STEM Passport for Inclusion

IMPACT SUMMARY

The STEM Passport for Inclusion (STEMP.Inc) addresses inequalities in access to STEM education and careers among socially disadvantaged communities. Since 2020 STEMP.Inc has supported 4000+ DEIS students to achieve a STEM qualification, meet with an industry mentor & progress to STEM courses through 50 Leaving Cert points scheme. Its impact is seen in both education policy and on Irish society.

A total of 4,360 students registered for the module, with a completion rate of 77%. Data from the first year highlighted the need for the project by examining the differences in STEM experiences between DEIS and non-DEIS girls. Two papers were published based on this data: "*Invisible barriers: how gender and class intersect to impact upon science participation in Irish secondary schools*" and *"I just want to annoy him now and say, look, I can do STEM too!": A qualitative investigation into the attitudes and engagement of female students in STEM education in Ireland* "

IMPACT DESCRIPTION

The 'STEM Passport for Inclusion' initiative is an example of a successful Industry-Education partnership that is changing the Science, Technology, Engineering, and Mathematics (STEM) education outcomes of underserved communities. Led by Dr Katriona O'Sullivan at Maynooth University (MU) (pictured to the right) in partnership with Microsoft Ireland, SFI, the RDI Hub, Munster Technological University (MTU), Atlantic Technological University (ATU), AMD, Kellog and Fexco, the initiative is providing a unique STEM pathway for approximately 5,000 students in DEIS (Delivering Equality of Opportunity in Schools) schools across the four provinces of Ireland. The innovative approach combines achieving a level 6 university qualification while in transition year (TY); meeting one of STEMP.Inc's 600+ Industry mentors and gaining access to a 50-points Leaving Cert bonus scheme, thus enhancing STEMP.Inc graduates to progress towards 3rd level STEM education opportunities.

TESTIMONIALS

STEMP.Inc was designed to respond to the gender inequity that is still pervasive across STEM; less than one-third of engineering and one-fifth of computer science undergraduates are female, and at age fifteen only 4.7% of females compared to 18% of males show interest in STEM courses and careers[1]. There are disparities in participation rates when we consider identity along multiple social axes, including gender, class, race and ability[2]. As it currently stands ethnic minority women[3], working-class women[4] and women with disabilities[5] are the most under-served in terms of STEM opportunities – this is apparent in Ireland, Dr O'Sullivan's research compared DEIS girls to their more privileged female counterparts & found large disparities in STEM opportunities[6].

The objectives of STEMP.Inc are to combat this, by:

- Increasing STEM Participation among socially disadvantaged groups
- Building Confidence and Aspirations
- Providing Mentorship and Support
- Supporting underserved groups to Achieve Educational Qualifications

The primary beneficiaries thus far have been over 4000 DEIS students who have successfully completed a STEM qualification. Results demonstrate the success of the STEMP.Inc programme with over 70% of participants now considering studying a STEM subject or considering a career in STEM.

"...a huge impact. The interest in taking part in STEM has impacted our school through the introduction of code club, ran by the STEM girls. The girls have also spoken to younger students to encourage them to choose subjects in STEM. The number of 5th Year girls studying Computer Science for Leaving Cert has gone from none(!) in 6th Year to 8 in 5th Year". (Teacher)

"It was amazing, probably the best course I've done in TY. I loved the coding and the practical elements. The way of thinking has broadened my horizons. It made me realise the extent of STEM and how many different job opportunities there are." (Student)

"I wanted to share a highlight from a parent from St. Mary's Secondary School, Co. Cork...whose daughter had very little interest in STEM before the programme and now has her No.1 preference on her CAO form Engineering in UCD. Great impactful story...". (Teacher)

Evidence of Impact

STEMP.Inc has had a considerable impact on young women from socially disadvantaged communities. This overwhelmingly positive impact has a ripple effect with benefits across society as a whole, fostering confidence and creating opportunity for career pathways that were previously believed unreachable. By partnering across industry, education and national funders, STEMP.Inc created a cohesive eco-system which allowed diverse groups, especially working-class women, see their place in STEM, access pathways to STEM courses/careers, and attain STEM qualifications and mentorship. By targeting underserved communities, STEMP.Inc is fostering diverse top talent ensuring that Ireland maintains its thought leadership position in STEM. While the effects are far reaching, the overarching areas of impact are societal and policy.

