



Scottish Government
Riaghaltas na h-Alba
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Report

March 2017

Engagement with young
people on the development
of the Science, Technology,
Engineering and Mathematics
(STEM) Strategy



Summary

This report contains the views, insights and experiences gathered from young people by Young Scot to influence the development of the Scottish Government's STEM Strategy.

Key findings:

- » Young people felt there will be more job opportunities in STEM as technology continues to increase
- » They overall felt that opportunities in this area will continue to grow in the future
- » When choosing a career path, it matters to them that this path will offer them a good salary, will provide them with opportunities to travel, will challenge them and most importantly they will find it enjoyable
- » The majority of respondents have studied STEM subjects at National 5/Standard Grade level, and then this number drops through further education
- » Most young people have had a good experience of being taught STEM subjects, and overall found the teaching to be engaging, challenging, interesting and enjoyable
- » The majority feel they have an understanding of the careers that can lead on from taking STEM subjects at school, and about half of these young people plan to have a STEM focused career

Introduction

The Scottish Government has announced a public consultation on the development of a STEM Strategy for Scotland. The aims of the strategy are to:

- » Improve levels of STEM enthusiasm, skills and knowledge in order to raise attainment and aspirations in learning, life and work.
- » Encourage uptake of more specialist STEM skills required to gain employment in the growing STEM sectors of the economy, through further study and training.

The Curriculum Unit of the Learning Directorate in Scottish Government approached Young Scot to engage with young people – particularly those currently engaged in the education and training system at all levels/sectors - from across Scotland in order to obtain evidence of their views on their experiences of STEM education and training, and their attitudes towards STEM-related careers.

The Scottish Government want to ensure their views, insights and experiences are listened to, gathered and used to influence the development of a final version of the Strategy.

This project delivered:

- » A national survey of young people from across Scotland to gather quantitative data on young people's views and experiences around STEM education and training, and their attitudes towards STEM-related careers. The survey received 266 responses.
- » An online task, 'Future Jobs, Future You,' via the Young Scot Rewards platform in order to gain a more in-depth insight what young people think the future job opportunities in STEM will be like and what matters to them when choosing career path. The online task received 119 responses.

Methodology

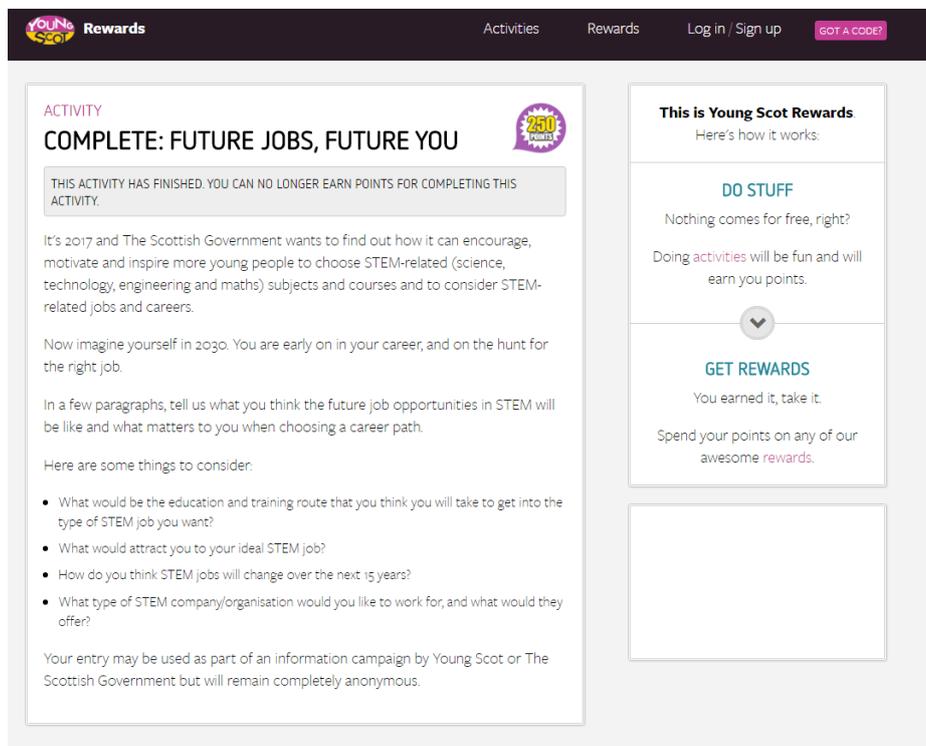
Young Scot plays a key role in supporting partners to engage and consult young people across Scotland, helping them to influence the design and delivery of policy and services. Our co-design service involves young people systematically co-creating, co-producing, co-designing and co-delivering solutions. Young people are involved much earlier in decision making process through a highly participative approach, developing informed insights, ideas, recommendations and solutions for policy and practice.

