An Roinn Oideachais
Department of Education

STEM Education Policy Focus Group Consultation Report – March 2023

Contents

Introduction

As part of the ongoing implementation of the STEM Education Policy Statement the Department of Education (DoE) is currently developing a new STEM Education Implementation Plan which will be informed by learnings the *STEM Education Implementation Plan 2017-2019*[1] (Phase 1, the Enhancing phase), and the findings from a consultation process including focus groups with relevant stakeholders.

The Department of Education (DoE) held a series of Focus Groups (FGs) with thirteen stakeholder groups between 17 February and 17 May 2022. The DoE worked in conjunction with the Department of Children, Equality, Disability, Integration and Youth (DCEDIY) for the Early Learning and Care (ELC) focus group. The Focus Groups were one element of the DoE's review of implementation,, and they were informed by an earlier public consultations process. The purpose of the Focus Groups was to capture the voice of teachers, early years educators, school leaders, learners, parents and education stakeholders on a range of issues that emerged from the initial set of consultations.

The Focus Group questions were informed by earlier stakeholder feedback provided through the STEM Education Policy Statement public consultation. A series of discussion topics was designed for each of the Focus Groups and provided to participants in advance. These formed the basis for discussion during the Focus Group sessions and covered a range of issues, such as:

- Successes and challenges in implementing STEM
- STEM Learning and Assessment Practices
- Leadership of STEM education
- Teacher and Early years Educator Capacity in STEM education
- Partnerships with external stakeholders

The Focus Groups were organised and coordinated by the Curriculum and Assessment Policy Unit (CAP) in the DoE (and in conjunction with DCEDIY for the early learning and care focus group), which identified and contacted the participants in advance of the live focus group sessions. H2 Learning facilitated the technical design and delivery of the focus group sessions online and subsequently analysed the discussion transcripts and compiled the STEM Education Focus Group Consultation Report.

This report provides a high-level overview of the perspectives that were shared by the participants across the thirteen focus groups. The participants shared a wide range of views, and these were initially categorised as either observations or suggestions. Subsequently, the observations were divided into successes and challenges, as contributors shared a wide range of experiences during the focus group sessions. The observation statements captured examples of current practice or contributors' views on a particular issue they were asked to comment on, while the suggestions proposed a possible action that could be taken to improve a particular topic or issue in the future. The report categorises these contributions under the four pillars of the existing STEM Education Policy Statement.

[1] *STEM Education Implementation Plan 2017-2019,* https://assets.gov.ie/43631/194126acae544b93895436013dadbefb.pdf

Focus Group Consultations

In preparation for the focus group sessions, the CAP STEM team analysed the key themes and considerations arising from the earlier consultation phase. This analysis identified a range of issues that the DoE and (DCEDIY in relation to early learning and care) wanted to further explore with each of the thirteen key stakeholder groups. A unique set of questions were developed in relation to these issues for each focus group, so as to gather a wider range of perspectives. The Focus Groups (see Table 1) were held online in 2022 and each lasted 90 minutes. The pupil sessions took place on 11 March 2022 and were 60 minutes.

Focus Group Name	Date/time
Post-Primary Principals	17 Feb 2.30-4pm
Discover Centre Network	18 Feb 10-11.30am
Business/Industry	22 Feb 10-11.30am
Guidance Counsellors	1 March 2-3.30pm
Primary Teachers	3 March 2.30-4pm
Post-Primary Teachers	8 March 2.30-4pm
Parents	9 March 10-11.30am
ITE/HEI	9 March 2.30-4pm
Primary Pupils	11 March 9.30-10.30am
Post-Primary Pupils	11 March 11-12pm
Primary Principals	29 March 10-11.30am
Early Years Educators	24 May 10-11.30am

Table 1: Focus Group Consultation Dates and Groups

Format of the Focus Groups

Participants were identified by the DoE with help from different organisations for some of the focus groups i.e. Institute of Guidance Counsellors, National Parents Council, Department of Children, Equality, Disability, Integration and Youth (DCEDIY), Irish Primary Principals' Network, Education & Training Boards Ireland, Joint Managerial Board, National Association of Principals and Deputies, Association of Community and Comprehensive Schools, An Foras Pátrúnachta and they were circulated with an advance copy of the areas for discussion (see Appendix 1) before the online focus group. Each session commenced with a brief overview of the purpose of the session and embedded it within the context of developing a new STEM Education Implementation Plan. The etiquette for running the session was also outlined (figure 1) at the outset and participants were encouraged to share their views, either through the microphone or the chat facility. Participants were informed that

their contributions would be anonymous and that the session would be recorded only for clarification purposes and to facilitate the subsequent writing of this report to ensure all views were accurately captured

Participants were encouraged to use the chat facility to add comments during the discussion. At the end of each Focus Group session, participants were invited to provide their two key observations on areas the new strategy should address on the Focus Group Padlet. H2 Learning personnel took detailed notes of the contributions during the live session and these were further enhanced after the session by listening back to the recordings.

Figure 1, Focus Group Etiquette

The discussion topics were used to guide the discussions and each group provided valuable insights into their experiences of STEM education in the context of the *STEM Education Policy Statement 2017-2026*[2]. CAP and H2 Learning worked with the National Council for Curriculum and Assessment (NCCA) to design and run the primary and post-primary learner focus groups and the Department of Children, Equality, Disability, Integration and Youth for the Early Years Educators focus group.

Analysis Approach

At the conclusion of each Focus Group, H2 Learning created a report on each session and captured the key contributions by each group under the discussion topics. Subsequently, all thirteen reports were compiled where the contributors were initially categorised under a number of headings, such as:

- The contributing Focus Group (e.g. Business and Industry)
- The question prompt that triggered the response (e.g. What were the challenges?)
- The type of response (e.g. an observation or a suggestion)

[2] *STEM Education Policy Statement 2017-2026,* https://assets.gov.ie/43627/06a5face02ae4ecd921334833a4687ac.pdf

- The education level (e.g. Early Learning and Care, Primary or Post-primary)

This initial categorisation phase noted there was quite a lot of overlap in the contributions from the groups so further analysis was carried out using a thematic review approach.

These contributions were further analysed in comparison to the existing pillars of the STEM Education Policy Statement. The current policy has four pillars, and each pillar has an accompanying set of objectives and high-level actions.

- Pillar 1: Nurture learner engagement and participation
- Pillar 2: Enhance teacher and early years educator capacity
- Pillar 3: Support STEM education practice
- Pillar 4: Use evidence to support STEM education

This approach worked well for pillars 1, 2 and 3 as these primarily related to STEM education practices while Pillar 4 was not a priority area for the Focus Group discussions at this time.

Thematic Descriptors

A set of thematic labels were then developed for each of the three pillars, and these were informed by the high-level actions outlined in the policy statements. The thematic labels were as follows:

Pillar 1: Nurture learner engagement and participation

- High-quality STEM education experiences
- Ensuring learners have a positive engagement with STEM education
- Access to high-quality advice in relation to STEM careers

Pillar 2: Enhance teacher and early years educator capacity

- Enhance the capacity and quality of and early years educator and teacher education and professional development
- Building capacity through continuous improvement

Pillar 3: Support STEM education practice

For pillar 3 it was decided to shorten the thematic descriptors, and these appear in italics and bold below.