SOCIETAL IMPACT

In terms of societal impact, the STEMP.Inc programme helps to address gender inequalities by targeting young, working-class women in socially disadvantaged communities, aiming to bridge gender inequalities in STEM education and careers. This is achieved by offering a Level 6, 5-credit university qualification entitled "Introduction to 21st Century STEM Skills." There is also an opportunity for mentoring for equality in which industry professionals, both women and men, participate in the mentoring programme where they mentor students and act as role models. This allows them to foster a system-wide change by preparing workplaces to support diverse women as future leaders in STEM. Further, this programme helps to enhancing the education experience through the availability of STEM resources by providing access to STEM resources for both students and teachers while aligning with the broader goal of promoting economic empowerment and social inclusion. Lastly, STEMP.Inc works at the intersection of disadvantage; focusing on empowering girls who are working-class to pursue STEM.

POLICY IMPACT

Our government's education policies and implementation plans have been greatly influenced by this programme. Endorsed by the Minister for Education, Minister Norma Foley commented:

"I would like to congratulate Katriona O'Sullivan and her team on this wonderful initiative. The Recommendations on Gender Balance in STEM Education launched earlier this year, illustrated the importance of encouraging female participation in STEM. In Ireland, out of almost 120,000 people working in STEM, just one-quarter are women. The STEM Passport for Inclusion project was included in the recommendations and is an excellent initiative which aims to make STEM subjects more accessible and attractive to female students across the country."

The initiative is explicitly included as a government action in the 'STEM Education Implementation Plan to 2026' and 'Ireland's Literacy, Numeracy and Digital Literacy Strategy 2024–2033: Implementation Plan to 2028'. These strategies highlight the importance of the programme in supporting those at risk of educational disadvantage. Further demonstrating its reach and value in policy and society, Dr O'Sullivan was invited speaker by the United Nations Economic Commission for Europe (UNECE) to inform key stakeholders on how to change education outcomes for young women. In further validation of its success, STEMP.Inc won 'IBEC women in STEM initiative of the year' (2023) and, in 2024 it won the Women In STEM Award, 'STEM Diversity and Inclusion Initiative of the year'.

STEMP.Inc has been a resounding success, meeting and surpassing its objectives. The success of the programme is borne out by its continued growth and the increasing numbers of new partners coming on board. In preparation for the 2025-2027 period, the programme funding has extended to 15 new philanthropic donating companies (funding of €840,000 has been raised), 4 university partners and 190 companies who have mentors donating their time. This expansion will also see the initiative be delivered to both girls and boys in underserved communities, and lone parents.

[1] OECD (2014), PISA 2012 Results: What Students Know and Can Do (Volume I, Revised edition, February 2014): Student Performance in Mathematics, Reading and Science, PISA, OECD Publishing, Paris.
[2] Wang MT, Degol JL. 2017. Gender Gap in Science, Technology, Engineering, and Mathematics (STEM): Current Knowledge, Implications for Practice, Policy, and Future Directions. Educ Psychol Rev. 29(1):119-140.
[3] Dubetz, T.A. and Wilson, J.A. 2013. Girls in Engineering, Mathematics and Science, GEMS: A science outreach program for middle-school female students. Journal of STEM Education: Innovations and Research, 14(3).
[4] Shields, S. 2021. Curiosity and careers: Female working-class students' experiences of university. International Studies in Sociology of Education, 32(4), 992–1012.
[5] Griffiths, AJ., Nash, AM., Maupin, Z., Mathur, Sneha, K. 2020. Her Voice: Engaging and Preparing Girls with Disabilities for Science, Technology, Engineering, and Math Careers. International Electronic Journal of Elementary Education, v12 n3 p293-301
[6] Boyle, N., Marshall, K., & O'Sullivan, K. 2023. Invisible barriers: how gender and class intersect to impact upon science participation in Irish secondary schools. International Journal of Science Education, 1-20.