



**Report from STEM is COOL event
held at Parliament Buildings 29th January 2014**



March 2014





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March 2014

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Contents

Overview	4
Roundtable Discussions	5
Question 1. Pathways to STEM.....	5
Key Messages.....	6
Question 2. Securing our Digital Tomorrow	6
Key Messages.....	7
Question 3. STEM Economy.....	7
Key Messages.....	8
Common Emerging Themes	9
Careers Education.....	9
Activities being undertaken	9
Recommendations and Further Actions	10
Engagement with Industry.....	10
Activities being undertaken	10
Recommendation and Further Actions.....	11
Curriculum.....	11
Activities being undertaken	12
Recommendation and Further Actions.....	12
Role Models	12
Activities being undertaken	13
Recommendations and Further Actions	13
Appendix 1 Resources Provided to aid Discussions	14
NISP CONNECT Annual Report -	14
Knowledge Economy Index Report -	14
STEM Careers and Courses Supplement -	14
Observer Article on the Tech Scene in Belfast -	14
Executive Summary from Aspires Report " Young People's Science and Careers Aspirations" ...	14
Generation Innovation Videos.....	14
Appendix 2 Output from Roundtable Discussions	15
Question 1 - Pathways to STEM.....	15
Question 2 - Securing our Digital Tomorrow	18
Question 3 - STEM Economy.....	20



March 2014



Overview

The '**STEM is COOL**' event led by NI Science Park in partnership with the NI Assembly Education Committee, was attended by over 60 stakeholders.

The aim of the event was to provide an update on some of the amazing, exciting and too often, unknown, developments in the STEM industries in Northern Ireland, highlight the importance of STEM to our economy and look at how we inspire our young people to consider careers within the STEM industries. In addition, it provided an opportunity to discuss with political representatives the importance of STEM to our economy and to draw together key influencers across government, education and business to identify the key challenges and what needs to be done to address the challenges.

There were three strands to the event:

1. **Economic Importance of STEM** - there were three presentations covering the key sectors of Software Development, Bio Sciences and Advanced Manufacturing and engineering.
2. **Inspiring our Younger Generation** - covered how we inspire our young people and excite them about the possibilities in STEM as a career. This covered the **importance and role of competition** to encourage and develop students, the importance of science on the curriculum and the growing initiative from NI Science Park - Generation Innovation.
3. **Link between STEM and Arts (STEAM)** - AES presented their case study on how they have worked with the Arts, Cinemagic, to engage school pupils with their business

Following the inspirational presentations, there were roundtable discussions focusing on the three themes. Each of the tables included a mix of MLA's, business people, educational institutions and delivery partners.



March 2014



Roundtable Discussions

Each table was given one of three questions to focus on for the discussion which covered:

- Pathways to STEM
- Securing our Digital Tomorrow
- STEM Economy

Notes of the discussions were taken and the outputs are distilled below. (the detailed notes are included at Appendix 2)

Question 1. Pathways to STEM

If we are to fully maximise the economic potential within our growing Knowledge Economy we need to equip more of our young people for jobs within the Knowledge Economy with the new skills that are needed to be successful, including those that are disengaged from education and the workplace.

This discussion explored the different pathways to careers in STEM industries and how we make these pathways appealing to young people. The discussion covered a number of different areas as detailed below:

- *Language* - the use of STEM / STEAM / Knowledge Economy can be deemed a barrier to entry. It was felt that the language needed to be more direct and down to earth.
- *Multiple Pathways* - there is a perception that the academic route (HE) is the only option for a STEM career and more work is needed to raise awareness of the different options - FE / Apprenticeships / Professional & Technical qualifications. Employers and Careers Advisors could do more to recognise and promote these as viable routes.
- *Curriculum* - it is important that STEM subjects are linked to real world problems and situations and are seen as relevant to pupils. Practical learning of STEM subjects is important and will help pupils to build their confidence in their abilities and make STEM subjects more accessible and interesting. Promotion of learning opportunities outside of school should be encouraged, e.g., CoderDojo - now around 12 across NI. This provides another hook for young people to get interested in STEM.
- *Skills* - ICT 'office' skills should be taught alongside more traditional subjects. Not enough schools teaching computer science in its truest sense. There has to be more opportunities for pupils to work collaboratively and to solve problems as these are necessary skills for the workplace. One suggestion was a transition year, similar to that in the RoI, providing a break from exam focused education and introducing more risk based endeavours.



