

Within the College, a number of influential female role models were recruited at senior levels. This included the appointment of one of the first female heads of a Computer Science school in Ireland, which ultimately transformed the culture and approach to equality, diversity and inclusion in that typically male-dominated discipline area. The School of Computer Science in TU Dublin has become a national and international award-winning leader in promoting women's participation in Computer Science. In 2020 the School of Computer Science was successful in attracting funding for one of twenty nationally dedicated senior academic Professors under the National Senior Academic Leadership initiative (SALi) (see Dunne et al., 2021 in this volume for further information regarding SALi). The funding facilitated the appointment of a permanent Professor of Inclusive Computer Science Education for TU Dublin.

The next two sections deal in detail with two interventions that had a significant impact on gender balance in the staffing and activities of the College of Sciences and Health in TU Dublin: the establishment of the Women Leaders in Higher Education group; and the roll-out across the University of gender-related training for researchers.

4.4 Intervention in Focus: Women Leadership in Higher Education

Since 2014, TU Dublin sponsored twelve women annually to participate in the AURORA Leadership Development Programme for Women in Higher Education (see Dunne et al., 2021 in this volume for further information regarding AURORA). A key message put forth in the AURORA programme relates to the benefit derived from being part of a strong network for women in higher education. This insight led to the formation of the Women Leadership in Higher Education (WLHE) network in TU Dublin.

A group of senior TU Dublin Managers from across the University, led by a senior academic manager in the College of Sciences and Health, established the Network in 2016 with the objective of encouraging and supporting women within TU Dublin to progress their careers and thus address imbalances in the gender profile at managerial level in TU Dublin and more broadly in Higher Education. The Network aims to be inclusive of women in academic, administration, research and technical roles at all levels and stages across TU Dublin. The Network hosts events, talks and workshops that are designed to encourage participants to take time for reflection on their personal and professional development and career advancement and enhancement.

To date the Network has held events in the thematic areas of:

- Professional enrichment, career advancement and promotion;
- Developing your professional supportive network;
- Being ready for opportunities;
- Leadership in higher education: where are the women?
- Transformation—the power of you;
- Conscious leadership—focus on the 'we' not the 'me'.

Keynote speakers have included female political leaders, educational leaders, television presenters and media experts, along with global business leaders. Speakers have shared their experience and personal journey to date including lessons learned and challenges along the way; their career launching platform (education/personal and professional supportive networks/mentors); how they made themselves ready to take opportunities and what influenced their choices; the values and beliefs they hold; and how they maintain a healthy work/life balance. More recently the Network launched a series of 'Come for Coffee' events, which aim to bring members of the Network across TU Dublin together to network with colleagues and to share experiences. These continued during the Covid-19 pandemic, as events moved to a virtual format. For its November 2020 event guest speakers explored experiences with Covid-19 and provided the audience with tools for supporting themselves, their families, colleagues and students. The success of the Women Leadership in Higher Education Network is evident in the high attendance to date, with each event attracting staff that recognise the need to focus on what they are doing to ensure that they achieve their personal goals.

4.5 Intervention in Focus: Researcher Gender Training

To ensure the gender element is considered within STEM research the main research funding organisations in Ireland, the Irish Research Council and Science Foundation Ireland, have included gender equality in their high-level strategic plans and consequent action plans. Each has introduced strategies to ensure that the research they fund meets the criteria that there will be gender equality in (1) research careers and teams and (2) integration of sex/gender analysis in research content (see (Dunne et al., 2021) in this volume for further information regarding these initiatives). To support its researchers in meeting these criteria the TU Dublin Research, Enterprise and Innovation Unit organised half-day researcher training workshops, one of which was hosted by the College of Sciences and Health in October 2019. The training was delivered by Yellow Window, a French-based global, multi-disciplinary product, service and public policy design agency employed by the EU to develop a Gender Research Toolkit and deliver training sessions all over Europe in order to give the research community practical tools to integrate gender aspects into research.

The objectives of the training workshop were:

- Strengthening participants' knowledge on gender issues;
- Raising participants' awareness on the importance of integrating gender in research;
- Informing participants on gender in Horizon 2020;
- Strengthening participants' capacities to integrate gender in research.