- Enhance STEM teaching, learning and assessment practices *(TLA Practices)*
- Enhance STEM teaching, learning and assessment practices using digital technologies *(TLA using Digital)*
- Enhance the link between STEM education and the Arts
- Enhance partnerships between schools and businesses and the research community *(Partnerships)*

The contributions from the Focus Groups were mapped back to these themes under the three relevant pillars and they were further categorised under the following headings.

- Successes when providing high-quality STEM education experiences
- Barriers and Challenges hindering progress
- Suggestions/Recommendations to support STEM education

Furthermore, each section concludes with a narrative section that reflects on the overall contributions and identifies a range of the issues for possible consideration in the next iteration of the STEM Education Implementation Plan.

Key Observations from the Consultation

This section provides a summary of the Focus Group contributions and aligns them with the current STEM Education Policy Statement 2017-2026. The policy statement has four pillars:

- **Pillar 1:** Nurture learner engagement and participation
- **Pillar 2:** Enhance teacher and early years educator capacity
- **Pillar 3:** Support STEM education practice
- **Pillar 4:** Use evidence to support STEM education

We have reviewed the Focus Group contributions against the key outcomes for each of the four pillars, where we then further categorised them under the following headings:

- Successes when providing high-quality STEM education experiences
- Barriers and Challenges hindering progress
- Suggestions/Recommendations to support STEM education

There was significant overlap in the contributions made by those who participated in the Focus Groups, yet each had their own perspective with some issues being more relevant to certain groups. We have captured and reviewed all the contributions across the thirteen focus group events and have clustered contributions by theme and where appropriate have included keywords or phrases from individual contributions. We have also provided the Prompt Questions for each of the Focus Groups in Appendix 1 of this report.

Pillar 1: Nurture Learner Engagement and Participation

Introduction

Pillar 1 is concerned with nurturing young people's STEM curiosity and ensuring that all learners have a positive engagement with STEM education. It has two objectives:

- Increase participation of learners in STEM education
- Increase awareness of STEM education

This pillar is associated with issues such as:

- Providing high-quality STEM education experiences
- Ensuring learners have a positive engagement with STEM education
- Access to high-quality advice in relation to STEM careers

It should be noted that elements of Pillar 1, those related to providing high-quality STEM education experiences, are closely related to Pillar 3, Support STEM education practice, so there may be some overlap in these sections.

Consultation Feedback

Table 1 captures the key observations contributors made when highlighting their successes in relation to their successes when nurturing learner engagement and participation.

Table 1: Pillar 1 – Successes when nurturing learner engagement and participation

Key Observation	Category
The importance of leadership in STEM education was noted. The competence and confidence of leaders, across early learning and care (ELC) settings and schools, were highlighted as being key to ensuring learners experienced high-quality STEM education.	High-quality STEM education experiences
Educational and pedagogical leadership was to the fore in many schools and ELC settings where a holistic approach was taken. In schools, this was often linked to their digital strategy and saw STEM embedded across the curriculum. Such approaches involved the entire school in activities such as *'tinkering and debugging*, something that previously pupils engaged in 5th and 6th class. Schools that take a holistic approach typically have a STEM Team and a distributed leadership model.	Ensuring learners have a positive engagement with STEM education
Schools and ELC settings spoke about having a dedicated person to lead STEM education and these individuals were typically recognised and provided with support, such as time, to develop a STEM culture.	High-quality STEM education experiences
Taking an integrated STEM approach, where they embedded STEM across the curriculum and moved beyond teaching STEM subject knowledge in silos (i.e., in Maths and Science lessons) was	High-quality STEM education experiences

noted. Such an approach was easier to achieve in Early Years and primary settings but there were post-primary schools that also endeavoured to take such an approach. In ELC settings STEM is embedded across the curriculum and predominately facilitated through play experiences therefore making it easier to implement.	
It was noted that STEM education is very much associated with play in ELC settings. It is associated with activities such as predicting, problem-solving, creativity, curiosity and engagement with the environment. In such activities, the children are often engaged in STEM without realising it.	Ensuring learners have a positive engagement with STEM education
It was noted that it is essential to introduce children and young people to STEM careers at the earliest age possible because leaving it to post-primary school and specifically Transition Year is too late. At post-primary all teachers, but particularly those teaching STEM subjects, and Career Guidance should link their subjects to relevant STEM careers.	Access to high-quality advice in relation to STEM careers
Many schools are trialling innovative approaches to allow young people in primary and post-primary schools to experience STEM subjects. This can consist of primary pupils participating in a STEM subject taster before entering post-primary school, at the start of first year or a Transition Year student taking a STEM subject taster for the Senior Cycle. Such approaches enable students to try out the subject and make an informed decision.	Ensuring learners have a positive engagement with STEM education
It was further noted that STEM education is not just confined to formal settings, such as ELC settings or school classrooms. Learners can engage in a range of STEM learning activities outside of ELC settings and school and these enable children and young people and their families to actively engage in STEM in a fun and engaging way, often without realising it	High-quality STEM education experiences

Table 2 captures some key observations contributors associated with the challenges encountered when nurturing learner engagement and participation.

Table 2: Pillar 1 – Challenges when nurturing learner engagement and participation

Key Observation	Category
Contributors noted that there is still ambiguity around what is meant by STEM education across ELC and school settings. There does not appear to be a unified understanding or continuity of approach across all three settings. STEM education looks different depending on the setting with a strong focus on "*STEM in Play*" in ELC, "*teaching STEM*" at primary level, while the focus is almost entirely *on "STEM subjects"* at post-primary. There is a need to provide greater clarity in relation to what STEM education looks like in each of these three unique settings.	High-quality STEM education experiences
There was agreement that there is significant competition between all curricular areas for time. There is a need for clarity around who is required to "*teach STEM*" and what this looks like, particularly in	Ensuring learners have a positive engagement with STEM education