March 2014



- *Career Teachers* - There was agreement in the critical role of careers teachers and the need for them to have a broader and deeper understanding of the range of STEM roles in the marketplace but there was recognition of the challenges in keeping up to speed with all the available opportunities and options for pupils. Career teachers should be advocates for STEM, recognising the value of vocational roles, rather than impartial advisors and it should be a requirement to gain exposure to industry - this was also raised as necessary for STEM subject teachers as well. Support for CPD should be provided to enable teachers to have more interaction with industry. More opportunities should be provided, e.g., a lot of the FE colleges engage with schools and run events to bring teachers and employers together. W5, through their STEM Ambassadors program, enable engagement between business and schools. Better co-ordination is required between schools, FE/HE and industry.
- *Entrepreneurship* - self-employment is not always promoted, encouraged or recognised as a valid career route/option.
- *Higher Education* - STEM degree courses should not be subject to the cap on students numbers and lower fees should be considered.

Key Messages

- More CPD for teachers
- Better co-ordination between the education artery and industry
- Recognition and parity of the different career pathways
- More practical application within STEM subjects and teaching of computer science
- Entrepreneurship to be recognised as a valid career option

Question 2. Securing our Digital Tomorrow

If we are to fully maximise the economic potential within our growing Knowledge Economy we need to inspire more of our young people to aspire to careers within the Knowledge Economy.

This discussion explored the different ways that pupils can be inspired within the education artery and looked at the role industry, careers education and advice, competitions and the role of the Arts. The discussion covered a number of different areas as detailed below:

- *Careers* - Industry critical to support careers education. Difficult for careers teachers to have the range and depth of knowledge in STEM. Earlier careers advice needed, as early as year 7 (not a mandatory requirement in primary school) and needs to be tailored to age groups. Support and flexibility required to enable more CPD for careers teachers, e.g. industry secondments. Quality of careers advice not evaluated as part of school inspections which could impact on importance/resource allocated.
- *STEM Competitions and programmes* - enhances personal development and impacts positively on all who take part, not just those who win. Helps to build momentum within schools on STEM and provides motivation and external exposure for schools. Relies on teachers going the 'extra mile' and it was suggested that competitions should sit within the curriculum to enable time, capacity and teacher commitment. RoI transition year lends itself



March 2014



to allowing time for competitions. Financial commitment can be challenging when schools do well.

- *Engagement with Industry* - this engagement is beneficial both ways. More innovative approaches need to be developed along with resources such as videos, career information. Practical, hands on opportunities help to make STEM subjects more relevant. There are good case studies, e.g. Bombardier, AES which have many different strands to their engagement within the education artery - but it takes resources within the businesses. Lack of overall co-ordination amongst schools and delivery organisations make it difficult for business to find best way to engage.
- *Role Models* - stereotyping starts early and there is a need for younger role models who pupils can relate to. This will include gender, different pathways, different backgrounds. Career aspirations can be limited to what children are exposed to and parents have a big influence. Parents need to be educated and inspired about the opportunities.
- *STEAM* - Art is about creativity, innovation and risk taking - all relevant skills for STEM. Artists think differently, engineers innovate - SONY Artists & engineers <https://www.youtube.com/watch?v=xyokM38u0U0>, Apple - design and technology. The curriculum should allow for Arts & Sciences to be studied and meshed together. Arts a great vehicle for giving pupils broader skills. In the modern world need managerial, communication and innovative skills as well as technical.
- *STEM subjects at primary level* - science and technology need to be included on curriculum in a practical way - learning through doing, computer coding. Has to be FUN.
- *Entrepreneurship* - an entrepreneurial culture needs to be supported and developed. Role for mentors?