The resources were drawn from the EU Gender Toolkit, which comprises a series of documents available to download in English and Spanish (Yellow Window, 2012). The toolkit includes an introduction; a checklist for embedding gender in research; and a series of case studies and specific guidance and further reading for nine specific research fields: health; food, agriculture and biotechnology; nanosciences, materials and new production technologies; energy; environment; transport; socio-economic sciences and humanities; science in society and specific activities of international co-operation.

4.6 Student Recruitment and Support in the College

In the period under consideration in this case study, the College of Sciences and Health increased female student enrolments on full-time undergraduate programmes in the College by fifty-three per cent from 1,201 to 1,832, and increased the proportion of female students enrolled in those programmes from forty-five per cent to fifty-three per cent. Student recruitment in the College is undertaken in the constituent Schools (for example, see specific interventions designed by Schools in Sects. 4.7, 4.8 and 4.9) and on a shared cross-College platform. The College of Sciences and Health coordinated its cross-College outreach activities through its Public Engagement and

Recruitment Committee, a sub-committee of the College Leadership Team. It was a requirement that the committee, like all sub-committees of the College Leadership Team, consisted of at least forty per cent female and at least forty per cent male representation.

The outreach activities undertaken by the College included visits to secondary schools for career evenings, open days and class presentations. In addition, students from secondary schools visited TU Dublin's Science campuses on a number of occasions throughout the academic year, including a dedicated open day which took place in March or April of each year, a Science competition which invited secondary school students to submit a project, an open day for students from educationally disadvantaged backgrounds, an open day for students in Further Education Colleges, activities as part of National Science Week, Science camps and ad-hoc visits by schools. The College's Public Engagement and Recruitment Committee aimed to ensure gender balance in any situation where two or more staff were presenting to guests from secondary schools or while visiting secondary schools. The College implemented a Student Ambassador programme whereby students could apply to represent the College at public events. The College had built a requirement for representation of male and female students into the terms of reference for the Student Ambassador programme and included this as a statement on the application form. The College also ensured that all promotional literature presented an inclusive environment with diversity reflected among the staff and students identified by name or image.

The next three sections present specific interventions designed within Schools in the College of Sciences and Health.

4.7 Intervention in Focus: Gender Equality in Computing

> It was one of my first labs—I stood at the door—there was already a big group of lads in there making a lot of noise—generally rowdy—and no other girls around. The lab assistant was sitting in the corner. I really wanted to turn around and run. I nearly did. But I went in and just sat quietly—too mortified to ask anyone how to get started.
>
> —Female first-year Computer Science student, TU Dublin 2012

In 2012, the School of Computer Science in TU Dublin arranged a face-to-face meet-up of all female undergraduate students in order to allow this minority group to make connections and get to know other women in the school. Additional objectives were to gain insight into female students' motivations for selecting Computer Science as an area of study in Higher Education; exploring whether their experience was a positive one; and understanding how their experience could be improved. As a result of the findings from that meet-up, the School of Computer Science developed initiatives to increase enrolment of female students on its programmes. A key problem encountered was that while Computer Science departments in most Universities were putting real effort into gender balance initiatives in technology, each was working in isolation from others throughout the country, without sharing the best

(and worst) practices that they were discovering. The School of Computer Science in TU Dublin (Dublin Institute Technology at that time) addressed this by setting up a collaborative network across Computer Science departments nationally. In 2017, they co-founded The Irish Network for Gender Equality in Computing (The INGENIC Network). This network includes a representative from each School of Computer Science (or Computing) across all Universities and Higher Education Institutions (HEI) in Ireland. The network is a simple but powerful way to enable HEIs to share information on their gender initiatives on the basic premise that working together is more powerful than working apart. Each representative has been able to highlight and share what they have learned on their gender balance journey, providing the implementation steps, costing, advice and benefits analysis. In addition to the benefit of shared learning, INGENIC has acted as a useful communication platform for data collection, with reach into every Computer Science department and Computing student in Ireland. INGENIC has also worked as a lobby group for change at government level, a tool for co-operation and information sharing, and a vehicle for attracting funding. In 2020, the Network attracted two funding grants to further develop the network as a mechanism for change in gender balance in Computing—and to develop a best practice toolkit for accelerating gender balance in HEIs. Representatives of the network meet three times per year, with hosting of the meet-up rotating around the members of the group. Communication is facilitated by an online repository for data and documents, and relevant email groups. Over time, peripheral benefits of the Network are emerging with wider research co-operation and strong working connections increasing across the individuals and Schools within the Network. The set-up cost of INGENIC is negligible, with each organisation committing to a representative being available for meet-ups and where possible, information gathering. The recent funding successes are now geared towards creating a more robust data sharing platform, and ongoing administration support for the network.

