

Submission to Oireachtas Joint Committee Education, Further and Higher Education, Research, Innovation, & Science

THE FUTURE OF STEM IN IRISH EDUCATION
THE HIGHER EDUCATION COLLEGES ASSOCIATION (HECA)

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Chairman, the Higher Education Colleges Association (HECA) welcomes the opportunity to make this submission on the Future of Science, Technology, Engineering and Maths (STEM) in Irish Education. HECA represents the majority of established, mature, privately funded higher education institutions (HEIs), providing QQI validated, flexible, cost effective and focused programmes at levels 6-9 on the NFQ, with some members, including my own, providing teacher training programmes across all levels.

Today, I would like to briefly consider the following areas.

1. STEM Education in Schools
2. STEM and Tertiary Education

1. STEM Education in Schools

We are currently facing rapid technological advancements and societal changes, along with uncertainty over the future of work and the economy. However, it is clear to all, that STEM will play a critical role in all our futures and as such STEM education is vital for providing individuals with the skills and knowledge necessary to succeed in a wide range of careers and fields.

From early childhood to post-primary education, Ireland has a clear pathway for developing 21st century skills through various curricula and frameworks¹. These policies contribute to an overarching vision for STEM across education. They outline the benefits that STEM education offers for all students, supporting children's capacity to understand and engage fully with the world around them, facilitating deeper and more meaningful peer-to-peer learning and fostering critical communication skills (Mobley & Fisher, 2014). However, while institutional and teacher capacity development through policies, frameworks, and programmes is essential, achieving and advancing STEM education goals necessitates several key actions.

These include:

i. Developing Future Skills of Teachers

Enhancing initial teacher education and providing continued professional development opportunities (Reimers, 2020) for teachers will be crucial for the future. The quality of teaching remains one of the most important factors influencing student learning opportunities (Hattie 2009) and it is crucial to explicitly develop teachers' capacity to understand, embed, and assess learners' future skills, as well as recognising the role of teacher training in promoting excellence in digital and STEM education.

ii. Investment in Digital Technology

STEM education relies heavily on technology as one of its fundamental components. Technology is increasingly playing a significant role in classrooms, reflecting the interactive media children use from an early age. Policy makers must invest in digital resources in

¹ In the Irish education system, a clear pathway for developing 21st century skills is in place, starting with Aistear, The Early Childhood Curriculum Framework and its themes of Wellbeing, Identity and Belonging, Communicating and Exploring and Thinking. This pathway then moves onto the new draft Primary School Curriculum with its key competencies, which include Being an Active Citizen, Being Creative, Being a Digital Learner, Being Mathematical, Communicating and Using Language, Fostering Well Being, and Learning to be a Learner. Post-primary schools also have new frameworks in place for 21st century skill development.

schools. To authentically integrate technology into the classroom, teachers need to be able to allow pupils to use familiar devices to enhance their learning and provide concrete methods for tracking individual achievements and personalising lessons. Authentic integration of technology can improve student engagement by incorporating kinaesthetic and whole-body learning, which can lead to enhanced critical thinking.

iii. Female Participation, Diversity and Inclusion in STEM

Many studies indicate that students from underprivileged backgrounds are less likely to pursue STEM courses, leading to a lack of diversity in the field, including women and individuals from ethnic minorities. Secretary-General António Guterres, UN Chief, announced in February of 2021 that '*Advancing gender equality in science and technology is essential for building a better future.*' (O'Brien, 2022) outlines how women are still underrepresented in STEM professions. She notes that according to the CSO in 2021 there were approx. 117,800 people employed in STEM related roles, but less than 25% of these roles are held by women. She goes on to state that in Ireland the gender gap in STEM starts to become more apparent after the Junior Cycle, noting that the optimal age for pursuing STEM topics is between 9 and 13 years old. It is imperative to ensure that STEM subjects are not only available to students, but that they are given the priority they deserve and that schools have the necessary resources and teaching methods to deliver these subjects effectively.

2. STEM in Tertiary Education

Although higher education offers specialised courses in STEM fields, it is crucial to provide not only advanced degrees and post-graduate courses in these subjects, but also interdisciplinary modules which can be integrated with other areas of study. To respond to rapid digital and STEM changes, we at HECA believe that national regulation should be flexible and time-sensitive, enabling both private and public higher education institutions to quickly introduce new programmes, micro credentials, and delivery modes under the digital strategy and STEM needs. This also relates to apprenticeships. Policymakers and educators must prioritise STEM education and invest in resources to support it for students to succeed in the 21st century and beyond. Expansion of the Springboard/HCI programmes to widen the participation of underrepresented groups/digital divide and upskilling should occur and HECA member HEIs should be included in the National Forum for the Enhancement of Teaching and Learning STEM related initiatives.

Furthermore, while a HECA member does have representation on the recently launched *Artificial Intelligence Skills Implementation Group Working Group*, for the most part, the private higher education sector does not have representation on national key drivers and decision-making panels with respect to the future of STEM education in Ireland, i.e., *National Skills Council, Regional Fora, Expert Group on Future Skills etc.*

It is important to ensure that all key stakeholders in STEM education provision and digital strategy are included in national steering groups to ensure their perspectives and expertise are considered. Excluding any stakeholder, particularly a key one, could potentially hinder progress and result in missed opportunities for collaboration and innovation.

Finally Chair, the centrality of the student in relation to the processes and outcomes of education regardless of the methodologies used and the environment in which they are placed must always remain the focus of policy developments (Snaza, 2014).

References

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