Key Messages

- More CPD for teachers and evaluation of careers advice & education
- Time allocated within curriculum for competitions and STEM programmes
- Better co-ordination between the education and industry. More innovation and resources
- Education of parents to opportunities for STEM careers and pathways
- STEAM
- Entrepreneurship to be recognised as a valid career option

Question 3. STEM Economy

If we are to fully support the economic potential within our growing Knowledge Economy we need to support our entrepreneurs and innovative companies giving them the best opportunities to grow, create jobs and generate wealth.

Although this question focused on supporting entrepreneurs and early stage companies, the discussions touched on careers as decisions made at school impact on future career aspirations. The areas covered included:



March 2014



- Careers - pupils with an aptitude for STEM subjects are more likely to be encouraged into the professions - law, medicine, accountancy, teaching. Careers is influenced by careers of parents/family and 'STEM Capital' within families needs to be increased. Earlier careers advice and exposure to career opportunities through more industry engagement.
- Tertiary Education - pupils can only gain access to STEM courses with STEM subjects, therefore decisions made at GCSE can close opportunities. This is not the case for degrees such as Law. There is not enough information available about UCAS points, e.g., A Level computing gains 30 extra points.
- Failure - we have to have a more positive attitude to failure. Less stigma and recognition of 'gallant failure' and the lessons that are learnt from failure. Celebrate the learning. Winning is an aspiration but taking part is the key. It's ok to fail if you are trying.
- Media - there needs to be more programming dedicated to STEM and Business

Key Messages

- Earlier careers education and more industry engagement
- Increase 'Science Capital' - knowledge - influence of parents
- More positive attitude to failure
- More Science and Technology in the media / dedicated programmes



March 2014



Common Emerging Themes

A number of common themes emerged across the discussions:

Careers Education

The importance of careers education was identified as critical for each of the areas discussed. This comes as no surprise and was recently the subject of an extensive inquiry by the NI Assembly Employment and Learning committee.

There was agreement in the critical role of careers teachers and the need for them to have a broader and deeper understanding of the range of STEM roles in the marketplace but there was recognition of the challenges in keeping up to speed with all the available opportunities and options for pupils. Career teachers should be advocates for STEM, recognising the value of vocational roles, rather than impartial advisors and it should be a requirement to gain exposure to industry - this was also raised as necessary for STEM subject teachers as well. Support for CPD should be provided to enable teachers to have more interaction with industry.

There is a concern that careers education starts too late in the education artery, after GCSE subjects have been chosen, with some avenues already having been closed due to subject choices. Earlier intervention is needed, as early as year 7, to enable pupils and parents to become engaged and inspired about STEM careers before critical choices need to be made.

There was also concern noted about the priority and importance that is given to careers education within schools as the quality of careers education is not currently evaluated as part of school inspections. This can impact of level of resources allocated.

Careers education is not just for pupils, there needs to be more information made available to parents who have a significant influence of the choices of pupils. The STEM 'capital' (knowledge) within homes needs to be developed.

Activities being undertaken

- *Production of STEM Courses and Career Supplements by the STEM Business Group* - there have been two to date - September 2013 (Belfast Telegraph) and February 2014 (Irish News) - these include information on all aspects of STEM careers including profiles of people working within the STEM industries and information on different pathways
- *Generation Innovation* - this programme run by NISP CONNECT aims to build and maintain a life-long relationship with NI's best young talent, be they high academic achievers, natural born entrepreneurs or both and influence their career decisions by inspiring them towards the Knowledge Economy using their extensive network of tech founders, tech industry executives and support organisations. Parents attend the annual showcase event.
- *Careers Fairs* - most of the FE colleges and HEI's run careers events for career and subject teachers to provide information on the different career pathways. There are a growing



March 2014



number that are focused on STEM. Employers are included and provide information on the job opportunities and the skills/qualifications they are looking for. An increasing number of schools run career events for pupils and parents with a focus on STEM.