A second initiative established by the School of Computer Science is the provision of free coding (Computer Programming) workshops for female students from non-technology courses, including business, mathematics, biological sciences, law and social sciences. This initiative was run in co-operation with the CodeFirstGirls social enterprise organisation. In 2016, Dublin Institute of Technology (DIT) (now TU Dublin) became the first HEI in Ireland to partner with CodeFirstGirls to facilitate free coding courses. Between 2016 and 2019, more than 250 female students within DIT attended HTML and/or python courses, in most cases introducing them to coding for the first time.

The School of Computer Science implemented a seven-year programme, titled SUCCESS, to recruit and retain female academic staff (McKeever & Lillis, 2019). SUCCESS had a four-strand approach: Source, Career, Environment and Support. The Source strand explicitly encouraged women to apply for each recruitment drive; Career focused on female career and skills development initiatives; Environment created a female-friendly culture and reputation, and Support addressed practical supports for the specific difficulties experienced by female staff. In an academic team of approximately fifty-five full-time equivalents, thirty-six academic staff were

female, and half of the senior academic leadership team were female, including a female Head of School.

4.8   Intervention in Focus: Educational Mentoring

The Equality in Science and Technology by Engaged Educational Mentoring (ESTeEM) initiative for female students was pioneered in September 2017. The development of the programme was shaped by research that demonstrated that when women are mentored by other women, in conjunction with other interventions such as gender-inclusive policies, there is a tangible and positive impact on their careers both for the short and long term (Lantz-Deaton et al., 2018). Mentoring is even more important where women are in work settings that are more male-dominated (Neal et al., 2013). Mentoring fosters support and co-operation rather than competition. Competition, which can be quite damaging, tends to be present in workplaces where the staff are significantly male (Chesler, 2009).

In 2015, the Organisation for Economic Co-operation and Development (OECD) published research about gender equality in education and STEM subjects which identified how adolescent girls lacked confidence in their abilities with STEM subjects (OECD, 2015). These findings were consistent with research Accenture conducted in Ireland and in the UK in 2015 (Accenture, 2015). The OECD report also proposed that some of these difficulties for young women in STEM subjects are due to a lack of female role models to emulate or look up to; and how a career in STEM does not fit into the stereotype of careers women 'should' be pursuing (OECD, 2015).

ESTeEM was designed to address these issues. Female students from Information and Communications Technology (ICT) programmes, Engineering programmes, and craft apprenticeships would be mentored by women from a related discipline in industry. As part of the mentoring, the student participants would develop a broader understanding about the range of career paths available as well as details about the skills required to be a successful STEM graduate. Since it is not uncommon for the numbers of female students in ICT, engineering and apprenticeship programmes to be low, which can also lead to a decreased retention of female students for a number of reasons, ESTeEM has additionally created an opportunity for the TU Dublin students to network with other students as well as professionals. Mentees are provided with a platform to meet other female students from other programmes which can lead to practical peer support while in third level. It is expected that these relationships will develop into professional connections during the students' future careers. Mentees are being afforded an opportunity to access a network of role models who are already established in their chosen careers; and learn from the insights and connections to prepare for the career opportunities and challenges that lie ahead.

ESTeEM targets two populations: the mentees and the mentors. For the mentors, the recruitment with the participating companies commences a month prior to the mentee's induction. The mentors are provided with a copy of the Mentor's Handbook

and the Mentee's Handbook. These handbooks review the purpose of the programme and provide information about the range of programmes from which the mentees come. All mentors are invited to participate in a half-day of skills training prior to the first ESTeEM event, and all mentors are asked for details about themselves and their careers. This information is collated and provided to the participating students. This material enables the mentees to make an informed choice about their mentor while also increasing the student's 'buy-in' to the programme. Finally, the students who join ESTeEM are asked to provide information about themselves and this is provided to their mentor to assist with the first meeting and ice breaking.

