

2022

Challenges of Data Collection for Equality Between Women and Men: the EUt+ Alliance Case

Yvonne Galligan

Technological University Dublin, yvonne.galligan@tudublin.ie

Rositsa Velchikova

Technical University of Sofia

Deirdre McQuillan

Technological University Dublin, deirdre.mcquillan@tudublin.ie

Follow this and additional works at: <https://arrow.tudublin.ie/eutprespap>



Part of the [Education Commons](#)

Recommended Citation

Galligan, Y., Velchikova, R., and McQuillan, D. (2022). *Challenges of data collection for equality between women and men: the EUt+ alliance case.* In Re-imagining higher education through equity, inclusion and sustainability (RISE). Proceedings of the 2nd. EUt+ International Conference on Equality, Diversity and Inclusion, Technical University of Sofia, Sozopol, Bulgaria, 1-3 September. doi:10.21427/1q9r-4t94

This Article is brought to you for free and open access by the EUt+ Academic Press at ARROW@TU Dublin. It has been accepted for inclusion in Papers by an authorized administrator of ARROW@TU Dublin. For more information, please contact arrow.admin@tudublin.ie, aisling.coyne@tudublin.ie, vera.kilshaw@tudublin.ie.



This work is licensed under a [Creative Commons Attribution-NonCommercial-Share Alike 4.0 International License](#).

Challenges of Data Collection for equality between women and men: the EUt+ alliance case

Yvonne Galligan*(1), Rositsa Velchikova(2), Deirdre McQuillan(1)

* Corresponding author

Technological University Dublin, Grangegorman, Dublin 7

yvonne.galligan@tudublin.ie

Technical University of Sofia(2)

Abstract

This paper provides a comparative analysis of gender equality figures between women and men for the partners of the European University of Technology (EUt+) alliance. A baseline template was developed appropriate for higher education institutions and influenced by categories of data collected for the 'She' survey. Results for a baseline year of 2019-20, and for some categories 2020-21 are illustrated in the paper. It is notable that average distribution hides significant variations between the eight institutions and these are explained. Notwithstanding, the trends are similar to the 'She' Figures and CESAER observations on technology universities. The proportion of women declines significantly at the top level suggesting clearly a glass ceiling for career progression. The paper also gives insight on challenges collecting this data across the EUt+ partners that can be grouped into cultural challenges that recognises how discriminatory practices differ across countries as defined in the 2023 OECD index, structural challenges whereby legislative and privacy interpretations and sources of data can be different across countries, and also technical challenges whereby reporting systems and definitions may differ across countries. The baseline data discussed in this paper provides evidence for a starting point of EUt+ collaboration towards supporting women's careers and more balanced student representation and governance.

Challenges of Data Collection for equality between women and men: the EUt+ alliance case

Introduction

Higher education is an area in which knowledge is created and disseminated and high-quality human capital is produced. This is shown to have a positive effect on the quality of life of individuals and on economic progress in the areas where higher education institutions are located (Chankseliani et al 2020, Valero & Van Reenan 2019, Ma et al 2019). In the context of global competition, the development of human capital is vital for economic competitiveness (Krstić et al 2020, Chulanova 2017). A critical element for guiding the development of human capital is the collection and analysis of relevant data (Lim et al 2018). Reliable, relevant, and consistent quantitative data, collected over time and with comparisons across similar institutions and sectors, enables analysts to determine the efficacy of development-oriented actions and evaluate outcomes (de Matos Pedro et al 2022, Demirgüç-Kunt & Torre 2022). Gathering and assessing human capital data at a general level exposes the data-gathering and analysis to inadequate interrogation, as it is likely to mask gender differences in performance and outcomes. Until recent times, with the collection of sex-disaggregated data in higher education by the European Commission, published as *She Figures* on a triennial basis, there was no clear comparative basis for examining the gendered profile of higher education. In addition, the collection of these data was not systematic within member states.

The demand is now growing in higher education for the collection of sex-disaggregated data, accompanied by gender and intersectional analyses. There are a variety of inter-connected reasons why this demand has emerged. First, there is the human capital reason - gender differences in academic careers points to a constraint on the maximisation of human capital as a good for the individual, the economy and society. Second, there is the justice reason – an equal valuing of male and female academic work is an aspirational norm in higher education. A sex/gender data analysis can point to the extent to which this norm is upheld. Third, is the role universities play as agents of social change - higher education is an important influencer of societal norms and expectation and can play a significant part in challenging gender stereotypes. Initiatives in higher education in tackling gendered patterns and practices are more persuasive in the societal context when supported by evidence-based outcomes. Fourth, there is a growing need for accountability in delivering gender equality when public finance is involved. Higher education is a

substantial consumer of tax-payers money, not least in respect of research funding disbursed by national, European and other world regional research and innovation funding bodies. Increasingly, applicant universities and researchers are being asked to address gender equality in their proposals as a non-negotiable eligibility condition. In particular, the condition is a lever employed by the European Commission to contribute to progress towards a gender-equal Europe by 2025. Finally, higher education institutions have a central role in delivering on the global Sustainable Development Goals (SDGs), of which Quality Education (SDG4), Gender Equality (SDG5) and Peace, Just and Strong Institutions (SDG16) are key to ensuring equity in education and society. While these five pressures vary from one country to another, they together point to higher education being a focus for the delivery of gender equality – a not uncomplicated task (Clavero & Galligan 2020, IESALC & THE 2022).