Recommendations and Further Actions

1. A flexible approach to CPD for careers and subject teachers with the ability to gain industry experience / mentoring.
2. Evaluation of careers education and advice to be included in School Inspection reports
3. Development of resources available to careers teachers - CCEA STEMWorks provides information on a number of STEM careers - this could be supplemented by films, career pathways, role models from industry etc.
4. Careers education provided earlier in the education artery - from year 7.

Engagement with Industry

Engagement between Industry and the education artery was raised within all the discussions as a critical aspect to encouraging and inspiring more people into STEM and the best way to bring the relevance of STEM into the curriculum. Another hot topic and the CBI have recently published their report - Research in Relation to School-Employer Engagement -

(http://www.cbi.org.uk/media/2588820/item_5_-_cbi_business-education_report-final.pdf).

Although this report looked at all school-business engagement and not specifically STEM, the content and conclusions are very relevant to STEM. Careers education was a significant part of the report and covered the points that were raised in the discussions at the STEM is COOL event. In addition the CBI calls for; funding of school-business activity to be managed through one government department; mandatory work experience during school breaks for pupils; parity for vocational routes, such as apprenticeships.

Each group raised the challenge of co-ordination of activities and the issue of multiple delivery partners with no overall picture of how to engage. It takes resources within the business to manage co-ordination of activities and this is difficult for smaller businesses. There are great examples of school-business engagement, but the challenge is to provide a consistent and diverse engagement across the education estate. This could be achieved by a more innovative approach and use of technology to enable business to engage on a one-many basis. With the perceived reduction in the practical aspect of teaching STEM subjects, there is more need for work experience, industry visits to show the practical application of STEM in the workplace.

Activities being undertaken

- Improved communication between business through the STEM Business Group and other channels. W5 is increasing the number of STEM Ambassadors and facilitate engagement



March 2014



with schools. Sentinus are providing industry engagement on the majority of their programs through their own Ambassador program. BITC and SEC provide industry input on their school programmes.

- The STEM Business Group have been working with schools to include employers in Parent Evenings. This is being piloted with a number of schools giving a speaking slot to a local STEM employer.
- The STEM Business Group have supported the DEL Careers Service to provide industry placements for their careers advisors. This first ran during the summer of 2013 with over 70 advisers spending time in industry. The feedback has been very positive and it is hoped that this will be re-run.

Recommendation and Further Actions

1. Co-ordination of employer education needs to be improved/streamlined especially for SME's. This could be facilitated through a mapping of all the delivery partners and engagement options.
2. Development of more STEM Industry resources that can be utilised by schools. TV programmes for the Educational TV Channel developed by NEELB (www.neelb.tv)

Curriculum

Different aspects of the curriculum were raised in each of the roundtable discussions including content and approach to teaching and learning.

It is important that STEM subjects are linked to real world problems and situations and are seen as relevant to pupils. Practical learning of STEM subjects is important and will help pupils to build their confidence in their abilities and make STEM subjects more accessible and interesting. Promotion of learning opportunities outside of school should be encouraged, e.g., CoderDojo and Code Club - now around 20 across NI. This provides another hook for young people to get interested in STEM.

ICT 'office' skills should be taught alongside more traditional subjects. Not enough schools teaching computer science in its truest sense and it is important that this is introduced early, i.e., primary school. There has to be more opportunities for pupils to work collaboratively and to solve problems as these are necessary skills for the workplace. The role of competitions is important in this context and these should be included within the curriculum and not seen as an 'add-on'. One suggestion was a transition year, similar to that in the RoI, providing a break from exam focused education and introducing more risk based endeavours and the time to take part in competitions and more STEM programmes.



March 2014



The importance of including the Arts - *STEAM* was recognised. Art is about creativity, innovation and risk taking - all relevant skills for STEM. Artists think differently, engineers innovate - SONY Artists & engineers <https://www.youtube.com/watch?v=xyokM38u0U0>, Apple - design and technology. The curriculum should allow for Arts & Sciences to be studied and meshed together. Arts a great vehicle for giving pupils broader skills. In the modern world employers need managerial, communication and innovative skills as well as technical.