The TU Dublin students are recruited for ESTeEM at the start of the academic year. The students who volunteer to join ESTeEM, including returning mentees, are invited to attend an induction where an overview of the programme is provided and the selection of mentors is initiated. At this meeting, they are provided with the Mentee Handbook and students are informed of the requirements, such as how they are expected to attend at least four of these events. Mentees who previously have been in ESTeEM are offered the option of choosing a new mentor. It has been found with this group of students, they value the opportunity to hear alternative perspectives and insights from a new mentor; and increase their professional network.

ESTeEM events are held as lunches during the academic year. Seated at each table are three mentors, their mentees (ideally each mentor has two students) and one TU Dublin staff member who is the moderator for the table. This set-up facilitates both networking and group discussions during the event, with eight to ten people at each table. The brief opening remarks start the event and then the main speaker, who is a person from one of the participating companies, discusses an agreed upon topic. The theme of the events, such as unconscious bias, networking or creating 'your brand', is kept broad and applicable to the student groups. At the end of each fifteen-minute talk, the moderator at each table will lead an activity with the mentors and mentees until the end of the event.

In 2019, when DIT received the Bronze Award for Gender Equity from Athena Swan, ESTeEM was selected as the example of best practice. Annually, the feedback via surveys to the mentors and mentees continues to be positive. In the words of a TU Dublin student:

> ESTeEM was one of my best experiences as a fresher [first year student]. Being shy didn't help me a lot but when I attend the first event it gave me the courage that I need. They helped me to come out of my shell, to experiment with new things and to create wonderful memories. My mentor wasn't just a person from a company, it was an entire table of students, lecturers and amazing people from industry.
>
> —ESTeEM participant

4.9   Intervention in Focus: Challenging Gender Stereotypes

The College of Sciences and Health is a participant in the Erasmus + funded W-STEM project, through which it implemented a one-day workshop for second-level

students to celebrate International Women's Day (IWD) 2020. The theme of IWD was #EachForEqual and the focus of the workshop called 'Let's talk about your dream job' was to raise awareness and challenge gender stereotyping and to consider how this can negatively affect the choices young people make about their future higher education and career planning.

The event, which was attended by seventy male and female students from three local secondary schools, commenced with activities to explore the students' attitudes to gender and stereotyping in various roles and careers. Many students continued to associate certain jobs with men or women. This was followed by a panel session, led by a TU Dublin Career Development Centre, with four professionals of gender non-typical to their field, including a female apprentice carpenter, a female apprentice plumber, a female computer scientist and a male primary school teacher. Speaking about their experiences, the panel demonstrated that gender is irrelevant in building skills in their chosen professions, and despite encountering challenges with bias, they spoke of the mentors that helped them along the way. Other activities included a talk about how lack of diversity in teams negatively affects innovation and design; Policies of inclusivity and the role of men in leading equality in Accenture; TU Dublin supports for diversity from the Students Union Vice-President for Student Welfare; and an advice session with TU Dublin Director of Equality, Diversity and Inclusion. The feedback received from attendees at the event was positive and highlighted the importance of students' biases and perceptions being challenged from a young age.

4.10 Discussion and Conclusions

During its eleven-year period of existence, the College of Sciences and Health in TU Dublin undertook a journey that helped it progress substantially along the path of equality, diversity and inclusion (EDI). Over these eleven years, the College addressed, to a substantial degree, the gender imbalance at senior levels of its academic staff and improved significantly the gender profile of its student cohort. The journey commenced by the College will continue into the future, as the EDI successes and ongoing challenges of the College may become a starting point for the new Faculties that are being developed in TU Dublin. This chapter has outlined several important aspects of the journey undertaken and highlighted a small number of influential initiatives whose design may serve as an indicator for Universities elsewhere of how interventions can successfully shape the gender profile of a University's staff and students.

A first, important lesson learned from this case study is the value of blending cultural and structural change. The everyday culture and lived experiences of staff and students, and the structures that form an organisation must both be captured by a lens that seeks to understand and address gender issues in an organisation. Changes to practice, or even changes to perception of practices, can have a significant impact and remove barriers to the satisfaction and progression of staff, and the options

taken by students. Strong, focussed leadership from the management throughout the University is an important part of achieving cultural change.

