Irish National Teachers' Organisation
Cumann Múinteoirí Éireann

INTO Opening Statement to the Joint Committee on Education, Further and Higher Education, Research, Innovation and Science

The Future of Science, Technology, Engineering and Mathematics (STEM) in Irish Education

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Introduction

The Irish National Teachers' Organisation is the oldest and largest teachers' trade union in Ireland. It represents almost 50,000 teachers at primary level in the Republic of Ireland and primary and post primary level in Northern Ireland. Ba mhaith linn ar mbuíochas a ghabháil leis an gCoiste as ucht an deis an t-ábhar seo a phlé libh.

In January 2022 the INTO made a submission to the Department of Education as part of the Department's Consultation on Phase 2 of the STEM Education Implementation Plan. In February this year a further submission was made to this Committee.

The Department of Education's STEM Education Policy Statement (2017–2026) provides a national focus on STEM education in early years settings and schools, and we welcome Minister Foley's and Minister O' Gorman's launch of the second implementation plan on March 2nd.

It sets out an ambitious journey up to 2026 which will be dynamic and evolve to meet the challenges of the future, with a vision to provide *"the highest quality STEM education experience for learners that nurtures curiosity, inquiry, problem-solving, creativity, ethical behaviour, confidence and persistence, along with the excitement of collaborative innovation"*. The INTO welcomes this opportunity to contribute further to the consultation and discussion around STEM education.

The foundations for Science, Technology, Engineering and Mathematics (STEM) education begin in early childhood. Young children naturally engage in early STEM exploration through hands-on multisensory and creative experiences. By doing so, they develop curiosity, inquisitiveness, critical thinking and problem-solving capacities.

Such is the rapid pace of change and technological development, that in 2019 the OECD predicted that more than 60% of children attending school today will work in a career that does not currently exist (OECD, 2019). Science, Technology, Engineering and Mathematics are key enablers for the Irish economy and for the development of important skills and competencies in our young people.

Learners' engagement with Science, Technology, Engineering and Mathematics (STEM)

The Irish Primary School Curriculum strives to promote the holistic development of the child, with its focus on the development of learners' skills, knowledge, and dispositions in an integrated, cross-curricular way. Science in primary school should nurture these attributes and allow children to develop the life skills they need.

Learner engagement and achievement in STEM is most effective at primary level when pupils are enabled to explore, investigate and to create, using thematic or cross-curricular approaches that encompass a variety of subjects, activities, and approaches. This was evident in the findings of the STEM report 2020 which found that 88% of primary schools were 'very aware' of the national STEM education agenda, with a clear articulation by schools of the importance, value, and opportunities that STEM education holds for students.

Teachers' engagement with STEM education methodologies

Findings of this research in relation to teachers' and practitioners' engagement with, and use of, STEM pedagogies in the 2020 report were positive.

Where high-quality STEM teaching was observed at primary level, it was often characterised by children's agency in their own learning, their use of the environment, and opportunities to experiment.

At system level, significant work in STEM education is underway in areas such as curriculum and assessment reform, teacher professional development and the embedding of digital technologies in all classroom activities.

Primary Curriculum Developments

Our current Primary Curriculum is the oldest in Europe, and the process of developing a new Primary Curriculum Framework is underway. The Framework will be presented in five broad curriculum areas, one of which will be STEM.

Mathematics, Science and Technology Education supports children's capacity to understand and engage fully with the world around them. Mathematics provides the foundation for science and technology. Science and technology are intrinsically linked and enable children to benefit from learning about, and working with, traditional, contemporary and emerging technologies (NCCA 2020).

During an INTO consultation with members on the Draft Primary Maths Curriculum in 2022, some members expressed concern at the grouping of mathematics with science, technology and engineering. Teachers emphasised the importance of ensuring that sufficient, distinct time is allocated to Mathematics, due to the crucial importance of the development of foundational numeracy and maths skills in the early years of primary school (INTO 2022).

Recommendations for the Future of Primary STEM

Class Size: Large classes at primary level are a barrier to the successful implementation of any curriculum subject. A reduced pupil–teacher ratio is a prerequisite for active pedagogies. The staffing schedule for primary schools has reduced by one pupil per mainstream teacher for the last three years, however, we remain three pupils per class above the EU average. We must continue to lower class size in Ireland.

Funding for Schools: There is a need to support schools in the reimagining of creative spaces where STEM education methodologies and STEM based learning can thrive. Increased investment is essential to provide creative spaces in all schools and resource them accordingly.

Continuous Professional Development: It is imperative that both practicing and student teachers are provided with the training and Continuous Professional Development (CPD) necessary. The INTO recommends that CPD for STEM should be provided on a continual, planned and well-resourced basis.

School Leadership/ Posts of Responsibility: The full restoration of middle-management posts in primary schools would afford them the opportunity to delegate STEM-related preparation for teaching and learning to an in-school management team member.

Integration: Whilst the 2020 STEM report promotes integrated experiences across curricula, this poses challenges. The Draft Primary Curriculum Framework, recently approved by the Minister, seeks to support a more integrated approach to teaching and learning. The NCCA and other stakeholders must bear this in mind in the development of a coherent curriculum.

Outdoor Learning: Outdoor learning provides children with an opportunity to experience the value of exploring the natural world and their environment. Sufficient investment must be provided to develop outdoor spaces in schools, particularly those currently without access to such spaces, to facilitate the interdisciplinary nature of STEM.

Links with the Community: Strong links with local industries, educational institutions and community groups are effective in enriching STEM education at school level and must be fostered. INTO is currently undertaking research on transitions from early years settings to primary school, and the area of STEM offers an opportunity for both settings to work collaboratively.

Gender Equity: Gender stereotyping, curriculum accessibility and resourcing are all contributory factors to Ireland's high gender differential between male and female STEM graduates. Gender-responsive STEM education must be encouraged from an early age.

Pupil Voice: It is an underlying principle of the curriculum that the child should be an active agent in his or her own learning. The INTO welcomes the NCCA's recent consultation with children and young people on STEM. In preparing for the teaching and learning of STEM, pupils' interest and prior knowledge must be considered and their active participation encouraged.

Artificial Intelligence (AI) Skills/Assistive Technology: Information and communication technology has brought profound changes to all aspects of our lives. To support the skills needed "*educators will need to be ahead of the curve"*. Schools will be required to deliver a grounding in digital skills across the board and must be resourced and supported to do so.

INTO also notes that the use of assistive technology has contributed to a transformation of the learning experiences of children with special educational needs (SEN). INTO believes that in an increasingly digitised world, enhanced access to assistive technology for pupils with special educational needs is paramount to support inclusion.

Conclusion

STEM subjects are relevant in our everyday lives, accentuating the need to ensure effective education in this area from the outset in early years education. As the world we live in continues to change, it is vital that we equip our young learners with the STEM tools that will enable them to tackle these obstacles in a problem-solving, solution-focused approach. Teachers are committed to providing the best possible outcomes for their pupils, but to do so they need relevant curricula and the tools to empower their pupils. To achieve this, appropriate resources and funding are vital. The INTO calls for increased investment to ensure all teachers in our primary schools are provided with appropriate professional development and supports to realise the ambitions within Ireland's National STEM Policy.

Go raibh maith agaibh as ucht éiseacht liom, bheinn sásta aon chuid den ráiteas nó den aighneacht a phlé.