An entrepreneurship culture needs to be developed and supported within schools and recognised that this is a valid career option.

Activities being undertaken

- *Arts & Business NI* facilitate partnerships between business and the Arts and there are a number of good case studies with STEM businesses. At the STEM is COOL event, AES talked about their engagement with Cinemagic.
- Growing number of CoderDojo and Code Clubs from children from as young as 6. More promotion of these opportunities is needed - both to parents and pupils and to business to provide support, both financial and staff as mentors.

Recommendation and Further Actions

1. Clear differentiation between ICT (office skills) and Computer Science.
2. STEM subjects need to be included at primary level in a practical and FUN way - learning through doing.
3. More recognition of entrepreneurship as a valid career option with better signposting to support for pupils.

Role Models

If we are to inspire our young people we need provide role models that they can relate to and can engage with. Stereotyping starts early, particularly for Technology and Engineering, and there is a need for younger, diverse role models who pupils can relate to. This will include gender, different pathways, different backgrounds.

Another aspect is our attitude to failure - this needs to more positive with less stigma attached. Role models who have tried, failed, tried and succeeded are one way to address this. We have to celebrate the learning, recognise resilience and determination to succeed - all of which are great attributes to have.



March 2014



Activities being undertaken

- As part of the STEM Careers and Courses supplements produced by the STEM Business Group, profiles of individuals working within the STEM industries was included. These included a good balance of gender, educational pathways, age and sector.
- The STEM Business Group suggests different individuals for inclusion in publications
- The STEM Business Group have published guidelines for employers to make STEM industries more appealing to women and are launching a CEO STEM Charter in June.
- SEMTA are launching Women into STEM on March 27th

Recommendations and Further Actions

1. Create a database of role models from all STEM sectors with short profiles. These could be produced into an annual publication, short films could be created and the resources made available to schools.



March 2014



Appendix 1

Resources Provided to aid Discussions

NISP CONNECT Annual Report -

http://issuu.com/nisciencepark/docs/nisp_connect_annual_report_2013

Knowledge Economy Index Report -

<http://www.nispconnect.org/kei/>

<http://www.nisp.co.uk/nisp-connect/the-ni-knowledge-economy-index/>

STEM Careers and Courses Supplement -

<http://www.irishnews.com/readerH.aspx?media=STEM&edition=stem2014>

Observer Article on the Tech Scene in Belfast -

<http://www.theguardian.com/uk-news/2014/jan/12/belfast-leading-tech-startups>

Executive Summary from Aspires Report " Young People's Science and Careers Aspirations"

<http://www.kcl.ac.uk/sspp/departments/education/research/aspires/ASPIRES-final-report-December-2013.pdf>

Generation Innovation Videos

2011 - <https://www.youtube.com/watch?v=Aicxr8LV3ok>

2012 - <http://www.nisp.co.uk/generation-innovation/>

2014 - <http://www.generationinnovation.co.uk/>



March 2014



Appendix 2

Output from Roundtable Discussions

Question 1 - Pathways to STEM

Table 1

Discussion started by considering those who may feel excluded from STEM and Knowledge Economy career paths either through social disadvantage or through lack of role models or awareness of this as a viable option. Typically some in the group felt that this was more likely to be boys from a working class background.

Some spark of imagination was required to make this career pathway appealing to them. The current language that it is couched in (STEM, Knowledge economy) was deemed to be a barrier to entry too. The language needs to be more down to earth and direct i.e:

- Hi tech jobs are well-paid, exciting, lead to a much better standard of living, open the door to travel and new experiences.
- Perhaps needs to be awareness of the tangibility of products that young people could be making if they go into STEM careers rather than just software.
- Need to make it fun and make it relevant

There is a need to change mindsets so those who don't view academia as a route to a career still see STEM careers as viable and achievable and something they are willing to invest their time in attaining.