primary schools, so that STEM has equity in terms of time compared to other subjects on the curriculum.	
Contributors noted that STEM is more than teaching "STEM subjects" in isolation, and should focus more on an integrated STEM approach, where multiple subjects are combined to explore real-world problems. While such an approach is easier to achieve in Early Years and Primary settings, it is more challenging in larger primary schools and at post-primary level.	High-quality STEM education experiences
It was agreed that there are supply and demand issues in post-primary schools in relation to certain STEM subjects. Schools have real issues in recruiting qualified teachers to teach certain STEM subjects (i.e., Junior Science, Leaving Certificate Physics, Chemistry and/or Computer Science). While there are also issues with low numbers of students taking some of these STEM subjects at Leaving Certificate level. The supply and demand issues impact the number of students taking these STEM subjects at Leaving Certificate level.	High-quality STEM education experiences
Post-primary schools also reported that the curriculum is overloaded, and they often struggle to timetable STEM subjects. . In this regard reference to the current requirements around wellbeing was raised.	Ensuring learners have a positive engagement with STEM education
It was agreed that some post-primary schools are finding it challenging to provide female students with a wide choice of STEM subjects. This can depend on the type and size of the school, as it was noted that girls are sometimes being pushed into '*softer'* subjects.	Ensuring learners have a positive engagement with STEM education
It was noted that there can be challenges associated with the language associated with STEM. In ELC some early years educators stated they require assistance to better understand the language of STEM, so they can communicate STEM learning experiences with parents/guardians. While at post-primary level, some students and their parents struggled with the language associated with certain STEM careers. There were calls for more accessible language and terminology to be developed around STEM careers and courses.	Ensuring learners have a positive engagement with STEM education
Teachers and early years educators noted that there can be challenges associated with the standard and suitability of digital technology to support STEM education. Others highlighted issues broader issues, such as broadband and the maintenance of existing equipment.	Ensuring learners have a positive engagement with STEM education
At primary level it was noted that it can be challenging to provide time for teachers for curriculum planning activities so they can collaborate with colleagues and cluster their STEM activities.	Ensuring learners have a positive engagement with STEM education
It was noted that the moratorium on posts of responsibility has been a challenge for primary schools and this has impacted on recognising and rewarding STEM leaders	Ensuring learners have a positive engagement with STEM education

It was noted that in ELC it can be challenging to embed digital technology into High-quality STEM education experiences. Parents/guardians and early years educators can be wary of providing young children with access to screens and educators want guidance on what digital tools to use in STEM.	Ensuring learners have a positive engagement with STEM education
It was agreed that it can be challenging to convince some parents/guardians of the value of STEM education and therefore there is a need to find innovative ways to inform them of the benefits and opportunities for their children to actively engage in STEM education and in pursuing STEM careers in the future.	Access to high-quality advice in relation to STEM careers

Table 3 captures a range of suggestions made in relation to nurturing learner engagement and participation in the future.

Table 3: Pillar 1 – Suggestions around how to nurture learner engagement and participation

Key Observation	Category
It was agreed that there is a need to provide educators with further clarity and support around what is meant by STEM education and what it looks like across ELC, primary and post-primary schools by providing guidance on curriculum time, sample lessons, resource packs etc.	Ensuring learners have a positive engagement with STEM education
Leadership is key to ensuring that high-quality STEM education practices are offered to all learners. Educational / pedagogical leaders, in ELC, primary and post-primary settings, have a key role to play in developing a STEM culture. There is an onus on leaders to embed STEM education across their setting and to adopt, where possible, an integrated STEM approach.	Ensuring learners have a positive engagement with STEM education
It was suggested that a staff member should be identified to lead STEM education. This role, typically referred to as the STEM Coordinator, should champion STEM education practices across the setting, whether in ELC or in schools.	Ensuring learners have a positive engagement with STEM education
It was agreed that STEM education experiences are relevant to the lives of children and young people, and there is a need to make this connection and ensure that all learners engage with high-quality STEM education experiences.	Ensuring learners have a positive engagement with STEM education
It was suggested that there is a need to take a holistic approach to STEM education, one that recognises that understanding the world around us is not dependent on any one discipline or subject, but rather requires using critical, context-based approaches to STEM education. Thus, there is a need for ELC settings and schools to take an integrated STEM approach.	High-quality STEM education experiences
Contributors called for increased collaboration between schools, at all levels, on STEM education issues while others called for greater collaboration between teachers in their own schools.	Ensuring learners have a positive engagement with STEM education

There was recognition of the multiple challenges facing all teachers and educators in light of Covid-19 and of the need to better support them to engage with STEM education. Suggestions ranged from the provision of incentives to recruit staff to subject areas where shortages exist (e.g., Physics, Chemistry and Computer Science) to the provision of technicians for Science laboratory work. Schools are seeking additional supports to help them better implement the policy statement.	Ensuring learners have a positive engagement with STEM education
There was agreement that the number of students taking certain STEM subjects at Senior Cycle is low and therefore there is a need to consider innovative approaches to address this issue. Suggestions range from having STEM subject taster days for students, to the Department ring fencing a supernumerary allocation to support minority STEM subjects. There is a need to consider alternative approaches to this issue.	Ensuring learners have a positive engagement with STEM education
The role of the Department of Education professional development support services and the Education Centre network was acknowledged as supporting schools to provide high-quality STEM education experiences. It was suggested that there is a need to develop resource packs for teachers across primary and post primary, so they have immediate access to quality lesson ideas for their learners.	High-quality STEM education experiences
It was acknowledged that STEM education can take place in multiple settings, from in-school/ELC setting to learning outdoors through hands-on activities. It was noted that learning in outdoor settings can often be more engaging and less intimidating and that such experiences can foster a positive engagement with STEM.	Ensuring learners have a positive engagement with STEM education
It was noted that while guidance counsellors clearly play a key role in helping students identify relevant STEM careers, there is also a role for other teachers, specifically STEM subject teachers to make linkages between their subjects and relevant STEM careers.	Access to high-quality advice in relation to STEM careers
It was agreed that STEM education is still not engaging all learners, particularly girls at post-primary level, as many of the technology subjects are still predominantly male-dominated. There is a need to implement additional sustainable measures to address these challenges.	Ensuring learners have a positive engagement with STEM education

Considerations

The Focus Group discussions highlighted that many early years educators and teachers are engaged in STEM education and the following issues should be considered in rolling out the next phase of the STEM Education Implementation Plan the Realising Phase (2023-2026).

While there is tremendous work taking place across ELC settings, primary and post-primary schools there is still work to be done on providing greater clarity to all sectors on what STEM education is and looks like in practice. Many believe that integrated STEM should be to the

fore, where learners engage in cross-curricular learning experiences that are predominantly underpinned by inquiry-based learning approaches. Staff want further guidance on what this looks like in their context and they are seeking resources and suggestions in relation to time, activities and good practices so they can provide high-quality educational experiences. The issue of STEM leadership has also emerged as a key factor in providing such experiences and where there is strong leadership, there is typically a strong STEM culture. Numerous contributors noted that there is a need for distributed leadership in schools, where one or more teachers leads STEM education. Furthermore, they noted that it is important to recognise and reward such STEM leaders and many schools have opted to appoint a STEM Coordinator to drive such educational experiences. There is a need to resource the STEM Education Policy Statement so that early years settings and schools can implement the key actions associated with the four pillars.

High-quality STEM education experiences can happen in a range of places, and not just in classrooms or ELC settings. There are opportunities to move outside the physical classroom walls so that learners engage in more hands-on experiential learning experiences. The provision of such engaging learning experiences has the potential to positively engage learners with STEM education. Furthermore, the appropriate use of digital technologies can also play a role in developing STEM competences such as curiosity, creativity, and problem-solving. Early years educators and teachers have choices to make in relation to where and how learners engage with STEM education, and they are seeking additional support on how to design and implement such practices.