Through the co-design process, young people have ownership of what they have to say; relating their views and opinions on a particular subject or policy area to deliver ideas and solutions in a spirit of co-design and collaboration.

This project focused on the **Explore** phase of the co-design process, where due to timescales, we opted to conduct a national young people’s survey and an online task via the Young Scot Rewards Platform.

Future jobs, future you – Rewards Task

In order to gain a more in-depth insight into young people’s insights, ideas and experiences of STEM education and training, we established an online task via the Young Scot Rewards platform - <https://rewards.youngscot.org/>.



The task took the form of ‘Future Jobs, Future you,’ where young people were asked to imagine themselves in 2030 and they are on the hunt for the right job. They are then asked to share their views and future vision for what future job opportunities in STEM will be like and what matters to them when choosing a career path.

National Survey

In order to gain a broad insight into the views and experiences of young people from across Scotland on STEM education and training, we worked in partnership with the team in the Scottish Government to devise a national survey, which was made available on Young Scot’s digital platform – www.young.scot,

using Survey Gizmo to collect responses. We also produced paper versions of the survey which Young Scot used when engaging face-to-face with young people. These were then entered into the online platform for analysis.



We offered 100 Young Scot Rewards points as an incentive for submitting their views and experiences. The opportunity was promoted via our extensive social media presence on Facebook and Twitter, and through our partnership networks. The survey encouraged participation from young people aged between 11 and 25.

Key findings

Future jobs, future you

The 'Future Jobs, Future You' activity revealed a wide range of views and experiences of young people from across Scotland, with a total of 119 responses.

Responses from this question revealed a mixture of ideas on what future job opportunities in STEM will look like and what matters to them when choosing a career path. When looking at what young people think future job opportunities in STEM will be like, the key findings were Increased Technology, Renewable Energy and more opportunities in STEM careers.

Increased Technology

Many young people commented that they felt that as technology is advancing, there will be many more career opportunities in engineering and technology. This means that companies will be looking for people with skills in these areas as the demand for new technologies continues to grow. Some comments also mention that as technology is a big part of our daily lives, people are now more interested in how the technology they use works and therefore want to pursue careers in this area.

“Future jobs will be looking for more people with technology and engineering skills and not just maths and science, as more and more new technology is created and the world is pushing for new and faster hardware.”

“I think that if the technology that we have continues to improve and grow within the next 15 years then more people would like to chase a STEM career as they will be more interested in how the technology that they use works.”

Renewable energy

Another recurring theme is the need for new advances and developments within renewable energy, and the increase in work opportunities this will create. Young people commented that this is in reaction to climate change and the need to address the issue. They think this would be an interesting career path to follow as it is an emerging sector.

“Future opportunities in STEM will be based around primarily alternatives to fossil fuels and the use of fossil fuels in everyday life due to the need to address climate change.”

More opportunities in stem careers

Young people mentioned that in general there will be more opportunities in STEM careers, as these areas are continuing to grow. They did not give many reasons as to why they think more opportunities in these areas will grow, but many mentioned that they are keen to pursue a career in these areas. They feel there will be a wider range of opportunities available compared to now.

“I see programmes on TV about the research here in the UK in medicine and science. My parents are both very interested in sciences, my dad is an engineer and my mother trained as a biologist so they also tell me about the programmes they have listened to or watched, which give me ideas about what to do when I leave school.”

“I would choose a technological job, but possibly an engineering or scientific job, as I enjoy these, but I am also good at them and will be most likely to strive. But, I don't know how these jobs will change, I never know what the future holds, really, it's up to the people.”

In responses from this question looking at what matters to them in a future career path, the key themes that emerged were salary, opportunities to travel, challenging and enjoyment.

Salary

Many young people commented that one of the most important reasons to them when choosing a career path is how much they will earn. They want to know that they will be paid enough money to live off comfortably, with the opportunities there to earn more over time. They link this into STEM opportunities and how they think careers in this area are growing and therefore they think careers in this area will be well paid.