In marketing it the message needs to link the science to real world problems those young people experience. How many young people in Northern Ireland really even know that trillion dollar foreign exchange transactions even impact their day to day life?

Some of the message needs taken out of the schools and into the community, i.e. CoderDojo's and Maker Spaces are definitely "cooler" than school in terms of acceptance of learning opportunity. Learning by doing for the less academically gifted allows them to build their own self esteem rather than relentless focus on exams.

There does need to be more support for teachers both in terms of their own skills to teach STEM subjects but also to understand the changing work environment. They need a broader and deeper understanding of the range of STEM roles out in the marketplace and that entrepreneurship is an option for many too.

Technological teaching aids are part of the answer but the technology shouldn't get in the way as some suggest Classroom 2000 does.



March 2014



ICT qualifications stretching from KS3 through GCSE and A-Level (Spreadsheets, Word Processing, PowerPoint, Photoshop, Website development, content creation and data processing) does not equal computer science.

Those office skills should be taught alongside more traditional subjects as a means to producing reports, diagrams etc but don't justify a dedicated qualification. Simply not enough schools teaching proper computer science.

Schools need to shift the career guidance focus away from the professions (Accountancy, Medicine, Legal etc) and recognise the value of vocational roles such as engineering, design, advanced manufacturing etc.

Key messages:

- More CPD for teachers
- Individual based curriculums – Let students focus on what they enjoy from an earlier stage
- A transition year – similar to republic of Ireland – might be a good way to re-engage students in education by offering a break from exam focused education and introducing more risk based endeavours
- Students need to achieve more collaboration and problem solving skills so they better placed to compete in the global jobs race

Table 4 - Pathways to STEM

Table 4 discussed the different pathways that need to be in place to fully maximise the economic potential within our growing Knowledge Economy. It was suggested that employers could do more to recognise the role of Further Education and foundation degrees, and the importance of professional and technical qualifications. In particular it was felt that apprenticeships were not given recognition as a viable route into industry by employers or careers advisers. It was suggested that a 'higher' apprenticeship programme could be developed.

It was felt important to put pathway opportunities relating to the Knowledge Economy on the agenda for students aged 14 - 19. It was argued that although graduate programmes were clearly linked to GCSE/A-Level attainment there was no similar link between graduate programmes and other more vocational qualifications.

It was also argued that Higher Education STEM courses should not be subject to the cap on the overall number of students in Higher Education. The fees for higher education were also considered to be a barrier to students continuing on a STEM-related pathway.

It was recognised that STEM pathway opportunities may be available via 'on-the-job' training, and that opportunities for re-skilling at work should be made available to allow entry into STEM-related careers.

Table 4 also discussed what was necessary to support the STEM skills pipeline. It was considered that better co-ordination was required between schools, Further Education colleges and industry.



March 2014



There was agreement regarding the important role that careers teachers have in promoting STEM-related careers and pathways. However it was suggested that it can be difficult for careers teachers to be “up to speed” with all the available opportunities including emerging opportunities for those who study STEM related subjects.

It was felt that careers teachers should be advocates for STEM, rather than impartial advisors, and that they should be required to network with industry and undertake STEM research work. There was concern about CPD opportunities for teachers, which can be limited, or for which teachers find it difficult to be released. Nonetheless it was argued that STEM teachers and careers teachers should have more exposure and interaction with industry. It was noted the Further Education colleges already have partnerships in place with industry and business.

It was also suggested that self-employment was not always promoted or recognised as a valid career route by careers teachers.

It was suggested that the fun aspects of STEM needed to be promoted in schools through an engaging environment, and that the influence of all teachers, not just careers teachers was important.

The role of parents was also recognised, but it was felt that there was limited parental understanding of STEM opportunities, and that parents needed to be informed and inspired about the opportunities available to students who have study STEM-related subjects.

It was felt that competitions like the BT Young Scientist and Technology Exhibition and other science festivals had the potential to make an impact, and also provided leadership and personal development opportunities for students while also providing motivation and external exposure for schools in STEM related areas.