Issues still remain in relation to increasing the uptake of certain STEM subjects at post-primary school level. There are challenges on the supply side with a lack of teachers in certain subjects in certain parts of the country and on the demand side where some subjects can have low numbers of students. Schools are seeking special support to help address both of these issues. They are seeking support to attract and retain teachers in these subject areas, while also seeking innovative solutions so they can offer STEM subjects to the widest possible number of learners. Contributors shared a range of suggestions ranging from clustering teachers regionally to offering certain courses online.

There is still additional work to be completed in relation to the promotion of STEM careers and STEM courses in further and higher education. While Covid-19 saw an increase in the use of video-conferencing technologies by further and higher education institutions to connect with students, and to inform them of their course offerings, more is required. Schools are seeking quality interactive sessions online where students are provided with good insights into actual course experiences. Furthermore, schools are seeking clarity on course titles and descriptions, so that students are better equipped to make judgements about the courses they might pursue. Some contributors are calling for a one-stop-shop where learners can find such information on all STEM-related courses, from apprenticeships right through to degree programmes.

Pillar 2: Enhance Teacher and Early Years Educator Capacity

Introduction

Pillar 2 is concerned with improving teacher and early years educator capacity in delivering STEM education of the highest quality for all learners. It has two high-level objectives:

- Enhance the capacity and quality of early years educator and teacher education to support STEM education in ELC settings and schools
- Building early years educator and teacher capacity through continuous improvement

This pillar is associated with issues such as:

- Enhancing the quality of Initial Teacher Education (ITE), induction and ongoing learning opportunities to support the development of STEM disciplines and pedagogical content knowledge
- Developing guidelines to facilitate STEM education in school placement in Initial Teacher Education
- Facilitating effective partnerships between Initial Teacher Education, teachers' learning providers, STEM research and business and industry.

While also:

- Ensuring STEM education professional learning and mentoring is included in teacher induction
- Ensuring the ongoing provision of teachers qualified to teach STEM-specific subjects at post-primary
- Providing a variety of high-quality STEM-related opportunities for early years educators and teachers to support their own professional learning
- Providing support to teachers in relation to the implementation of STEM education curricular change
- Promoting collaboration on STEM education within and between school settings
- Conducting an ongoing review of the standards and quality of STEM education professional learning

Consultation Observations

Table 4 captures some key observations contributors made in relation to the successes associated with enhancing teacher and early years educator capacity.

Table 4: Pillar 2 – Successes when enhancing teacher and early years educator capacity

Key Observation	Category
Contributors noted that there are multiple examples where schools and ELC settings enhance the capacity of staff in relation to STEM education. Some are connecting with their local Education Centre and ITE institutions (e.g., Clare Education Centre and Mary Immaculate College) where staff are engaged in STEM and the Arts. They bring this knowledge and practice back to their classrooms where children engage in a range of fun and engaging activities.	Enhance the capacity and quality of teacher education
Other contributors connected with other Higher Education institutions and their Education Centres to borrow STEM equipment for use with learners in school. This approach enabled them to see how the equipment could support STEM, before deciding to purchase the resources later. Schools later held in-service events in school during the summer (primary level) for all staff on using the materials to support STEM education.	Enhance the capacity and quality of teacher education
It was noted that in ITE, modules are provided in teaching the Social, Environmental and Scientific Education (SESE) curriculum, one-third of which is focused on science content knowledge. These modules cover inquiry-based learning approaches (fundamental to STEM education in primary and ELC), skills development and education for sustainability.	Enhance the capacity and quality of teacher education
Some teachers are already collaborating and clustering with other schools in relation to STEM either through an Education Centre, a project or as part of an Erasmus+ project.	Enhance the capacity and quality of teacher education
Others commended the Curious Minds Programme noting that it was very positive and that it focused on teachers.	Enhance the capacity and quality of teacher education
Some schools provide time for staff to visit other classrooms where they mentor their colleagues on STEM education. Time is also provided at staff meetings to share ideas and learn across different streams, and staff are encouraged to run activity evenings for the children.	Enhance the capacity and quality of teacher education
Contributors from the Discover Centres Network (DCN) described a range of examples from ELC to third level. The programming includes hands-on STEM workshops for pupils at centres, outdoors, through outreach visits to schools and online. Teacher CPD is also offered by the network.	Enhance the capacity and quality of teacher education

Table 5 captures some key observations contributors made in relation to challenges associated with enhancing teacher and early years educator capacity.

Table 5: Pillar 2 – Challenges when enhancing teacher and early years educator capacity

Key Observation	Category
It was noted that the Teaching Council reaccreditation of ITE science programmes is proving to be an obstacle in providing pre-service teachers with the integrated education they need to teach Junior Cycle Science.	Enhance the capacity and quality of teacher education
Time was cited as a challenge for all educators, across all settings, when participating in STEM education professional learning activities including in-service events and to collaborate and network with early years educators and teachers in their own and other ELC settings and schools.	Enhance the capacity and quality of teacher education
Contributors noted that during COVID-19; the main focus in schools was on literacy and numeracy learning activities, rather than on STEM. There was little or no sharing of resources and less opportunity for CPD.	Enhance the capacity and quality of teacher education
There was agreement that there is a need to provide multiple and varied opportunities for early years educators to develop their capacities in relation to STEM. Early years educators reported engaging in CPD in their own time and there was a call to increase funding for professional learning experiences across the sector. Contributors noted a need to focus on CPD in the area of STEM education and play, so that early years educators are competent to use the language of STEM with parents/guardians in capturing and reporting such activity.	Building capacity through continuous improvement
Contributors noted that students engaged in initial professional education programmes can experience challenges to engage in STEM education on placement and as early years educators can lack training and the ability to support students on their placement and there are concerns about the use of digital technology with young children. In schools ITE students may not be provided with sufficient time to deliver an inquiry-based lesson as curriculum time may not be given to STEM in all schools. Such experiences can result in a student-educator/teacher never having had the opportunity in their ELC or primary school placement to engage in STEM-related activities or at primary level to teach a STEM lesson.	Building capacity through continuous improvement
Contributors said that support for STEM in ELC needs to be considered in a wider context. It was noted that Aistear needs to take STEM into account, and at the time Aistear was introduced in 2009 there was no formal training	Building capacity through continuous improvement
It was agreed by contributors that there was an increase in the use of digital technologies during Covid across education. However, teacher and early years educator confidence in using digital technology in STEM learning is still a challenge and further funding and CPD is needed to address this issue.	Building capacity through continuous improvement

Table 6 captures some key observations contributors made when highlighting their suggestions to enhance teacher and early years educator capacity.