“You can be a doctor or engineer. It matters choosing a career path because it is going to be how you earn money in the future.”

“I think STEM will continue to grow in terms of job opportunities. There are always new things to look into. I want a career that is good pay.”

Opportunities to travel

Another aspect that would attract young people to a career is the opportunity to travel. They felt this would make certain career paths more attractive and exciting if the opportunity to see new places was available to them.

“I would need find some enjoyment within the job. Perhaps opportunities to travel abroad with the job would definitely attract me more.”

“I want a career that is good pay, maybe allows me to travel a bit, something that I enjoy.”

Progression

Another key finding in what matters to young people when choosing a career is that they find the job challenging and enables them to learn more and progress. They think without this that the career may not be enjoyable or you may lose interest over time to follow the career path you have chosen.

“When choosing a career path I care that the job I have will let me earn enough to live comfortably and will challenge me intellectually.”

“When choosing a career path, I will always try to find an equal ratio between what I'm good at, what makes me happy, and what is challenging.”

Enjoyment

It matters to young people that their chosen career path is one which they will enjoy and are passionate about. They feel that they need this in order to be happy within their chosen career and to feel driven to do well. Without this, they feel that they would not succeed and would not have the motivation to do so.

“I think what matters most when choosing a career path is that your heart is in it and you are not just stepping on to that path for the money you could potentially make.”

“It is important to me that I find my career enjoyable, which will enable me to perform to the best of my abilities.”

NATIONAL SURVEY

The national survey was made available on Young Scot's digital platform – www.young.scot, using Survey Gizmo to collect responses. The survey was promoted through our social media platforms. The number of useable survey responses **totalled 266**.

We should not assume that those engaged are wholly representative of the broader demographic of young people across Scotland, however this piece of work has provided a 'snapshot' into young people's views and experiences on STEM education and learning.

205 young people completed the About You section of the survey, showing that 70% identified as female, 27% as male, 1% as other and 2% as prefer not to say. The majority of respondents were aged between 12-20 and currently attending school (79 %.) Participation was particularly high in Edinburgh, Glasgow, Fife and South Lanarkshire.

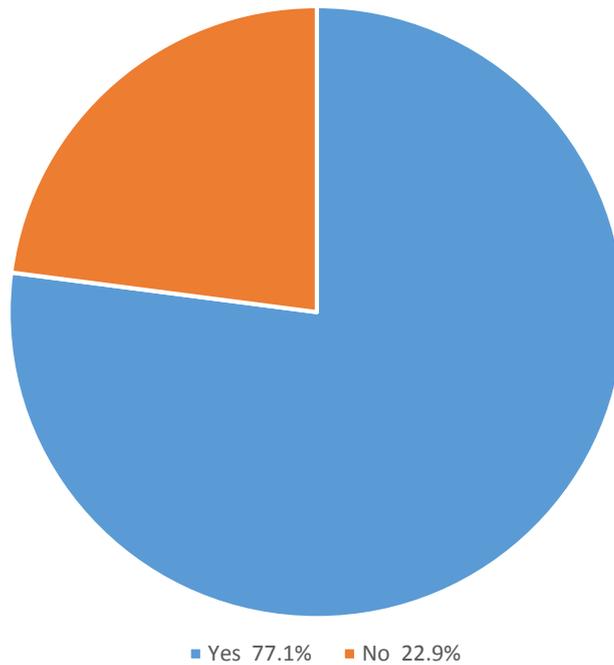
Survey Questions

The survey contained nine questions of which some were multiple choice and some were open for comment. The questions were as follows:

1. Are you currently studying or have studied STEM (Science Technology Engineering Maths) subjects?
2. Which STEM subjects are you studying or have studied and at what level?
3. What has been your experience of how these subjects are taught?
4. What has been your experience of how these subjects are taught? – comments
5. How have you found the learning? – comments
6. What made you choose/not choose particular STEM subjects?
7. Are you aware of the job opportunities for those with qualifications in STEM subjects?
8. How did you hear about these?
9. Do you feel STEM skills and knowledge could be used in other careers?
10. Please give examples
11. Do you plan to have/are you in a STEM focused career?
12. What influenced this?
13. Do you understand the qualifications/courses you need to undertake to follow pathways into STEM career?
14. Where did you get this information?
15. Are there are aspects of STEM education and skills development which are important in life outside employment? Please give examples.

