



14th April 2023

A Chathaoirligh agus a dhaoine uaisle go raibh míle maith agaibh as ucht an cuireadh a bheith anseo agus caint libh faoi thodhchaí na heolaíochta, teicneolaíocht, innealtóireacht agus mata i gcóras oideachais na hÉireann.

I am a Computer Engineering graduate, an Associate Professor in the School of Education at the University of Galway, and a Funded Investigator with Lero, the SFI Research Centre for Software. I inform you of this because the terms ‘Software, IT, or Computing’ do not fall within the STEM acronym - however coding and computational thinking, constituent elements of the discipline of Computer Science - are embedded and underpin all of Science, Technology, Engineering and Mathematics.

Computer Science is a key discipline necessary for our future and societal development as highlighted in our written submission. In considering the disposition of the young person when completing their formal education, the key competencies necessary for their future, I will emphasise three points about Computer Science Education and its role in the future of STEM in Irish education.

Ireland is working to become a digital leader at the heart of European and global development. The recently published Digital Ireland Framework¹ sets out a roadmap for the ongoing digital transformation of the economy and the need to strengthen the centrality of education, research and innovation. Digital skills and a flourishing Computer Science education ecosystem are essential to our national digital transformation. To grow our digital economy, Ireland needs an advanced workforce ready to take advantage of the opportunities the transformation will bring.

¹ Department of the Taoiseach, (2022) Harnessing Digital: The Digital Ireland Framework, National Digital Strategy, <https://assets.gov.ie/214584/fa3161da-aa9d-4b11-b160-9cac3a6f6148.pdf>



Opportunities to learn basic digital skills must be provided from an early age. This includes Computer Science education, along with comprehensive knowledge and understanding of data-intensive technologies, such as Artificial Intelligence (AI). Computer Science (CS) is an important part of STEM. CS is the study of computer technology, including how coding, programming and computational thinking can be used to solve problems, and how computing technology impacts the world around us. The knowledge, ways of thinking, problem-solving and creativity involved in the diverse field of CS are invaluable skills which bring the benefits of innovation and digital transformation.

In recent years, the Irish education system has embraced Computer Science by bringing it into the curriculum. Nevertheless we are a long way off making this important subject available to all students². Equity of access is a matter of concern. Currently, Computer Science at Senior Cycle is limited by the low numbers of post-primary schools offering Coding as a Junior Cycle short course, and by the significant shortage of teachers qualified to teach the subject. (In 2022 only 15.6% of Irish Schools offered Computer Science at Leaving Certificate level, only 22% of girls studied the subject, and just 34 teachers were accredited by the Teaching Council to teach the subject³.) The capacity of the Irish education system to facilitate CS education is highly contested with constraints being placed on school timetables². Coupled with this is a low level of awareness and a pervading misunderstanding about what the discipline is and what it is not.

The international PISA review on education will examine ‘Informatics’ (as the subject is known more widely in Europe) in 2024 which will include the study of the data, structure, and behaviour of natural and computational systems. The new Primary Curriculum Framework therefore offers a promising opportunity for the introduction of Computer Science to all school children in Ireland within the key competencies of the framework. Professional development

² Connolly, C. and Kirwan, C., (2023). Capacity for, Access to, and Participation in Computer Science Education in Ireland, University of Galway, Ireland. <https://doi.org/10.13025/bccm-2c38>

³ In 2020/21 the post-primary population was 391,698 with 14,007 students in 117 schools studying JC short course in Coding; and 1,604 students in 114 schools studying LCCS higher level.



in CS education should no longer be viewed as an elective for primary teachers but rather be embedded within all initial teacher education programmes, for both primary and post-primary.

In summary, a chathaoirligh, we need to develop a shared understanding and strengthen the acceptance of Computer Science as a foundational competence for every child, irrespective of race, gender or socioeconomic background - enabling young people of today to become active participants in the digital society of tomorrow – to become the designers, developers and not solely consumers of technology. Secondly, broad engagement is needed with key stakeholders across the education system and with industry partners to highlight and optimize the benefits of CS and AI literacy as key competencies. Thirdly, we need a holistic approach to the introduction of Computer Science in formal education and to create a learning pathway from preschool, through primary and into post-primary. To ensure this learning pathway, Computer Science competencies must be embedded within initial teacher education and with continued investment in in-service teacher programmes.

In preparing the 1965 ground-breaking ‘Investment in Education’ report one of the distinguished authors, Bill Hyland, used Computer Science in analysing data on the use of resources in schools. That seminal report was informed by the *concept of education as a means by which society invested in the next generation* - a mission that remains of importance today and in particular to Computer Science education.

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