A second lesson relates to the importance of building connections. The interventions detailed in this case study demonstrate the importance of connections being built through networks. Bringing people together to share experience and demonstrate support and leadership is an essential aspect of building a culture of belonging and inclusiveness. This applies in the case of networks being built internally within a University (such as the Women Leadership in Higher Education Network), across Universities (such as the Irish Network for Gender Equality in Computing) and between Universities and enterprise (such as the Equality in Science and Technology by Engaged Educational Mentoring programme).

The achievement of enhancement in equality, diversity and inclusion is a lengthy journey that needs to be nurtured and supported. The progression along this journey requires that academic leaders invest time in recognising the weaknesses within their organisation and address issues structurally and culturally. Elements of change require careful and thoughtful top-down leadership, but initiatives can also be created from staff who experience a supportive environment that is welcoming of change. Some of the most significant interventions in the College of Sciences and Health during the period under consideration arose from individual schools and individual staff taking responsibility for enacting change. The 'Interventions in Focus' sections in this chapter detail several occasions where this type of change was driven from individual experiences in the College of Sciences and Health. These successful initiatives can be replicated, built upon, learned from and enhanced in Universities elsewhere.

References

Accenture. (2015). *Continuing to power: Attracting more young women into Science and Technology 2.0.* Accenture.

Central Statistics Office. (2019). Women and Men in Ireland 2019. https://www.cso.ie/en/releasesandpublications/ep/p-wamii/womenandmeninireland2019/work/. Retrieved on 11 Oct, 2021.

Chesler, P. (2009). *Woman's inhumanity to woman.* Lawrence Hill Books.

Department of Education. (2020). Review of literature to identify a set of effective interventions for addressing gender balance in STEM in early years, primary and post-primary education settings. https://assets.gov.ie/96986/f05f7b2f-e175-442e-85e9-4a2264391843.pdf. Retrieved on 11 Oct, 2021.

Dunne, J, O'Reilly, A, O'Donoghue, A., & Kinahan, M. (2021). A review of Irish national strategy for gender equality in higher education 2010–2021. In this volume.

Engineers Ireland (2021) Engineering, 2021: A barometer of the profession in Ireland. https://www.engineersireland.ie/LinkClick.aspx?fileticket=wVvyHGDSRAQ%3d&resourceView=1. Retrieved on 11 Oct, 2021.

Higher Education Authority. (2011). National strategy for higher education to 2030. https://hea.ie/assets/uploads/2017/06/National-Strategy-for-Higher-Education-2030.pdf. Retrieved on 11 Oct, 2021.

Higher Education Authority. (2018). Higher education institutional staff profiles by gender. https://hea.ie/assets/uploads/2018/01/Higher-Education-Institutional-Staff-Profiles-by-Gender-2018.pdf. Retrieved on 11 Oct, 2021.

IDA Ireland. (2021). Facts about Ireland 2021. https://www.idaireland.com/newsroom/publications/ida_facts_about_ireland_2021b. Retrieved on 11 Oct, 2021.

Lantz-Deaton, C, Tabassum, N., & McIntosh, B. (2018). Through the glass ceiling: is mentoring the way. *Internationa Journal of Human Resources Development and Management, 18*(3/4), 167–197.

McKeever, S., & Lillis, D. (2019). Gender equality initiatives and policies to develop the careers of female faculty; SUCCESS @ TU Dublin Computer Science. Informatic Europe. https://www.informatics-europe.org/component/phocadownload/category/16-develop-female-faculty.html

Neal, S., Boatman, J., & Miller, L. (2013). Women as mentors: Does she or doesn't she? Development Dimensions International, Inc, Pittsburgh. https://www.ddiworld.com/research/mentoring-women-in-the-workplace. Retrieved on 11 Oct, 2021.

OECD. (2015). *The ABC of gender equality: Aptitude, behaviour*. OECD Publishing.

Women in STEM Ireland. (2021). Women in STEM Ireland: Statistics and key findings. https://www.stemwomen.co.uk/blog/2021/02/women-in-stem-ireland-statistics-and-key-findings. Retrieved on 11 Oct, 2021.

Yellow Window. (2012). Gender in EU Funded research. Toolkit and training. https://www.yellowwindow.com/genderinresearch. Retrieved on 11 Oct, 2021.