Table 6: Pillar 2 – Suggestions to enhance teacher and early years educator capacity

Key Observation	Category
It was acknowledged that there is a need to provide practical CPD to all educators in relation to STEM education. Teachers and Early Years educators want clarity on what they should teach and suggestions on how to introduce STEM learning experiences into play in ELC and primary and how to design lessons at primary level. They are seeking sample lessons, and further guidance, resource packs and other supports to build their confidence and enable them to teach STEM. For example, some found the packs distributed by Science Foundation Ireland to be particularly useful and in particular the box of resources that were distributed for Science Week.	Building capacity through continuous improvement
It was noted that at primary level teachers are seeking more sustained and varied year-round CPD in the area of STEM education. They would like to see the use of digital technologies embedded within these learning events, so they can experience good STEM education practices. Mentoring of less confident staff in school and visits from STEM experts when appropriate was also raised..	Building capacity through continuous improvement
Schools would also like to partner and collaborate with other schools. Some contributors noted the role that the Education Centre network can play to facilitate such peer learning activities. Such peer learning activities should be recognised.	Building capacity through continuous improvement
In relation to teacher supply contributors called for more sustainable solutions to recruit and upskill more teachers, so they are competent and confident to teach these STEM subjects.	Building capacity through continuous improvement
The idea of linking and partnering with outside organisations, such as Education Centres, Discover Centres and HEIs, was seen as being a really valuable form of teacher professional learning. Further support was requested in terms of substitution cover and other supports (i.e., travel costs) to enable teachers and learners to attend these external events.	Building capacity through continuous improvement
At post-primary level it was suggested that all STEM education teachers should join their subject association, so they can avail of the resources provided and participate in subject-based peer learning events and activities.	Building capacity through continuous improvement
It was noted that in ELC there is a requirement for ongoing professional development experiences for early years educators in the area of STEM education. Educators want to experience quality STEM education and learning experiences and have access to relevant supports. Furthermore, they want to develop and use the language of STEM in their practice, particularly when sharing examples with parents/guardians, colleagues and others.	Building capacity through continuous improvement

It was suggested that in ITE there is a need to provide students with access to compulsory modules that will develop their STEM content knowledge and also there is a need for students to experience integrated STEM education, particularly in 3rd and 4th years.	Enhance the capacity and quality of teacher education
There was a call to *"support STEM teachers to go to work in a HEI on graduate research / strategic leadership programmes"*, and that programmes, such as STINT[3], could be offered and recognised for credits in ITE.	Enhance the capacity and quality of teacher education
Contributors noted that there is currently a heavy focus on numeracy and literacy professional learning within the primary school sector and they recommended to *"shift the focus of primary teacher summer courses from numeracy and literacy to integrated STEM".*	Building capacity through continuous improvement
There was a general call to provide encouragement or incentives so as to encourage all STEM educators to participate in CPD activities. While primary teachers can avail of Extra Personal Days (EPV) or 'course' days for professional development attendance during the summer, there is no similar programme for post-primary teachers or for Early Years educators. Contributors suggested that this issue requires consideration so that educators are acknowledged and rewarded for such engagement.	Building capacity through continuous improvement
The issue of mentoring was raised both in relation to ITE and in-career professional development. There is a need for more mentoring of teachers during their Professional Master of Education (PME) programme, particularly in relation to STEM education. A similar need exists for in-career teachers so they can receive support from colleagues.	Building capacity through continuous improvement

Considerations

While tremendous work is already taking place in relation to enhancing teacher and Early Years educator capacity to engage in STEM education, there are still issues that need further attention and support. Contributors highlighted a number of issues associated with ITE at present, chief among these is the new Teaching Council accreditation requirement surrounding Science teachers. Post-primary school principals noted they are struggling to find Science teachers who are qualified and confident to teach Junior Cycle Science. Elsewhere ITE providers are experiencing challenges in ensuring that all student teachers/ educators in ELC settings and in primary schools have an opportunity to engage with STEM learning experiences while on placement. It was noted that some student teachers may never have the opportunity to teach STEM while on placement and this should be a cause of concern.

ITE providers recognise the importance of ensuring that all student teachers are confident and competent to teach STEM. They are suggesting that, at primary level, all teachers have

[3] *STEM Teacher Internship (STInt) Programme, https://stemteacherinternships.ie/*

compulsory modules to develop their STEM content knowledge, while also providing time on the timetable, in years three and four, for integrated STEM modules. At post-primary level they are also advocating for more sustainable solutions to educating Physics, Chemistry and Computer Science teachers. The current solutions, while appropriate for the short term, will ultimately require more permanent solutions. Furthermore, there are calls to provide professional development for staff, across ELC settings and schools, in the area of integrated STEM education. This will require new forms of CPD for in-career staff and this should be considered in light of some of the emerging suggestions under Pillar 3 around new short courses at post-primary level.

Early years educators are seeking a range of supports to help them embed STEM education into their practices. There is a need to provide practical ongoing support to further develop the capacity of early years educators to design and implement STEM education through play. Educators are also seeking assistance around clarifying what STEM learning experiences might look like in ELC settings and in providing them with the appropriate language to capture and share these experiences with parents/guardians.

The Focus Groups captured a range of innovative practices in relation to enhancing teacher capacity to teach STEM at primary level. These ranged from providing time to more confident and competent staff to mentor colleagues to engaging with HEI institutions, the support services, Discover Centres and Education Centres for specialised STEM education. Many teachers and Early Years educators are seeking more focused support, such as guidance on time for STEM and model lessons or units at primary/post primary level that they can use with their learners. There is also a call for raising the value of STEM education professional development activities across the system so that it is valued in the same way as literacy and numeracy.

Finally, all contributors noted that digital technology, not just computers, has a role to play in STEM education and there is a need to continue to embed digital in all future STEM education professional learning activities at primary and post primary level and to consider how it would be embedded at ELC.

Pillar 3. Support STEM Education Practice

Introduction

Pillar 3 is concerned with supporting STEM education practice to enhance:

- STEM teaching, learning and assessment practices in early years settings and schools
- STEM teaching, learning and assessment practices using digital technologies
- The link between STEM education and the Arts
- Enhance partnership between schools and business/industry and the research community

This pillar is associated with issues such as:

- Providing for ongoing STEM-related curriculum review, development and assessment
- Providing access to high-quality curricular materials for STEM-related subjects and courses
- Providing opportunities for all learners to participate in STEM education through informal, co-curricular and extra-curricular programmes
- Supporting ELC and school leadership to enhance STEM education
- Supporting the evaluation of STEM education at ELC and school levels.

While also:

- Providing for digital technologies to support STEM education
- Including provision for STEM education in the national research repository for Arts
- Providing for STEM education linkages in Arts education
- Providing supports for schools to establish links with business and industry, HEIs and the research community more broadly

Consultation Feedback

Table 7 captures some key observations contributors made when highlighting their successes when supporting STEM education practice.

