

IPPN Submission - STEM Education Policy



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TABLE OF CONTENTS

Introduction	1
1. Opportunities and Positives	2
2. Challenges and Concerns	3
3. Feedback in relation to the online STEM Survey.....	4
Conclusion	5

Introduction

The Irish Primary Principals' Network (IPPN) is the officially-recognised professional body for the leaders of Irish primary schools. Established in 1999, IPPN is an independent, not-for-profit voluntary association with a local, regional and national presence. Recognised by the Minister for Education and Skills as an official Education Partner, IPPN works with the Department of Education and Skills (DES), the National Parents' Council, management bodies, unions, education agencies, academic institutions and children's charities towards the advancement of primary education. IPPN articulates the collective knowledge and professional experience of over 6,400 Principals and Deputy Principals, leading Ireland's 3,200+ primary schools.

IPPN has sought input from current serving principals in relation to STEM education policy. This submission provides an outline response of the positives and challenges in relation to STEM policy. We have encouraged our 6,400+ members to complete the online survey, although the timing of the survey during the very busy period in schools in June will likely significantly limit the number of respondents.

1. Opportunities and Positives

Given the importance of STEM education in developing key skills, it is encouraging that the DES is developing and implementing a STEM education policy.

IPPN welcomes the focus on integration across primary and post-primary sectors. If STEM is to be encouraged at both primary and post-primary levels, the foundations must be set at primary level, and the appropriate investment made. Adequate resourcing and training will need to be provided to enable primary schools to effectively embed STEM learning at an early age. Indeed, research has shown that if children, particularly girls, do not have an appreciation for STEM by the time they leave primary education, they are far less likely to take up STEM subjects at second level.

There is widespread agreement in primary education that, while STEM subjects are valuable, there should not be undue emphasis on them at the expense of other aspects of education, especially the Arts. Most other developed countries have adapted STEM to include the arts, known as 'STEAM'. There is an opportunity for the DES, and the NCCA to develop enhanced curricula to cover all of STEAM.

There is also an opportunity to further develop the 'softer skills' – particularly communication and interpersonal skills - and pupils' creativity within the curriculum, alongside enhanced STEM education. These life skills are crucial to any organisation, including those in the technology industry.

No mention is made in the STEM discussion paper of the DES ICT Strategy or the Digital Schools of Distinction programme, both of which should be part of an overall framework of which STEM is a new component. There is an opportunity to integrate all of these related strands within an overarching strategy and framework.

In terms of theme 2 - *Supporting STEM Teachers within the system with a particular focus on CPD* - background knowledge is as vital for building confidence in teachers as good lesson content. Approved courses in STEM undertaken during the school year should qualify for EPV days. This would act as an incentive to teachers to undertake CPD and put their learning to immediate use.

The DES and NCCA could look at models such as www.eie.org as a means of providing ongoing CPD and lessons. The new National Children's Science Centre based in Dublin would seem like an ideal base a la Boston Museum of Science <https://www.mos.org/>.

The National Science Centre should also be tasked with travelling interactive exhibitions aimed at primary school children and teachers.

2. Challenges and Concerns

If the DES is serious about school improvement in any domain, the related issues of under-funding and principals' workload must be addressed. Another fundamental issue that needs to be urgently addressed is the ongoing moratorium on posts of responsibility and its impact on leadership and management capacity in schools, especially to review, implement and embed *any* system change. It has become impossible for school leaders and Boards of Management to comply with the various DES and other directives given the limited human and financial resources provided, particularly to primary schools. The anomalous discrepancies in the funding of primary and post-primary schools are an ongoing cause of concern and frustration.

The current plan in relation to linking coding to the mathematics curriculum needs to be reconsidered. Many teachers are passionate about technology in education, yet they are deeply concerned that adding coding to mathematics is narrow-minded in the extreme and will result in failure. If primary schools are to teach coding, it should be integrated across the curriculum - to do so otherwise would be akin to allowing children to write only in one subject.