Survey Results

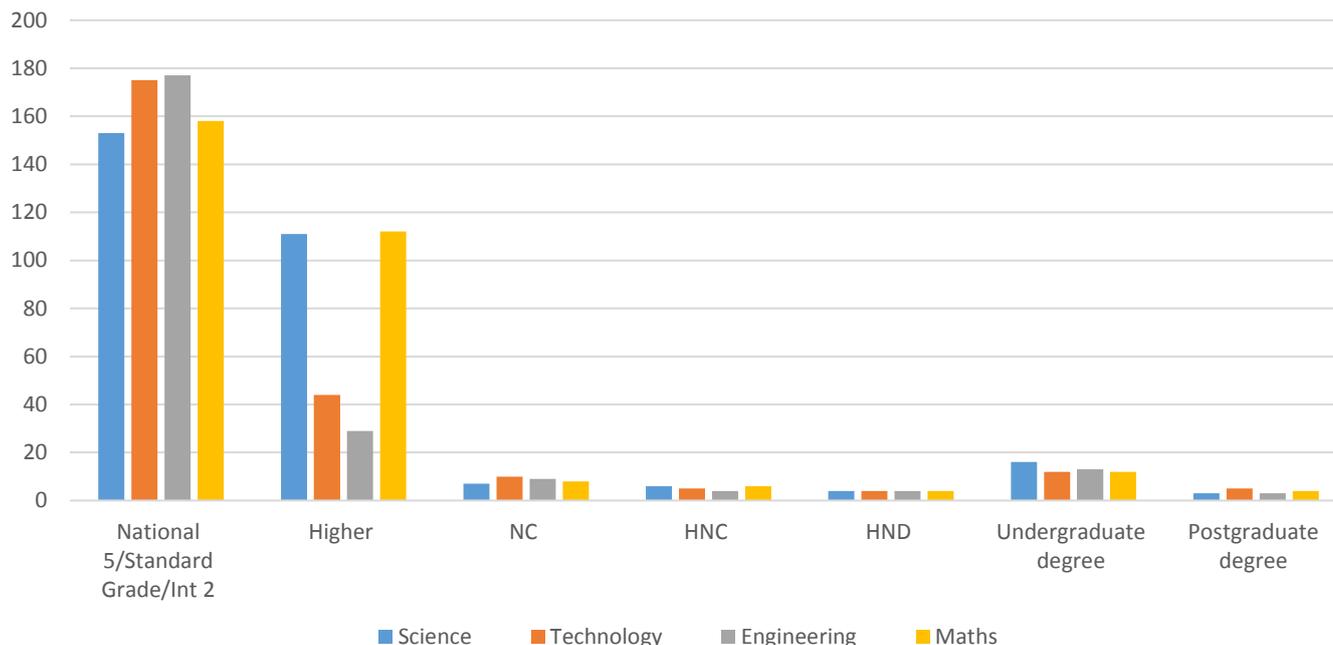
1.) Are you currently studying or have studied STEM (Science Technology Engineering Maths) subjects?



Most of the respondents (77.1%) are currently studying or have studied STEM subjects, and 22.9% have not studied STEM subjects before.

Anyone who answered no to this question could not take part in the survey and were redirected to the closing Thank You page of the survey. Those who answered yes, 70% identified as female, 27% identified as male, 1% defining other and 2% prefer not to say.

2.) Which STEM subjects are you studying or have studied and at what level?



The results of this question show that the STEM subjects have mostly been studied at National 5/Standard Grade/Intermediate 2 Level, with 58% having studied science at this level, 66% having studied technology, 67% having studied engineering and 59% have studied maths. At higher level 42% have studied science, 17% have studied technology, 11% studied engineering and 42% have studied maths. The numbers then drastically drop when it comes to further education.

Please see the tables below for the gender split between each STEM subject at each level.