Table 7: Pillar 3 – Successes when supporting STEM education practice

Key Observation	Category
It was noted that schools have linked in with the Department of Education professional development support services and other	TLA Practices[4]

[4] *"TLA" stands for Teaching, Learning and Assessment Practices which captures practices associated with the high-level objective STEM teaching, learning and assessment practices in early years settings and schools.*

support services and organisations and this has been a fantastic help in rolling out STEM education.	
While many schools sought additional STEM resources, other schools have been very self-sufficient in relation to resources they have used basic materials from home and the local environment with learners.	TLA Practices
Primary schools have connected with local post-primary schools to organise STEM engagement during and after school. This has included visits to an after-school coding club which took place over 6 weeks.	TLA using Digital[5]
That many post-primary schools are already connecting in with their local HEIs was discussed. It was noted that this is dependent on where schools are located but where possible it has enabled schools to borrow STEM equipment and resources to use of these technologies with their students. Schools urged that it is important to build sustainable partnerships with HEIs that move beyond just mere visits.	Partnerships[6]
There were multiple examples discussed of schools organising external events, such as science fairs, Scifest, Key expo etc. where all students not just the high achievers gained from involvement in such events.	TLA Practices
It was agreed that one of the positives of Covid-19 was the increased use of digital technology and this led to gains in areas such as "*Digital literacy*" and *"meaningful workflow between teachers and teachers and students."* Covid also fast-tracked the use of online conferencing tools to connect post-primary schools with local enterprises on matters associated with STEM careers.	TLA using Digital
Contributors mentioned that schools have also developed dedicated spaces for STEM with some creating STEM labs as spaces for lunchtime clubs to meet and play. Such spaces typically support inquiry and creativity, they provide a dedicated space for '*messy'* activities, and they can also provide access to specialist technologies, such as green screen, digital cameras etc.	TLA Practices
The importance of the early childhood curriculum " Aistear being a huge advantage in terms of opportunities for STEM education was mentioned. It was felt that *"STEM has tied in very easily to the Aistear curriculum"* and that it can be activated through "*asking open-ended questions and providing the materials".*	TLA Practices
It was noted that through STEM education learners of all ages can engage with issues such as "ethics, integrity, accuracy and error"	TLA Practices

[5] *TLA using Digital stands for Teaching, Learning and Assessment Practices using Digital which captures practices associated with the high-level objective STEM teaching, learning and assessment practices using digital technologies.*

[6] *"Partnerships" captures practices associated with the high-level objective to enhance partnerships between schools and business/industry and the research community.*

because “STEM is about curiosity inquiry and questioning the world around you”.	
Contributors mentioned that some schools are building connections between their STEM course offerings by building linkages between subjects in Junior Cycle, such as Coding and Podcasting, with the Senior Cycle Technology subject. In this way, they are making STEM careers visible to students by making technology more relevant to their lives.	TLA Practices
Other schools are creating integrated STEM courses at post-primary level *“around growing, cooking and selling food, and the practical application of STEM worked very well.”* Forty-nine schools signed up for this short course also.	TLA Practices

Table 8 captures the challenges that contributors encounter when supporting STEM education practice.

Table 8: Pillar 3 – Challenges when supporting STEM education practice

Key Observation	Category
Contributors discussed the issue in some primary schools with teachers saying that STEM education is not part of the curriculum and therefore they don’t need to teach it. Principals reflected that “*It is all about curriculum”* and they want their *“staff to cover the curriculum”.* They noted that *“there is a need to provide help and assistance on where STEM marries into the curriculum as all subjects come into STEM”.*	TLA Practices
Similarly, there were calls from contributors for assistance on what STEM and engineering might look like across ELC and schools settings.	TLA Practices
The shortage of STEM subject teachers was already captured under Pillar 1 and 2 but principals further noted that often there are *“no female teachers in either technology or construction”,* and this can present challenges in recruiting female students for certain STEM subjects.	TLA Practices
It was agreed by participants that, there are further challenges facing post-primary schools trying to include additional STEM subjects and integrated STEM short courses into an already “*overcrowded timetable”.*	TLA Practices
Post-primary contributors shared concerns with some existing STEM subject curricula. They noted that the current *“syllabus for construction studies is not fit for purpose”* and while a new specification has been developed it has not been implemented. Others felt that there is a gap in terms of the content included in the new Junior Cycle Science curriculum and the respective Leaving Certificate Science subjects.	TLA Practices

Many contributors commended the Department for increased digital funding, they are also seeking advice and guidance on what technologies to purchase to support STEM education.	TLA using Digital
It was noted that many Early Years settings and schools are keen to bring in outside speakers and STEM professionals but there can be challenges associated with such practices. These can range from issues with Garda vetting to the inability of the speaker to connect with their audience.	TLA Practices
It was mentioned that assessing STEM education is a complex issue and while there are a range of standardised and national tests at primary and post-primary for STEM subjects there are challenges around assessing integrated STEM and STEM competences, such as *"problem-solving, teamwork, debugging, tinkering and playing".* It was noted that tests are not designed to measure such competences and cross-curricular work and that alternatives are required.	TLA Practices
Contributors shared stories of how they engaged with external stakeholders, both locally and at a national level. However, some felt *"there is an issue of equity for schools to access external stakeholders*" as it is not an even playing field. They are seeking support to access business/industry and higher education institutions in a more equitable and streamlined way.	Partnerships

Table 9 lists a range of suggestions to support STEM education practices.

Table 9: Pillar 3 – Suggestions for supporting STEM education practice

Key Observation	Category
It was suggested that *"a structured way of engagement between industry/business and schools*" is required and there were numerous calls for the development of a centralised platform to mediate such partnership requests. Industry is keen for schools to have a specific ask from schools, as this is not always the case, and it was felt that a centralised platform might also address this issue.	Partnerships
It was further suggested that the platform should primarily act as a "central repository for industry and teacher engagement on STEM initiatives" where employers and others "can showcase STEM roles as well as non-STEM careers in which STEM skills are highly valuable". Any such platform should focus on demystifying STEM careers and provide practical accessible information to schools and school leavers.	Partnerships

In addition to providing better information on STEM careers, others suggested that *"a structure is needed to support industry-academia engagement".* This need could also be facilitated by the central repository.	Partnerships
It was noted that there are opportunities at post-primary level to develop integrated STEM short courses at Junior Cycle level and such developments would allow learners to develop their STEM competences in school.	TLA Practices
Several contributors referenced models of curriculum support models/programmes from other areas, such as sports and heritage. These included the model where sports coaches visit a school for 8 weeks and they model good practices which teachers can then implement on their own. Others also referenced the Heritage in Schools Scheme and noted: "*that it has a panel of experts that can visit schools and that it is part-funded by Heritage Council"*. It is suggested that similar models could work with STEM education.	TLA Practices
Some contributors stated that STEM education is very much associated with STEM subjects at post-primary and there is limited space for integrated STEM learning. However, contributors identified Transition Year *"as a sweet spot to engage young people"* in integrated STEM activities that could also potentially involve local businesses. Suggestions ranged from schools engaging in Lego League activities that involved local businesses to engaging in *'open enquiry'* projects with the local community. It was felt that such activities could help develop a strong STEM mind-set and encourage more students to take STEM subjects at Senior Cycle.	TLA Practices
Schools and Early Years educators are seeking more targeted support in the form of resource packs. The Access Inclusion Model (AIM) "was provided as an example of a programme that provides an AIM Inclusive Play pack to ELC settings. The pack helped show what inclusion looks like in a play-based learning setting and it was suggested that a STEM pack could demonstrate what supports STEM learning and what STEM looks like in play.	TLA Practices
The accreditation and assessment of STEM short courses and integrated STEM learning units can be challenging, and it was suggested that alternative accreditation methods such as "*micro-credentials and badges"* should be considered. It was also suggested that post-primary schools could offer pre-apprenticeship programmes and that these could be validated using micro-credentials. The use of micro-credentials could lead to the development of alternative pathways for students into STEM courses in Further Education and Training and in Higher Education or STEM careers in the world of work.	TLA Practices

The assessment of student learning in STEM Education at Junior Cycle includes the use of Classroom Based Assessments (CBAs). Some suggested there are too many CBAs at present and that it might be better to reduce the number of CBAs and take an integrated approach that combined a number of existing CBAs into one STEM CBA.	TLA Practices
There was recognition of the role of digital technologies and other specialised equipment in STEM education with some noting that it added to the cost of offering STEM subjects. Others suggested that there is a need *"for technicians in schools to support science and engineering subjects".*	TLA using Digital
It was noted that STEM education can take place in a range of spaces, from classrooms to specialist rooms to outdoor settings. A number of schools heralded the creation of a *"STEM lab – a dedicated space for creativity"* at post-primary level which could support links with local primary schools. Such spaces are very much seen as creative spaces where learners can engage in play and develop key STEM competences.	TLA Practices
It was agreed that there is a wide array of digital technology that can support STEM education, but many teachers and early years educators want support in using these technologies to support STEM practices. They want advice on what to buy and how to use it with learners.	TLA using Digital
It was noted that the Arts could be a vehicle for STEM Education and that while being evidence-based it can also nurture other types of knowledge; arts, philosophy, creative and critical thinking. Furthermore it can support children in their creativity".	STEM Education and the Arts
There were calls for existing and future Department of Education funding for STEM education to be ring-fenced and only used for its intended purpose. Those in ITE also recommended that STEM funding should also be ring-fenced, "*so it is not absorbed elsewhere*."	TLA Practices
Contributors commented on the value of the existing STEM eco-system which includes the Discover Centre Network (DCN). There were calls to provide more incentives to schools so they can more easily avail of these experiences, as currently, not all schools are availing of these resources. The centres would like to explore how they can be linked more closely with STEM education in schools and ELC settings *"to show students and pupils how fun activities cover the curriculum and how it is all connected rather than standing on their own as just subjects to learn because we have to show them how STEAM is part of everyday life."* While the centres operate outside the formal school system there is a desire to connect more closely with schools and Early Years in the future.	Partnership
The importance of the range of support that the Department of Education provides to schools in the area of STEM education was discussed. From the support services, specifically the PDST and the JCT, to the Education Centre network. There is agreement that	Partnership

there is a need to market these resources so that schools can avail of these sustained supports in their locality.	

Considerations

There was widespread agreement that ELC settings and schools need greater supports to establish sustainable links with business and industry, HEIs and the research community. Many external organisations are interested in linking with education, but it is not always easy and there were calls for a central repository or platform where ELC settings or schools can easily connect with businesses, preferably in their region, on STEM education matters. Such a platform would act as a one-stop-shop for STEM careers information, and it would help industry, in particular, to respond to specific requests from across the education sector. There is a need to consider what such a platform might look like and how it could be structured and resourced to meet the needs of a diverse range of stakeholders that includes educators, learners, parents, industry and those involved in preparing people for STEM careers.

STEM education at post-primary level is primarily associated with STEM subjects, and this goes beyond traditional Science, Technology, Engineering and Maths subjects. There are challenges around teaching integrated STEM at post-primary level and a number of contributors suggested great usage of short courses and an increased focus on Transition Year to enable young people to engage in active open STEM inquiry. There were also suggestions for new forms of assessment at post-primary level that focused more on the process than on the product or the result of an examination. While there are existing assessments for STEM subjects there are gaps in how we might assess integrated STEM approaches at all levels. Some suggested that post-primary schools should consider new forms of accreditation, such as micro-credentials and badges, for such integrated learning activities and move beyond standardised and summative accreditation. Others suggested that micro-credentials could also be linked with apprenticeships and in the process build new pathways into STEM careers. There is scope here to explore what these new forms of assessment and accreditation might look like in schools.

As noted elsewhere, there are challenges with recruiting and retaining STEM subject teachers in certain subject areas and contributors suggested a range of innovative solutions, from clustering schools so that schools could pool their scarce resources (i.e., human and other resources) to offering these subjects online, so that the widest possible number of students can take these subjects.

Digital technology has a role to play in relation to providing high-quality STEM educational experiences and again there were calls for greater technical support and for support packs to help educators and teachers at all levels. The role of the support services and the Education Centre network was also highlighted here, as people are seeking practical help in this area.

Finally, the Discover Centre Network is offering a range of supports to the entire sector and it was suggested that the Department of Education work more closely with the network, so that ELC settings and schools can avail of integrated STEM programmes across a network of accredited centres.

Concluding Remarks

STEM education is an umbrella term and one that is often contested, as evidenced by the contributions across the Focus Group discussion. The discussions found that there is still a need to further elaborate on what is meant by STEM education in Early Years, in primary and in post-primary schools. Early Years educators are seeking examples of what STEM education can look like in their setting, while primary teachers want clarity around where it fits in the current curriculum. They are also seeking practical support on what integrated STEM looks like at primary level and they want to see it more valued within the school and by external evaluations. At post-primary level STEM education is almost entirely equated with STEM subjects and there is limited capacity and evidence of integrated STEM. However, many contributors noted that there are opportunities in Junior Cycle and Transition Year to change this and for schools to develop short courses. The creation of such short courses could utilise new forms of assessment, such as micro-credentials, and there are opportunities for schools to innovate in terms of new courses and new forms of assessment.

Early years educators and teachers across primary and post-primary schools are seeking a range of quality professional learning experiences. These should support educators in planning and implementing integrated STEM activities across all three levels. Furthermore, there is a requirement to provide additional support to educators in relation to their STEM content knowledge, particularly in relation to subjects where there is a shortage of staff. In initial teacher education, there are also challenges in relation to the Teaching Council requirements for Science teachers and in ensuring that student teachers have opportunities to teach a STEM lesson while on placement. The Focus Groups highlighted a range of issues and potential solutions for these problems.

The Focus Groups highlighted the need to enhance the partnership between ELC settings, schools and business/industry and the research community. Many believe that a portal could support such collaboration by having a one stop shop for all stakeholders to meet and develop connections. It could enable schools to find timely and engaging information on the widest possible range of STEM careers and courses for their students. Furthermore, it could support collaborations between business/industry and the research community. Such an idea would require further research to see if it is a viable solution to the current state of play, where connections with business/industry can be uneven.

AREAS of Discussion for the Focus Groups

1. Primary Principals – Areas for Discussion

1. **Leadership**
   What have been the successes for you as a leader in implementing STEM education in your school?
2. **Awareness /Increasing Participation in STEM Education**
   What is needed (e.g., strategies, resources etc.) within your schools to raise awareness and increase participation in STEM Education in your school?
3. **Teacher Capacity/Teaching**
   What would help to further develop STEM teacher capacity in your school?
4. **STEM Learning and Assessment**
   How can STEM learning and assessment practices be enhanced in your school?
5. **Partnership with External Stakeholders**
   Does your school have partnerships with external STEM stakeholders such as business/industry, third-level institutions, etc.?