It was suggested that people who are skilled in STEM related areas also need to develop life skills like communication and entrepreneurship. It was argued that these life skills should also be an essential part of the curriculum in addition to basic numeracy and literacy skills.

The importance of mentoring, particularly with regard to entrepreneurship was also highlighted. It was noted that NI society in general is risk averse and that an entrepreneurial culture has not been supported in Northern Ireland.



March 2014



Question 2 - Securing our Digital Tomorrow

Table 2

Re importance of competitions and programmes: It impacts positively on the whole cohort who apply/enter – not just those that get through. Continued engagement with competitions/programmes year on year builds momentum within individual schools.

Competition plays on the natural competitive nature of children/students and is a good way of helping them realise their potential.

Recognise that it takes time for individual competitions to build their reputations and get their message across.

Feedback from teachers that as well as nurturing competitiveness the competitions and programmes also enhance personal development. Students also learn that they can't always win which is an important life lesson.

However, it relies on teachers going the extra mile, it was therefore agreed by the group that competitions must sit inside the curriculum to enable teacher commitment. Sentinus mentioned the Republic of Ireland model where this happens. It was felt there was no time in the A Level syllabuses in grammar schools in NI.

Engagement with Industry: AES take it very seriously and invest substantially both monetarily and in staff's time for school visits. It was noted that it takes a lot of resource to do it well. As well as school visits they also supply mentors for schools in Larne. They look on engagement with schools as a marketing role – show children what happens inside a power station and also exposes them to other career options. AES is in 25 countries so truly global opportunities. They run a successful apprenticeship programme and undergraduate programme.

Momentum: members are really engaged with schools, however, there is a lack of overall co-ordination and a number of different organisations involved. Industry wants to get involved but sure how to best go about it.

Sentinus: Have different levels of contact and it is difficult to co-ordinate activity. Industry needs a co-ordinated approach with schools.

Role models: Gender issues, tech jobs should be an attractive option to women – flexible working etc. Women in engineering are rare so they are in constant demand as role models.

Stereotyping starts very young and industry is losing out on a lot of talent. Teenage years are also critical.

Parents and teachers are key. Children's aspirations will be limited to what they have been exposed to. They have to choose between Arts and Science and these need to be 'meshed' more.

Use of Arts etc: Art about creativity, innovation and risk taking, very relevant skills for STEAM subjects. Sony partnering with artists and engineers. Artists can think differently and then engineers can innovate, e.g. Game of Thrones.

AES is 80% engineers but also needs communicators, managers, thinkers. It also runs project with Arts organisations e.g. be a magician for a day – helps to learn about presentation and communication skills. Arts are a great vehicle for giving people broader skills. In the modern world can't just be an engineer – need managerial, communication, innovative skills etc as well.

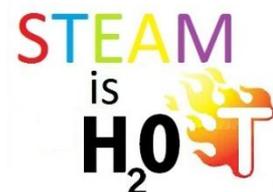
Importance of teaching through doing. Computer games the gateway – art + creativity.

Important to keep young people's minds open.

Introduction of STEM subjects at Primary: The group definitely agreed with this. Need to teach coding in primary schools, - can engage kids who haven't engaged before and teach them how to work as part of a team. BUT it needs to be fun!



March 2014



(Bit of topic now) Need to make Belfast/NI as attractive a place as possible to live to attract FDI.
Marketing/messaging key.

Table 5

Table 5 discussed how more of our young people can be inspired to aspire to careers within the Knowledge Economy. It was felt that, from an industry perspective, it is difficult for those giving Careers Education Advice to know the extent and range of careers available, and it was also noted that careers teachers are not subject specialists. It was suggested that those involved in industry could help to provide careers advice.

It was noted that that Year 10 is critical in career path terms but that careers advice often happens after that. It was therefore felt that it would be important talk to young people about careers and STEM opportunities before Year 10. There was a suggestion that children in Primary 7 should be made aware of the opportunities arising from pursuing STEM related subjects, and it was noted that different ages of children will be inspired and excited by different aspects of STEM. However it was also noted that careers guidance is not a statutory requirement in primary schools.