Because of these conditions, many institutions are addressing the task of collecting data on sex and gender, quantitative and qualitative, and of conducting meaningful analyses of these data as a prerequisite for developing gender equality plans. This paper considers the challenges of data collection experienced by an alliance of eight European university partners, the European University of Technology (EUT+), as an illustration of the issues being experienced across higher education more generally. It is particularly relevant to choose the EUT+ case for two reasons. First, the partners share an explicit vision of a human-centred approach to technology, expressed in the slogan ‘Think Human First’. In operationalising this vision, the alliance has committed to embedding equity and intersectionality in its shared work agenda. Second, the issue of gender equality is more challenging for technological universities, given their teaching and research emphasis on engineering, science and information technologies, disciplines in which significant gender imbalances are evidenced (Klee et al 2019, Galligan & Clavero 2019).

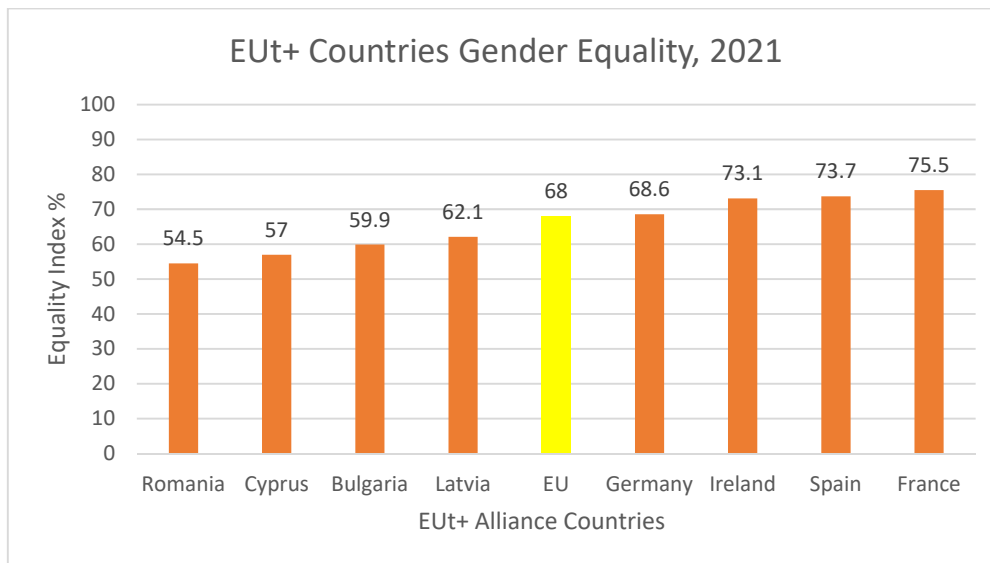
The paper proceeds as follows. First, a brief description of the partners of the alliance is provided followed by discussion of the process by which the EUT+ alliance came to develop a common data collection plan. This is followed by a comparative analysis of the data collected, illustrating the evidence base for building (intersectional) gender equality plans. In the third part, the paper reflects on the institutional challenges posed by the data collection process. The paper concludes with general reflections on the institutional lessons learned to inform further rounds of data collection.

Developing a common data collection plan for the EUT+ alliance

The flagship European Universities Initiative is designed to contribute to the European Union ambition of creating a ‘globally competitive and attractive European Education Area and European

Research Area'. It consists of transnational alliances of higher education partners intended 'to become the universities of the future, promoting European values and identity, and revolutionising the quality and competitiveness of European higher education' (EU, 2018). The 8-member European University of Technology (EUT+) alliance is one of 41 alliances funded by the European Commission to test the European University model in advance of scaling up by 2027 (EU, 2019). Spanning the continent of Europe from Ireland (Technological University Dublin, TU Dublin) in the west to Cyprus (Cyprus University of Technology, CUT) in the east, and from Latvia (Riga Technical University, RTU) in the north to Spain (Technical University of Cartagena, UPCT) in the South, the alliance brings together 100,000 students, 7,000 academics and researchers, and 5,000 administrative and technical staff. The other four partner institutions between these geographical points are in France (University of Technology of Troyes, UTT), Germany (Darmstadt University of Applied Sciences, h_da), Romania (Technical University of Cluj-Napoca, UTCN) and Bulgaria (Technical University of Sofia, TUS). Each institution operates in a wider social environment where variations in the degrees of gender equality are manifest. The European Institute for Gender Equality (EIGE) index of gender equality ranking for the countries of EUT+ partners (Figure 1) indicate the extent to which the wider culture is responsive to gender equality issues. As can be seen, there is a wide variation relative to one another and to the EU average. There is also a distinctive European West-East split except for Cyprus. Its societal level of gender equality level is more like that of the East European countries. This wider socio-cultural environment is relevant, as it influences, and to some extent explains, the degree to which each institution in the EUT+ alliance is receptive to initiatives such as sex/gender-disaggregated data collection as part of its work.