Science

Gender	National 5/Standard Grade/Int 2	Higher	NC	HNC	HND	Undergraduate degree	Postgraduate degree
Male	37	31	1	2	1	6	1
Female	111	79	5	3	2	10	2
Prefer not to say	4	1	1	1	1	0	0
Other	1	0	0	0	0	0	0
TOTAL	153	111	7	6	4	16	3

Technology

Gender	National 5/Standard Grade/Int 2	Higher	NC	HNC	HND	Undergraduate degree	Postgraduate degree
Male	45	16	4	1	1	3	1
Female	126	26	5	3	2	8	3
Prefer not to say	3	2	1	1	1	1	1

Other	1	0	0	0	0	0	0
TOTAL	175	44	10	5	4	12	5

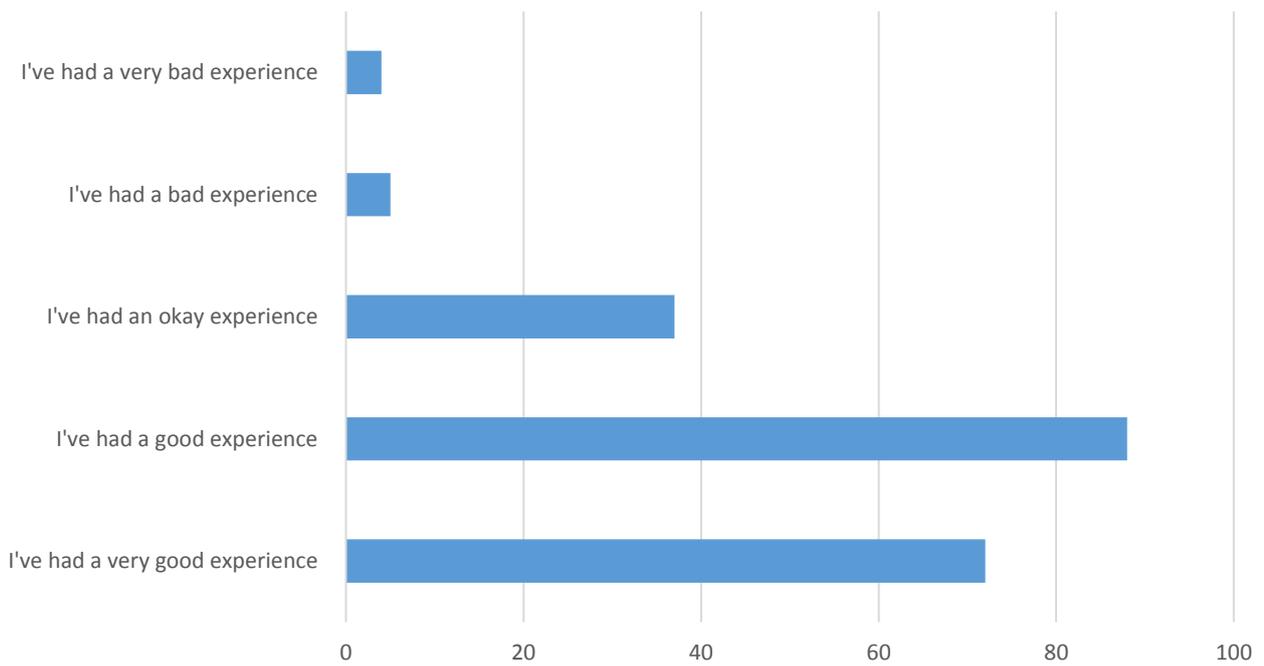
Engineering

Gender	National 5/Standard Grade/Int 2	Higher	NC	HNC	HND	Undergraduate degree	Postgraduate degree
Male	45	14	2	1	2	3	1
Female	127	14	6	2	1	9	1
Prefer not to say	4	1	1	1	1	1	1
Other	1	0	0	0	0	0	0
TOTAL	177	29	9	4	4	13	3