2. Post Primary Principals – Areas for Discussion

1. **Leadership**
   What have been the successes for you as a leader in implementing STEM education in your school?
   What have been the challenges for you as a leader in implementing STEM Education in your school?
2. **Awareness /Increasing Participation in STEM Education**
   What is needed (e.g., strategies, resources etc.) within your schools to raise awareness and increase participation in STEM Education in your school?
3. **Teacher Capacity/Teaching**
   What would help to further develop STEM teacher capacity in your school?
4. **STEM Learning and Assessment**
   How can STEM learning and assessment practices be enhanced in your school?
5. **Partnership with External Stakeholders**
   Does your school have partnerships with external STEM stakeholders such as business/industry, third-level institutions, etc.?

3. Early Years Educators – Areas for Discussion

1. **Understanding of STEM and the Arts in Early Learning and Care Settings**
   What is your understanding of STEM?
2. **Curriculum/STEM Learning**
   Is STEM integrated into your curriculum or practice?
   How does your setting capture STEM learning which takes place in play?
   Does this help inform ongoing planning and provision?
3. **Leadership**

What have been the successes for you in leading STEM in your setting?
What have been the challenges for you in leading STEM in your setting?

4. **Awareness /Increasing Participation in STEM and the Arts Education**
   What is needed (e.g., strategies, resources etc.) within your settings to support young children's early awareness of STEM?
5. **Resources and Supports for Early Years Educators**
   What would help to further develop early years educator capacity in STEM in your setting?
6. **STEM Learning and Assessment**
   How can STEM learning and assessment practices be enhanced in your school?
7. **Partnership with External Stakeholders**
   Does your setting have partnerships with external STEM stakeholders such as parents, local libraries, community groups business/industry, artists, third-level institutions, etc.?

4. Primary Teachers – Areas for Discussion

1. **Leadership**
   What have been the successes for you as a STEM leader in implementing STEM education in your school/classroom?
2. **Awareness /Increasing Participation in STEM Education**
   What is needed (e.g., strategies, resources etc.) within your schools to raise awareness and increase participation in STEM Education in your school?
3. **Teacher Capacity/Teaching**
   What would help to further develop teacher capacity in STEM in your school?
4. **STEM Learning and Assessment**
   How can STEM learning and assessment practices be enhanced in your school?
5. **Partnership with External Stakeholders**
   Does your school have partnerships with external STEM stakeholders such as business/industry, third-level institutions, etc.?

5. Post Primary Teachers – Areas for Discussion

1. **Leadership**
   What have been the successes for you as a STEM leader in implementing STEM education in your school/classroom?
   What have been the challenges for you as a STEM leader in implementing STEM Education in your school/classroom?
2. **Awareness /Increasing Participation in STEM Education**
   What is needed (e.g., strategies, resources etc.) within your schools to raise awareness and increase participation in STEM Education in your school?
3. **Teacher Capacity/Teaching**
   What would help to further develop teacher capacity in STEM in your school?
4. **STEM Learning and Assessment**
   How can STEM learning and assessment practices be enhanced in your school?

5. **Partnership with External Stakeholders**
   Does your school have partnerships with external STEM stakeholders such as business/industry, third-level institutions, etc.?

6. Guidance Councillors – Areas for Discussion

1. **Leadership**
   What have been the successes for you as a guidance counsellor in promoting STEM education in your school?
   What have been the challenges for you as a guidance counsellor in promoting STEM education in your school?
2. **Awareness /Increasing Participation in STEM Education**
   What is needed (e.g., strategies, resources etc.) to raise awareness and increase participation in STEM education/training/careers?
3. **Guidance Counsellor STEM Capacity**
   What would help to further develop guidance counsellor STEM capacity?
   Do you believe you are fully aware of the different STEM opportunities in order to be able to guide students?
4. **STEM Learning and Assessment**
   How can STEM learning and assessment practices be enhanced in your school?
5. **Partnership with External Stakeholders**
   Does your school have partnerships with external STEM stakeholders such as business/industry, third-level institutions, etc.?

7. Primary Students and Post Primary Students – Questions for discussion

1. **What words come to mind when you hear the word STEM?**
2. **What STEM activities do you do in school?**
3. **What opportunities do you have for involvement in STEM?**
4. **What STEM activities do you do outside of school?**
5. **What do think is important about STEM?**

8. Parents – Areas for Discussion

1. **Awareness**
   How can you increase your knowledge about STEM subjects, STEM careers etc. so as to encourage your child to participate in STEM?
2. **STEM Learning at School and Early Years Settings**
   How can STEM learning practices be enhanced in your child's school/early years setting?
3. **Business/ Industry Support to Schools**
   In what way could industry engage with and support schools/early years settings in the promotion of STEM, in line with Department policy and requirements?
4. **Parental Support**

Are there ways in which parents could better support their children's learning in STEM?

9. ITEs – Areas for Discussion

1. **STEM Learning**
   How is STEM education being addressed within your ITE/Guidance programme?
2. **Department Supports**
   How can the Department, in collaboration with the Department of Further and Higher Education, better support you in terms of embedding STEM education across your teacher education programmes?
3. **Engagement with STEM**
   What could facilitate greater engagement with STEM education in school and early years placement?
4. **Supporting Schools**
   Are there ways in which HEIs/ITE could better support the education sector in raising awareness and promoting STEM education and opportunities in STEM careers?
5. **STEM Education Policy**
   How has the STEM Education Policy Statement 2017-2026 informed the content of your ITE programmes?
   In terms of the HE and ITE sector what are the priorities that should be included in the new STEM Education Implementation Plan 2022-2026?

10. Discover Centres – Areas for Discussion

1. **STEM Engagement with Formal Education**
   How can you increase your knowledge about STEM subjects, STEM careers etc. so as to encourage your child to participate in STEM?
2. **Settings**
   Can you provide examples of STEM engagement with schools, early years settings or through the formal education system?
3. **Informal STEM Engagement**
   Can you provide examples of STEM engagement in informal contexts?
4. **Barriers and Enablers**
   What are the barriers and enablers you see to STEM engagement?
5. **Supports**
   What actions would you suggest need to be taken to broaden and develop informal STEM engagement?

11. Business/Industry – Areas for Discussion

1. **STEM Policy Statement Priorities**
   In terms of the business/industry sector, what are the priorities that should be included in the new STEM Education Implementation Plan 2022-2026?
2. **Business/ Industry Support to the Department and Support Services**

Are there particular areas where business/industry engagement with the Department and its teacher support services would assist in progressing the embedding of STEM education in schools and early years settings?

3. **Business/ Industry Support to Schools**
   In what way could business/industry engage with and support schools and early years settings in the promotion of STEM, in line with Department policy and requirements?
4. **Business/Industry Equity of Access**
   Are there ways in which better business/industry collaboration and coordination with schools and early years settings could ensure greater equity of access to all learners? Supports
   What actions would you suggest need to be taken to broaden and develop informal STEM engagement?
5. **Awareness**
   Are there ways in which business/industry could support the education sector in raising awareness and promoting STEM education and the opportunities in STEM careers?