Figure 1 EUT+ Countries Gender Equality Index 2021



Source: EIGE 2022

The EUt+ vision is to provide a top quality ‘technological education that empowers citizens and the society to build a powerful Europe’ that is ‘inclusive and diverse, delivers a high-level scientific education and research, and raises technologically responsible citizens who can act for a better world’ (EUt+, 2021). This strong emphasis on diversity and inclusion built into the mission of the alliance is implemented through a dedicated cross-cutting workpackage ‘Europe for Everyone: inclusiveness and embeddedness’, led by TU Dublin. This workpackage contained four distinct cross-cutting tasks: addressing multilingualism and multiculturalism (Task 2.1); championing inclusiveness and modelling inclusive processes and interactions (Task 2.2); being a beacon of gender and race equity through implementing intersectional equity plans (Task 2.3); deepen the EUt+ connections with partner eco-systems and collaborate across territories and sectors on knowledge exchange activities (Task 2.4). The focus of this paper is on one aspect of Task 2.3, the challenge of data collection as a prerequisite condition for designing and implementing intersectional equity plans.

In May 2021, partner institutions nominated two individuals to lead each organisation’s delivery of Task 2.3, and these representatives met on 18 May to form a co-ordinating group for equity, diversity and inclusivity issues for the alliance (EDI Coordinating Group). A workplan and timeline was agreed. At the following meeting, a 3-person data management group was formed to draft an EDI Data Management Plan (DMP) which was a key deliverable of the task (D2.1.1). As part of the DMP it was agreed to start with gathering data with an initial focus on gender, as that was the data most likely to be accessible across the alliance. Agreement was then reached among the EDI

institutional representatives on a common template of data consisting of 12 specific data-points taking 2019/20 as a baseline year. These data included the number and proportion of women and men on governing committees and in senior leadership positions, gender-disaggregated data on the student profile, compared with the national benchmark, from undergraduate to PhD, and the employment profiles of academic, research and administrative staff by gender and nature of contract (see Appendix 1 for list of data points). From the equity and inclusivity perspective, the DMP was an essential piece of structure to have in place to enable partners share data on EDI in a professional and ethical manner. This step enabled data collection on the gender profile in each institution to progress as a precursor to analysis and equity action plan development, and for the data to be shared among partners. The DMP including the baseline metadata on gender and more qualitative sources of data collection was approved by the EUt+ Steering Committee on 25 November 2021. Data collection based on the metadata template was completed by early July 2022 and uploaded onto the shared EUt+ site to form a shared EUt+ EDI dataset.

Comparative analysis of gender data

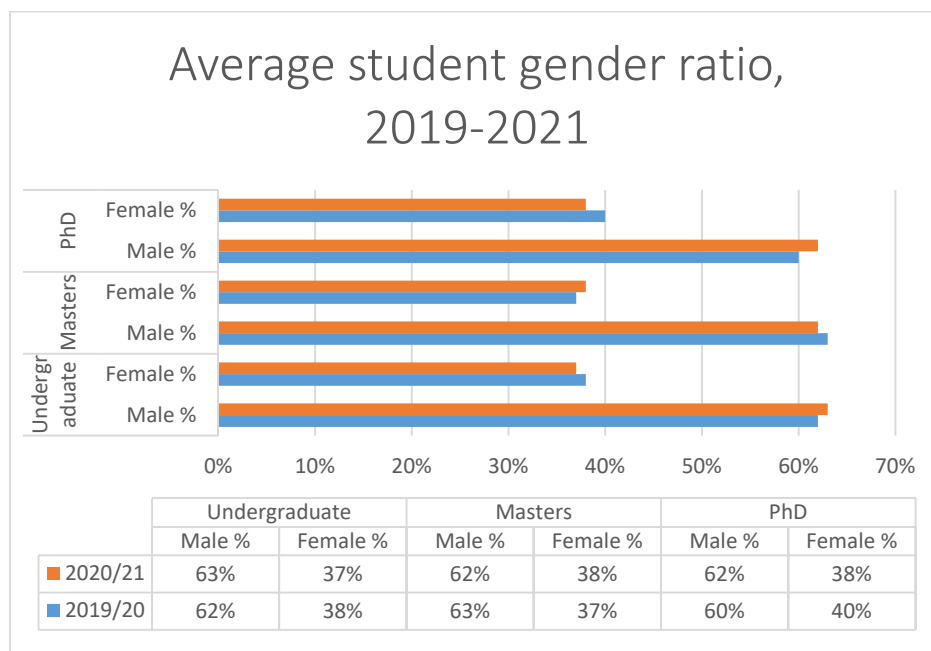
In this section, a graphical representation of data collected in EUt+ for a period of three years is given. A descriptive data analysis was made of the male-female ratio in three areas – undergraduate, masters and doctoral students, distribution by academic positions, and the ratio of men to women in governing bodies.