Maths

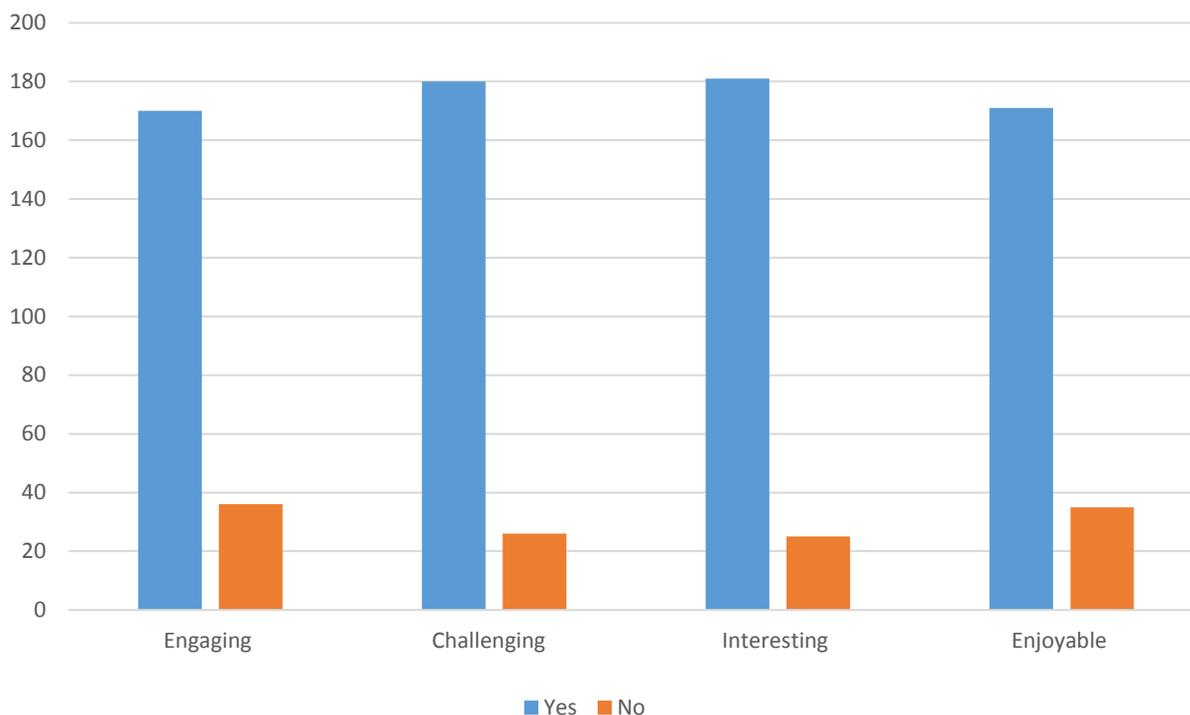
Gender	National 5/Standard Grade/Int 2	Higher	NC	HNC	HND	Undergraduate degree	Postgraduate degree
Male	41	31	4	2	2	4	2
Female	112	80	3	3	1	7	1
Prefer not to say	4	1	1	1	1	1	1
Other	1	0	0	0	0	0	0
TOTAL	158	112	8	6	4	12	4

3.) What has been your experience of how these subjects are taught?



27% say they have had a very good experience of how STEM subjects have been taught and 33% feel that they have had a good experience. 14% feel that their experience of how these subjects is taught was okay, 2% say it was a bad experience and 2% say it was a very bad experience.

4.) What has been your experience of how these subjects are taught?



This question was open for comment and received 32 comments. The most replicated responses were that their experience of how STEM subjects are taught varies from teacher to teacher and the different teaching styles in which they use. However, most of the young people who left comments mentioned that overall they really enjoyed these subjects.

"I think it largely depends on the teacher's attitude to the subject, class, and teaching style in my experience anyway."

"Some subjects better than others. I.e. Physics wasn't taught well but I loved the subject. Maths, I again loved but degree of teaching quality between teachers was varied. Chemistry and Biology were both taught very well. Wider learning opportunities were limited in all subject areas."

5.) How have you found the learning? Please answer Yes or No.

206 young people answered this question. These results show that 83% find STEM subjects engaging to learn about, whilst 17% of respondents did not find it engaging. 87% found the learning challenging, whilst only 13% did not. 88% of young people who took part found the learning to be interesting, with only 12% saying that they did not find it interesting. 83% found learning about STEM subjects enjoyable, with 17% saying they did not.

This question was open for comments and received 36 comments. The comments gave an insight into how young people found learning STEM subjects. Many responses mention that they found Maths particularly hard to learn and engage with compared to science subjects.

There were mixed responses on the relevance of maths and sharing they found the subject challenging and difficult to understand. They commented on the course content and lack of enthusiasm/teaching style. Overall, the comments demonstrated that young people can find STEM subjects challenging, but with the right teaching style, resources and support, young people feel the subjects can be fun and achievable to do well in.

“Through use of both theory and proper practical work that I can partake in fully. The work when challenging has been a positive challenge and has improved my skills all round.”

“Biology was interesting and somewhat enjoyable, however National 5 Maths was horrible and I strongly regret taking higher.”

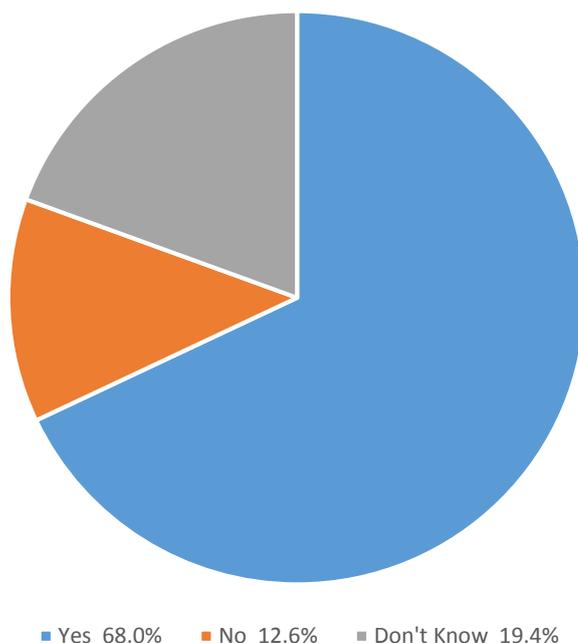
6.) What made you choose/not choose particular STEM subjects?

This question was open for comment and there were 206 responses. For young people who did choose to study particular STEM subjects, the most common reasons for doing so were to meet the entry requirements for university and as it is needed for a future career path. Other reasons included that they were good at these subjects, they enjoyed them and found them interesting. Young people who did not choose STEM subjects did so because they found they did not enjoy them, find them engaging and they also found these subjects particularly difficult. It was also the case that many young people did not feel these subjects were for them, and they enjoyed other subjects or were following a different career path.

“My brain clicks quite well with science I think. I love to learn new things about how the world works and then use this to solve problems.”

“I didn't choose them again because they were not for me.”

7.) Are you aware of the job opportunities for those with qualifications in STEM subjects?



206 young people responded to this question. 68% feel that they are aware of the job opportunities for those with STEM subjects, 12.6% feel they are not aware of the job opportunities and 19.4% don't know if they do.

8.) How did you hear about these?

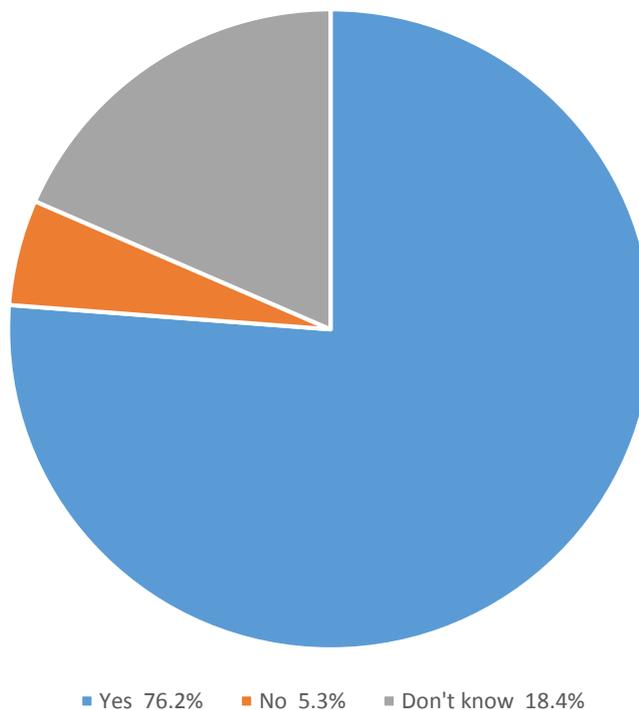
This question was open for comment and there were 93 responses. The most common answer was that they heard about job opportunities with qualifications in STEM subjects through school and their teachers. They also heard about the opportunities through their own research, done by looking at University prospectuses and job search websites.

“At school. We used to get big talks from companies, unis and colleges talking about what grades we need to do what kind of job”

“University open days, the internet, family members”

9.) Do you feel STEM skills and knowledge could be used in other careers?

There were 206 responses to this question. 76.2% think that STEM skills and knowledge could be useful in other careers, 5.3% feel that it could not be used in other careers and 18.4% are not sure if it could be.



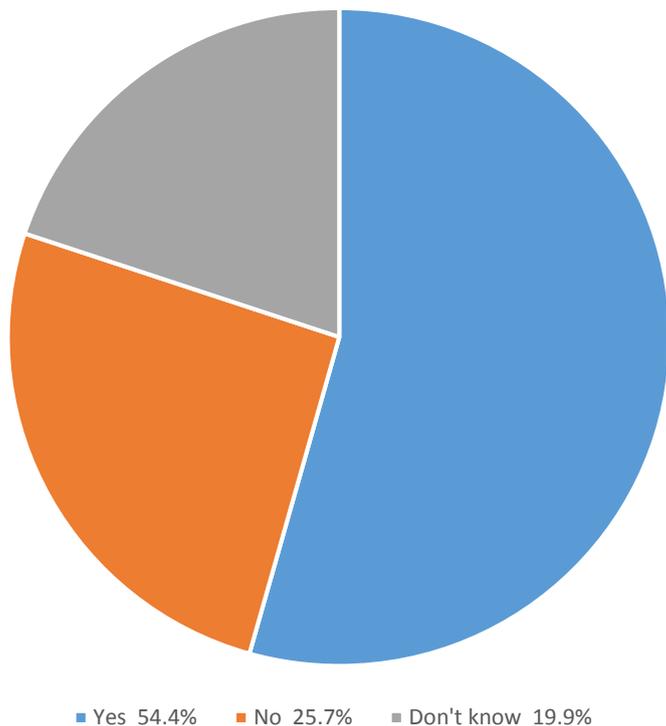
10.) Please give examples

There were 146 responses to this question. Responses included that there are key skills you learn from studying STEM subjects that can be used in other career paths. These transferrable skills include problem solving, analytical thinking and teamwork.

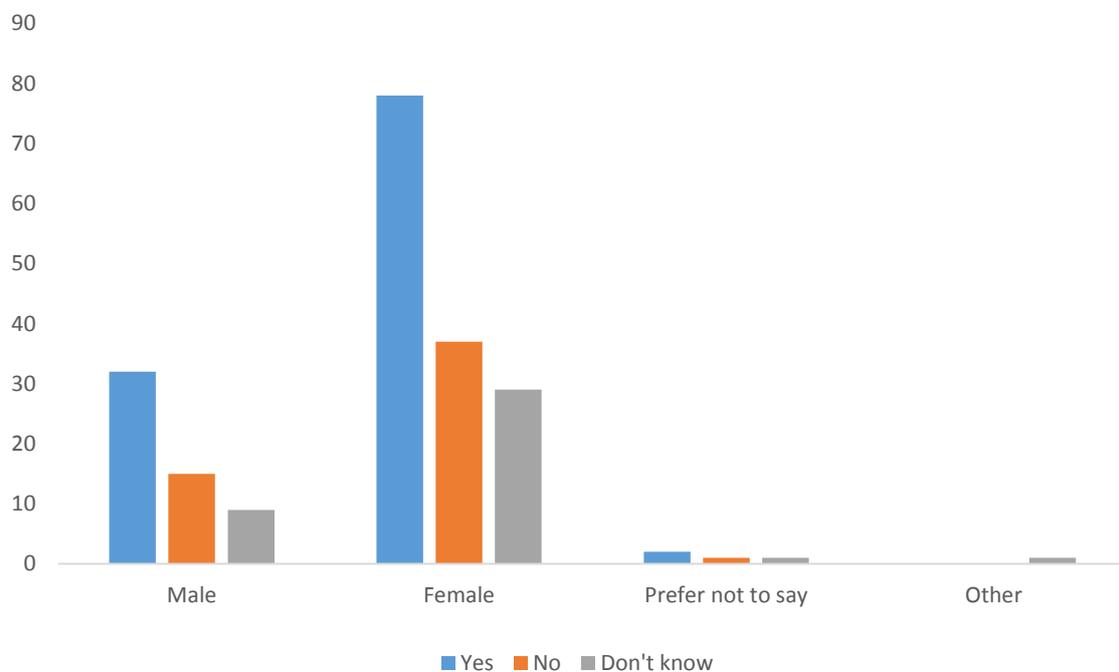
Examples of other career paths included Architecture, business, finance and many commented that the skills are transferable to any career path you chose.

11.) