

Engineers Ireland

Submission on ‘STEM Education Policy Statement & Implementation Plan’

For the attention of Department of Education & Skills

15th June 2017

Highlights

- Engineers Ireland has a wealth of experience in promoting STEM education at all levels
- We welcome progress towards a STEM Education Policy Statement & Implementation Plan
- STEM is vital for tackling global challenges and its application should be promoted as such
- There is an acute shortage of engineers in Ireland which could undermine future prosperity
- Our STEPS programme has shown the importance of hands-on, interactive experiences
- STEM promotion should combat unconscious bias and engage girls from a young age

Engineers Ireland welcomes the progress made towards a STEM Education Policy Statement and Implementation Plan for Schools which builds on the excellent work by the STEM Education Review Group.

1. Promoting the applications of STEM

The report of the STEM Education Review Group points towards the contribution of STEM to society, environment and economy. Indeed, STEM is vital to informing public decision making in our democracy. It is the very role of STEM in addressing global challenges that can be exploited to promote these fields to students, teachers and the wider public. To this end, Engineers Ireland would like to see learning environments which embrace the complexity of the world, encourage critical thinking and problem solving. Real-world applications of STEM should therefore be strongly encouraged in student learning and assessment, initial teacher education and teachers’ professional development.

In addition, many of the core engineering traits/behaviours – curiosity, exploration, creativity, problem-solving, collaboration – overlap with the principles of early childhood education (e.g. discovery and exploration). These links could be highlighted and made more prominent for teachers and parents. These behaviours could also be recognised and linked in to the primary school curriculum.

2. The growing importance of Engineering

The continuing economic recovery and demographic trends are placing extreme demands on Ireland's infrastructure. In response, the Government has committed to increasing infrastructural investment in key areas such as housing and transport. However, there is an acute shortage of engineers which is threatening the supply of infrastructure, thereby potentially undermining future prosperity. Engineering is an exciting and rewarding career prospect for young people today, but we must ensure that students at primary and post-primary levels equip themselves with an adequate knowledge of STEM to study engineering at third level and go on to work in the profession. This applies not only to the core STEM subjects, but also leaving certificate subjects such as engineering, construction studies, technology, and design and communication.

3. Engineers Ireland's STEPS experience

Engineers Ireland has been actively promoting STEM education, STEM career pathways and public engagement with engineering for many years through the STEPS programme, a strategic partner of the SFI Discover programme. From 2005 to the end of 2016, STEPS engaged with 841,380 people through its outreach efforts. In 2016, volunteer engineers donated 14,692 hours to the programme (activity worth an estimated €242,000), delivering more than 73,000 direct engagements with students, teachers and parents throughout the year.

Contact with role models is an influential factor for young people, and visibility of female role models is especially important for young girls. In our experience, industry is very willing to engage with young people (and their teachers) to help spark their imagination about engineering and to provide them with careers information. We are happy to work with any interested parties to increase the links between industry and education.

In our experience of providing STEM careers information, students and teachers want more hands-on, interactive experiences. We help companies to bring students out into industry situations, we train industry volunteers to run hands-on workshops in the classroom, and we provide teachers with suggestions for running their own make-and-do STEM activities. We favour the promotion of a coordinated national outreach effort (e.g. under SFI), where all parties have clear visibility of all STEM outreach activity and partnerships are encouraged, to avoid duplication of effort and to highlight areas of low engagement.

4. Encouraging young women to study STEM

It is positive to note that the number of young women studying STEM subjects has been increasing in recent years to the extent that the majority of those taking higher level mathematics for the junior certificate are now women. However, there is a significant gender imbalance in subjects relating to science (other than biology), technology and engineering. This manifests in third level where only 15% of undergraduate entrants in engineering, manufacturing, construction and ICT are women.

Particular attention must be paid to encouraging young women to pursue STEM careers and the policy statement should consider the Accenture reports 'Continuing to Power Economic Growth: Attracting more young women into Science and Technology' which make a series of recommendations in this regard. Studies show that the encouragement of girls into STEM needs to

start as young as age 5. In addition, unconscious bias needs to be addressed among teachers, parents and indeed wider society. Training and unconscious bias workshops would be helpful in this regard.

ENDS

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Background to Engineers Ireland

With over 23,000 members from every discipline of engineering, Engineers Ireland is the voice of the engineering profession in Ireland. Engineers Ireland was established in 1835 making us one of the oldest and largest professional bodies in the country. Members come from every discipline of engineering, and range from engineering students to fellows of the profession.

Our responsibility is to

- Promote knowledge of engineering
- Establish and maintain standards of professional engineering and engineering education
- Provide opportunities for Continuing Professional Development (CPD)
- Maintain standards of professional ethics and conduct
- Ensure that professional titles are granted to qualified candidates
- Act as the authoritative voice of the engineering profession in Ireland

Our Vision Statement

Engineers Ireland: a community of creative professionals delivering solutions for society.

Our Mission Statement

Engineers Ireland is an organisation that enables the engineering community to progress their professional development, make an impact on society and encourage and educate the future generations of engineers.