Students

We begin with the overall gender profile of EUt+ students for the academic years 2019-20 and 2020-21. Male students comprised about 63% of the population at each level, female students about 38%. This student gender pattern is similar to that found in the CESAER 2015 gender equality study, focusing on 43 technical universities in the European Union, and based on data for 2012-13 (CESAER 2015: 51).

Figure 2: Average student gender ratio in EUt+ institutions, 2019-2021¹²

¹² Missing data: UG-h_da 2019-20; MA-h_da 2019-20; TUS 2019-20; UTCN 2019-20; PhD-TUS 2019-20, UTCN 2019-20



Source: EUt+ EDI dataset

The average distribution hides significant variations between institutions. Females comprised the greater share of undergraduate students in CUT (2020-21 = 54%), but only 25% of the undergraduate student body in UTT. Female students were also in a majority at Masters' level in CUT (2020-21 = 62%), while in UTT the female Masters' population was 23% of the total. also had the greatest share of female Masters' students. In general, the gender profile of undergraduates is reflected in that of the Masters' level. In the cases of TUS and UTCN, however, there are proportionally more women taking Masters' studies than is in the undergraduate cohort (2020-21: TUS 26% at UG level, 37% at Masters; UTCN 36% female UGs, 44% at Masters'). At PhD level, the student profile of CUT remains predominantly female (55%). UTT attracts proportionally more women into doctoral studies (2020-21 = 39%) than at undergraduate level. These individual deviations from the average require further exploration to understand the underlying factors driving the variations.

Researchers and Academics

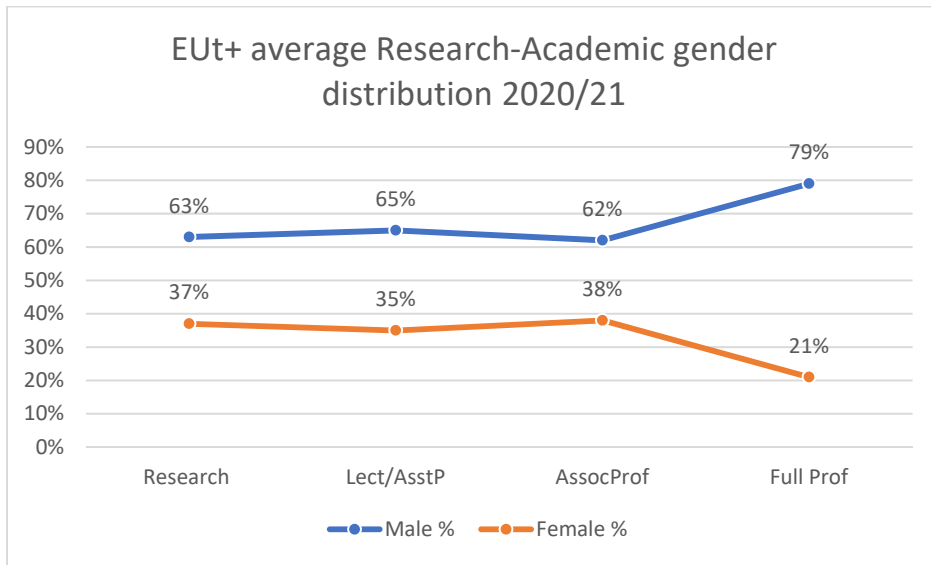
Mapping the distribution of academics is a more complex task than the student profile, as there are variations between the institutions with regards to the academic career path, full-time/part-time employment, and between academic and researcher roles. For example, TU Dublin does not have the formal position of Full Professor, so attributes the Senior Lecturer Grade III to this

role description in the data. Despite comparability challenges, the consortium institutions returned data, with 2020-21 as the most complete return.¹³ This paper thus does not analyse across years, and instead uses the data returned for academic year 2020-21 as a basis for comparison. While the agreed data template was extensive, covering matters such as rate of maternity leave takeup, the gender promotions profile, and contract type, not all partners could fill all of the requested information. Nonetheless, seven of the eight partners returned sex-disaggregated data on their research and academic employees in four groups – Researchers; Lecturer/Assistant Professor; Associate Professor; Full Professor. The eighth partner h_da provided this data beginning 2021-22. Apart from those with research-only contracts, the academic categories broadly correspond to the *She Figures* categories of academic Grade C (early career); Grade B (mid/senior career) and Grade A (the highest point of academic advancement) (European Commission 2021: 179). From these data it was possible to construct a general picture of the academic gendered profile of EUt+, and also compare trends across institutions.

Averaging the representation of women and men across the EUt+ alliance shows that in 2020-21 for every three men holding researcher, assistant professor and associate professor positions, there were two women: an average 63% male: 37% female. The gender gap widened at Professor level where for every four men holding this role, there was one woman (79%: 21%) (Figure 3). Compared to other Universities of Technology in Europe, this is a moderately positive pattern, as women occupied just over one-quarter (28%) of associate professor posts in the 29 institutions surveyed by CESAER in 2018, and only 17% of full professorial positions (CESAER 2019: 24). This pattern for EUt+ is negatively adrift that found in the 2021 *She Figures*, where women comprised 47% of Grade C (Lecturer/Associate Professor) positions, 40% in Grade B (Associate Professor) posts, and 26% of the highest Grade A (Full Professor) positions (European Commission 2021: 179). Similar to the *She Figures* and CESAER observation, the proportion of women declines significantly at the top level. However, unlike the overall European pattern in other academic posts, women's representation remained stable, though from a lower base than the European average. Nonetheless, this is cold comfort for equality, as there is clearly a glass ceiling for progression to the topmost full professor position, and barriers to entry to other positions.