It was suggested that as the quality of careers guidance is not evaluated during the school inspection process, some schools may not pay as much attention to this compared to other areas of the curriculum. It was suggested that there should be more funding for careers guidance in schools, and that teachers with responsibility for careers advice should be given opportunities to be up-skilled. However the time and resource limitation for teachers, with an already heavy workload, was acknowledged. One suggestion was that teachers could be seconded to industry to help raise awareness of opportunities. It was suggested that the Department of Education needs to allow teachers greater flexibility to take this on.

The difference that one inspired and enthusiastic teacher can make was noted, and that capacity needed to be created within schools to allow students to enter competitions like BT Young Scientist. It was noted that the transition year in the Republic of Ireland lends itself to entering competitions like this.

It was noted there is no formula for the allocation of budgets across departments within individual schools, and that STEM related subjects are often the most expensive to teach.

The importance and value of work placements and work experience for students was noted and the extent of the exposure and the range of companies available placements was questioned. It was felt that industry needed to be more innovative about their open days and placements allow for much more hands on opportunities. Industry placements were considered very important for students in Higher Education.

It was suggested that STEM related businesses and industries should develop a package which would include some of the videos shown at the STEM is cool event with appropriate links to career opportunities / pathways and placements.

The importance of role models or young STEM ambassadors was acknowledged, particularly younger people in industry who might more easily relate and talk to other young people.



March 2014



Question 3 - STEM Economy

Table 3

- Access to Capital
- Access to Skills
- Access to people
- A system with less 'red tape'
- A positive attitude – it's ok to fail if you are trying. If we only reward people who succeed in every way – no one will take any risks.
- Fewer stigmas towards failure. We should admire 'Gallant failure'
- Our culture/ Society does not embrace & nurture entrepreneurs.
- A culture of getting things right is embedded in our psyche.
- We should be celebrating the learning.
- Winning is an aspiration, but taking part is the key.

How do we recognise our pioneers?

- Some pioneers do not care if they are not recognised in their local economy as they aim for a global scale.
- There is nothing televised for scientists / technologists / entrepreneurs. There should be more television programmes about scientists and business.
- Entering competitions encourages young students as they are surrounded by people who show an active interest in their ideas and this builds their confidence.
- School open days that illustrate that the school is focused on science is encouraging for pupils.
- There is not as much recognition for getting into the shortlist of a competition – only recognition if they actually win.
- Inspiring teachers within the schools act as role models for the students.
- Businesses should recruit for attitude and secondly skills.

Table 6

Table 6 discussed what might be necessary to support entrepreneurs and innovative companies to give them the best opportunities to create jobs and generate wealth.

It was noted that parents do not see the same value in the pursuit of STEM related careers, as they do in the pursuit of careers in the older established professions. It was also felt that universities are producing too many lawyers and doctors. It was also suggested that if a student is good at STEM subjects they are pushed by parents and schools into subjects like medicine etc. rather than into other STEM careers.

It was suggested that there needs to be more information coming from industry about the jobs and career paths available. There was also evidence to suggest that high tech industries were having trouble finding the right staff.



March 2014



It was suggested that more needs to be done to encourage young people into STEM subjects and that they should be informed of the opportunities available. It was acknowledged that careers run in families; if parents are lawyers, doctors, engineers, their children or nieces/nephews tend to follow in these footsteps. It was suggested that “STEM capital” within families was one way in which young people could be inspired to consider careers in STEM related subjects.

The importance of better/earlier careers advice was noted, and that for most students the careers advice comes after subjects are picked which can be too late.

It was also argued that students can gain admission to a Law course at university with any A-levels as long as they are good results. However, students can only gain admission to a STEM degrees if they have STEM A-levels.

Participants indicated that the A-level in ICT Computing is given 30 additional UCAS point, but that this was not widely promoted .



March 2014