It has been acknowledged that the current curriculum is out of sync with 21st century learning. There may be a temptation to bow down to economic needs, such as a narrow focus on STEM. The primary curriculum must open children's minds to other aspects of learning - independent thinking and creative skills. The advantage of the 1999 curriculum is that it gives children opportunities to think, explore and be creative. These must not be lost.

If STEM is to happen, it must be recognised that the vast majority of teachers require significantly more training and ongoing professional development in what would be expected of them. Furthermore, in order to focus on STEM, all schools must have adequate Broadband infrastructure. This is still not the case in a significant number of primary schools and must be achieved before any attempt is made to enhance STEM teaching and learning.

Support for ICT and other materials must be provided. There is little or no provision for hardware, software, networking and technical support in primary schools. It was famously stated that most technology in primary schools has been funded by cake sales. While the government are allocating some funds for ICT over the next few years, it will be insufficient in supporting the aims of the STEM strategy.

STEM resources, outside of ICT equipment, are also expensive. All schools must be provided with regular finance to purchase science, engineering and maths equipment. An efficient approach to achieving this may be to adequately resource all the Education Centres, facilitating a system of sharing among schools.

3. Feedback in relation to the online STEM Survey

IPPN encouraged our members to participate in the online survey. A few key issues were highlighted in the course of our discussions about the survey. They are as follows:

Theme 1: Preparation of Teachers for STEM education in Ireland

- i) ITE: Audit is a good idea but do colleges have the ability/personnel to provide this knowledge. Are they willing to provide the time for it?
 - ii) Yes, all primary teachers should pass all STEM methodology-related subjects.
 - iii) Primary schools are mentoring Student Teachers as a voluntary add on. Significant support is needed if this is to be any more than an aspiration.
- 1) Beware the 'Hero/Champion' teacher model as it tends to be short-lived as the 'heroes' go to pastures new. If STEM and STEM approaches are to become embedded in primary education, then every teacher needs to be a STEM teacher. A better idea might be to identify specific schools in different geographical areas and build clusters around them. This might involve drawing on schools already proficient in STEM or asking schools to upskill in STEM with DES support. These schools could then be the 'magnet' or 'beacon' schools with a specific task of having planned interaction with the schools in their cluster. Additional teacher/teachers and equipment would be required to facilitate such an approach.
- 2) Optional placements are a good, if limited, idea. Industry talks a lot about STEM in education but the businesses tend to engage with primary schools at a very superficial level. There is also a danger of building further inequality into the system from a geographical perspective as technology companies operate in larger urban areas. Financial support from industry for STEM training/programmes that would be available to all schools might be more beneficial and effective.

Theme 4: The use of technology to enhance STEM learning

This theme has two key suggestions, both of which relate mainly to second-level schools. This should be expanded to take into account technology available in primary schools and the need for multi-annual funding for hardware, software, networks, broadband as well as a critical need for training for primary teachers to embed technology within the teaching and learning right across the curriculum, as well as within STEM subjects themselves.

Theme 5 Promotion of STEM Careers and identification of methods to enhance the engagement of students in STEM subjects.

The biggest challenge is the simplest one. If children - girls and boys - are exposed to interesting, well thought-out, well-planned and challenging STEM lessons that build on the previous year's work, then they will be more interested in taking these subjects at second level. Research shows that, where interest is not developed by the end of primary, children do not take these subjects later.

Conclusion

There is a need to review the primary curriculum to meet the needs of 21st century children. The key advantages of the current curriculum must be maintained, particularly the focus on holistic development of the child, rather than a narrow focus on subjects and skills. Creativity across a wide range of skills needs to be harnessed and nurtured. This can and should include STEM learning but not at the expense of other learning opportunities. Schools are developing children to become well-balanced individuals with the capacity for life-long learning and to contribute to society as a whole, not just to the workplace, and this needs to be borne in mind in any DES strategy. It will be crucial to ensure that there is adequate investment in professional development for all teachers, as well as curriculum resources, ICT infrastructure and resources, if a new curriculum, including STEM education, is to succeed.