Figure 3: Average researcher and academic staff distribution in EUt+, 2020-21

¹³ h_da first year of reporting 2021.22 thus not included in EUt+ average Research-Academic gender distribution for 2020/21. Figure 11 shows the distribution for h_da in 2021/22.



Source: EUt+ EDI dataset

Individual institutions show variation on this general theme, though there is no exception to the significant gender gap at the top level of the academic career (Figures 4-11, all data sourced from EUt+ EDI dataset)

Figure 4:

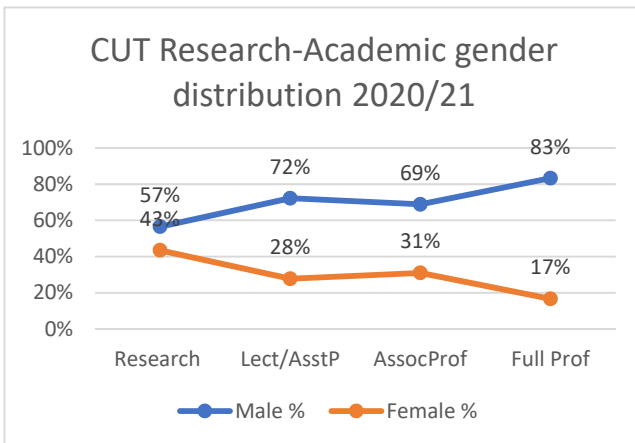


Figure 5:

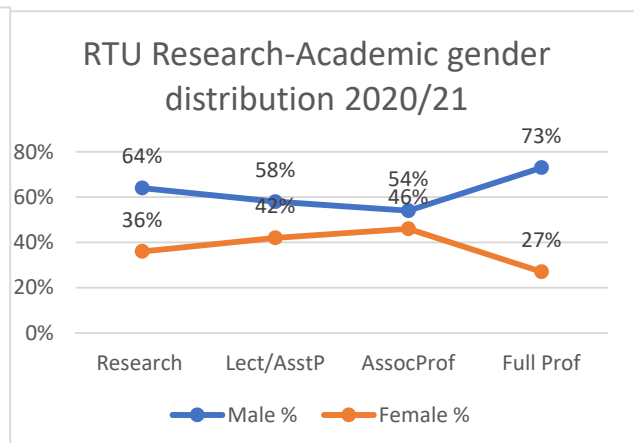


Figure 6:

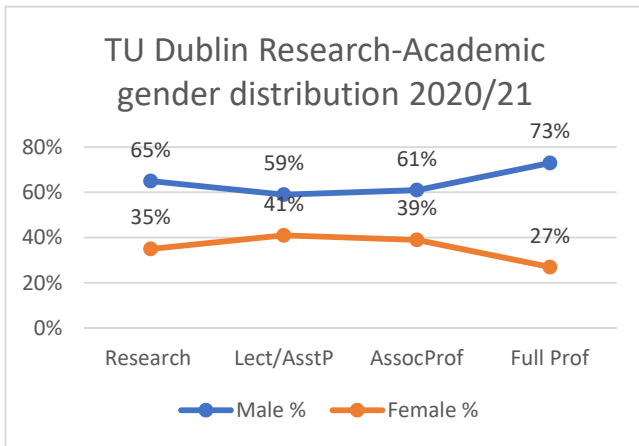


Figure 7:

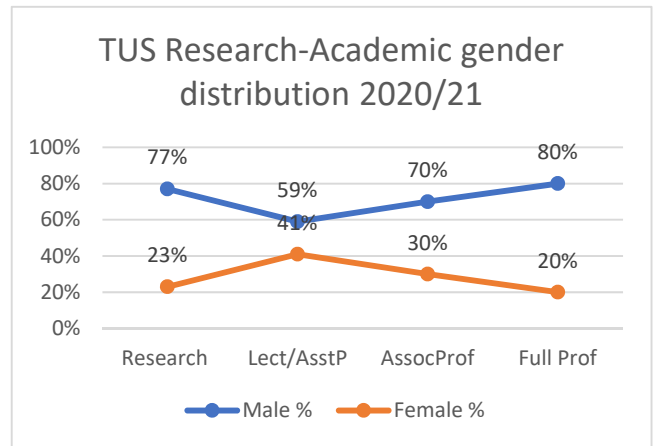


Figure 8:

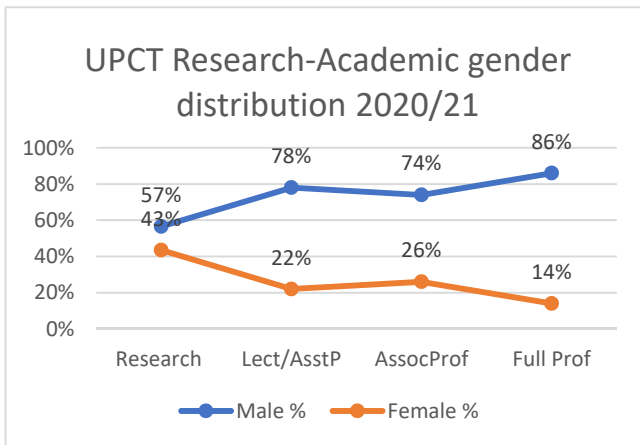


Figure 9:

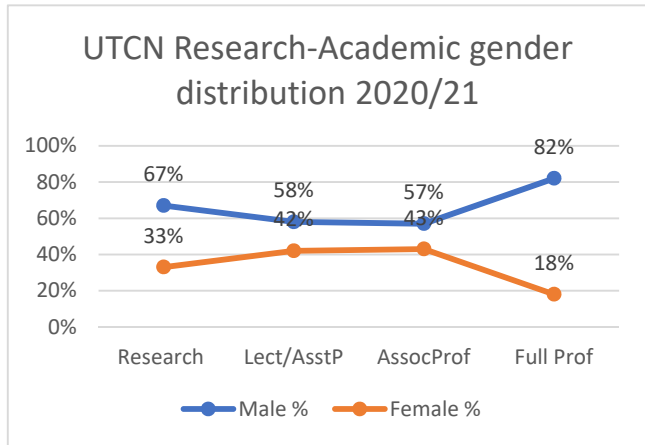


Figure 10:

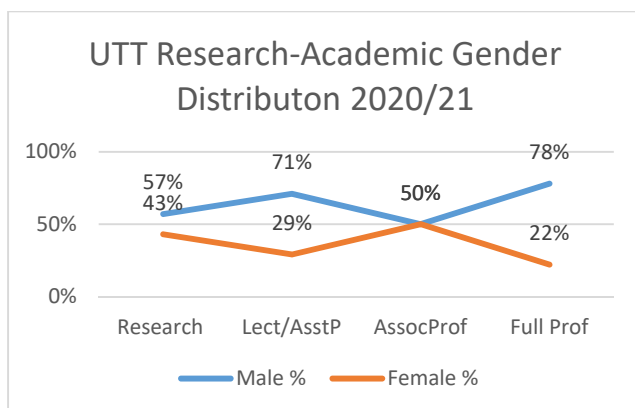
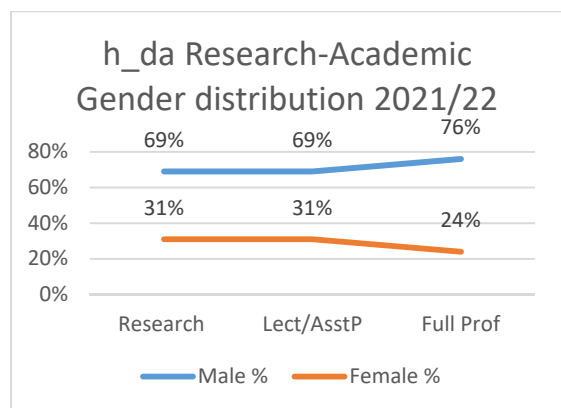


Figure 11:



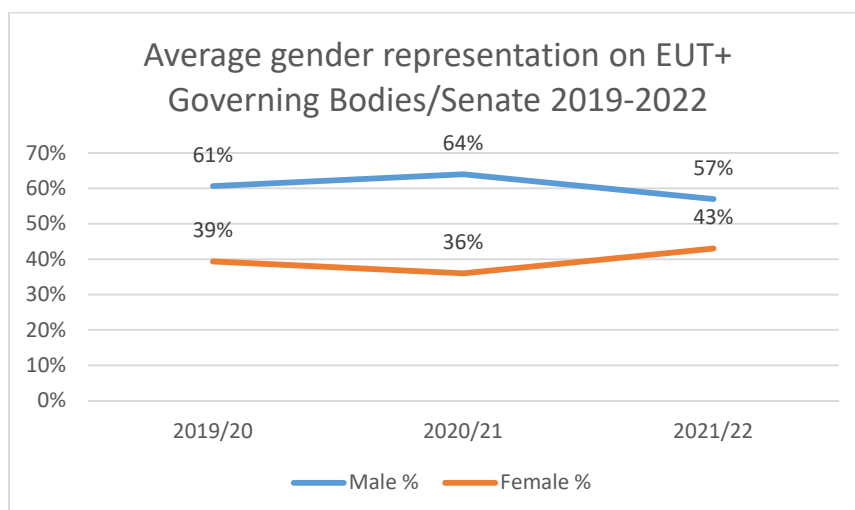
The above gender distribution of student and academic positions shows the typical 'scissors'

pattern, with a decreasing proportion of women across the career trajectory, and a corresponding increase in men. None of the EUt+ institutions exceeded the proportion for females in top academic posts, though TU Dublin and RTU match the *She Figures* average. This is evidence that the glass ceiling is a systemic institutional challenge across the EUt+ alliance – a matter addressed with concrete solutions through the partners gender(+) equality plans.

Governing Bodies/Senate

Over the 2019-22 period, the gender ratio on governing bodies of EUt+ institutions remained stable, at an average of 39% female members (Figure 10). This is within touching distance of the 40% gender balance expected in decision-making bodies.

Figure 10 Average gender representation on EUt+ governing bodies/senate, 2019-2022 .



Source: EUt+ EDI dataset

Within that average, there are some variations among institutions, with UPCT showing a lower-than-average female representation (27%), and RTU a higher-than-average female representation (54%). The CUT governing body shows the largest increase in this period, from 19% to 36% female (Table 1). The overall trend towards gender equality indicates an awareness of the significance, symbolic and practical, of a diverse decision-making body at the apex of the institution.

Table 1: Percentage of male and female members of EUt+ governing bodies, 2019-2022

	2019/20		2020/21		2021/22	
	Male %	Female %	Male %	Female %	Male %	Female %
CUT	81%	19%	77%	23%	64%	36%
h_da					59%	41%
RTU	54%	46%	55%	45%	47%	54%
TU Dublin	50%	50%	50%	50%	52%	48%
TUS			85%	15%		
UPCT	78%	22%	82%	18%	73%	27%
UTCN			63%	37%	67%	33%
UTT	62%	38%	62%	38%	62%	38%
Average	61%	39%	64%	36%	57%	43%

Source: EUt+ EDI dataset

Institutional challenges to data collection

Culture

The gender equality index of each EUt+ country (Figure 1) shows the inequality gap between women and men. This profile is broadly endorsed in an OECD index of the extent of discrimination in social institutions (SIGI), which finds that among partner countries in the EUt+ alliance, France is least likely to discriminate against women in social institutions (family, access to resources and assets, physical integrity, civil liberties) while Cyprus and Bulgaria are the countries with the most discriminatory practices (OECD 2023). This is the environment in which the EUt+ higher education institutions operate, and indicates that partners with higher levels of institutional inequality face a greater challenge to addressing gender equity issues. For example, the Bulgarian Strategy for Higher Education Development 2021-30 has but one reference to gender equality and indicates that there is gender balance among science and ICT researchers (EIGE, 2022). Thus, the wider cultural environment has an influence on the extent to which there is acceptance of gender inequality in higher education in the country and its amelioration through measures such as gender equality plans.

Structure

A variety of structural challenges feeding into logistical aspects of data collection emerged during the course of this exercise. First, it was quite common to find that data were kept in more than one office in each institution. For example, human resources held staff-related data, post-graduate offices held data on Masters' and Doctoral students, while undergraduate data repositories were managed by admissions or registry offices (e.g. TUS, TU Dublin). Thus it was quite common for researchers on this project to have multiple discussions on the need for these data as part of the development of a gender equality plan. The spread of data was complicated further in some cases by multiple campuses in dispersed locations (e.g. TUS, TUDublin) with their own record-keeping protocols. Thus, integrating data into a unified institutional profile posed challenges that called for additional resources of time and personnel unanticipated, or underestimated, at the outset.

A second common challenge was to unearth the retrospective data. This required considerable time and effort, and consumed a significant amount of person-days. For example, in CUT and UPCT, the data took a considerable time to collate, but was worth the effort as in both cases it delivered a comprehensive sex-disaggregated dataset of decision-makers and academic career profiles. An emerging challenge is for these data to be updated annually, which is required to track the impact of gender equality plan initiatives.

A related challenge was the nature of the data to be filled in the template. It became clear from an early stage that while it was relatively feasible to profile the gender ratio among decision-makers, academic staff and students, other detail was not easy to gather, for example, recruitment and appointment data, and gender pay, were variably collected. Time, and the operation of gender equality plans, may address this lacuna.

Technical

While personnel were motivated to collate data, technical challenges had to be overcome. One related to the categorisations provided in the template, which do not completely map on to the academic post descriptors in use in specific countries. Germany (h_da) is a case in point. Also as previously referred, TU Dublin adapts its Senior Lecturer III post to professor description even though they do not fully equate. This issue was a matter of extensive discussion among partners. For the most part, though, the academic grade categories provided in the template could be mapped on to academic post titles in the partner institutions and higher education systems.

A second technical issue uncovered during the task of data collection and management was the absence of software in human resources systems to harvest and report on relevant data. This is

clearly a resource matter, and one that will require a degree of systems harmonisation across partners into the future.

Conclusion: lessons learned

The collection of data to inform a meaningful analysis leading to a gender plan is a significant exercise in its own right. It calls for commitment from the highest levels to addressing gendered inequalities, and it requires time and personnel resources to gather the required data. Given that this is an additional demand on the institution, it takes time to have this factored into the workflow and schedule of the organisation. Thus, one lesson is that institutions should expect to give adequate time to this task, and to routinise it into the work schedule.

Related to this issue is the acquisition of software that can enable harvesting of such data in a routine manner. There are additional costs associated with this, and a national approach to gender data collection, if present, can assist the process.

Third, and a matter for European Union consideration, is communicating standard definitions relating to academic positions. While this is already carried out for the purposes of producing the *She Figures*, even those definitions are open to interpretation at country level.

Finally, an exogenous factor influencing data collection is the cultural climate towards gender equality. This is a challenge to the recognition of gender inequality in higher education as a problem, both in its own right as a matter of justice, but also as a matter of economic and societal development. The wider environment in which EUt+ partners are situated varied considerably in that regard. Nonetheless, as contributors to thought leadership and norm-setting in their societies, EUt+ partners have a genuine opportunity to advance social awareness and understanding of the advantages accruing to a more gender-equal culture.

References

- Conference of European Schools for Advanced Engineering Education and Research (CESAER) and M. Horvat (2015). *Results of the CESAER Gender Equality Survey 2014: Final Report 2015*, Leuven: CESAER.
- Conference of European Schools for Advanced Engineering Education and Research (CESAER) and Klee, D., N. Wolf, M. Aye, H. Kreisel, K. Feldmann (2019). *Equality Survey 2018: White Paper*, Leuven: CESAER.
- Chankseliani, M., Qoraboyev, I. & Gimranova, D. (2021). Higher education contributing to local, national, and global development: new empirical and conceptual insights. *Higher Education* 81, 109–127 <https://doi.org/10.1007/s10734-020-00565-8>
- Chulanova, Z. K. (2017). The Human Capital as a Factor of Competitiveness and Economic Development. *The Journal of Business Economics and Environmental Studies* 7(3), 23–31 <https://doi.org/10.13106/EAJBM.2017.VOL7.NO3.23>
- Clavero, S. & Galligan, Y. (2021). Delivering gender justice in academia through gender equality plans? Normative and practical challenges, *Gender, Work and Organization* 28, 3, 1115–1132 <https://doi.org/10.1111/gwao.12658>
- de Matos Pedro, E., Alves, H. & Leitão, J. (2022). In search of intangible connections: intellectual capital, performance and quality of life in higher education institutions. *Higher Education* 83, 243–260 <https://doi.org/10.1007/s10734-020-00653-9>
- Demirgüç-Kunt, A., Torre, I. (2022). Measuring human capital in middle income countries, *Economics of Education Review* 68, 53-67 <https://doi.org/10.1016/j.econedurev.2018.09.001>
- European Commission (2021). *She Figures 2021: Gender in Research and Innovation Statistics and Indicators*, Luxembourg, Publications Office of the European Union. doi: 10.2777/06090
- European Institute for Gender Equality (EIGE) (2022). Gender Equality Index, available at <https://eige.europa.eu/gender-equality-index/2022> (accessed on 31 August 2023)
- EU (2018) European Universities Initiative available at <https://education.ec.europa.eu/education-levels/higher-education/european-universities-initiative> [accessed July 21 2022].
- EU (2020) 24 new European Universities reinforce the European Education Area available at https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1264 [accessed 21 July 2022]
- EU+ (2021)
- Galligan, Y. & Clavero, S. (2019). How epistemic justice can inform gender equality in a technological university, *Irish Journal of Academic Practice* 8,1 <https://doi.org/10.21427/w5jg-nq60>
- Klee, D. Wolf, N. Aye, M. Kriesel, H. & Feldman, K. (2019). *Equality, Diversity and Inclusion: Best Practices*, Leuven: CESAER
- Krstić, M., Filipe, J.A., Chavaglia, J. (2020). Higher Education as a Determinant of the Competitiveness and Sustainable Development of an Economy. *Sustainability* 12, 6607 <https://doi.org/10.3390/su12166607>

- Lim, S.S, Updike, R.L., Kaldjian, A.S., Barber, R.M., Cowling, K., York, H., Friedman, J., Xu, R., Whisnant, J.L., Taylor, H.J., Leever, A.T., Roman, Y., Bryant, M.F., Dieleman, J., Gakidou, E., Murray, C.J.L. (2018). Measuring human capital: a systematic analysis of 195 countries and territories, 1990–2016, *The Lancet* 392 (10154), 1217-1234
[https://doi.org/10.1016/S0140-6736\(18\)31941-X](https://doi.org/10.1016/S0140-6736(18)31941-X)
- Ma, J., Pender, M & Welch, M. (2019). *Education Pays 2019: The benefits of higher education for individuals and society*, New York, NY: The College Board
- OECD (2023). Social Institutions and Gender (indicator). doi: 10.1787/7b6cfcf0-en (Accessed on 01 September 2023)
- UNESCO International Institute for Higher Education in Latin America and the Caribbean (IESALC) & The Times Higher Education (THE) (2022). *Gender Equality – How Global Universities are Performing, Part 1*. London: THE & IESALC
- Valero, A. & Van Reenen, J. (2019). The economic impact of universities: Evidence from across the globe, *Journal of Comparative Economics* <https://doi.org/10.1016/j.jce.2022.05.007>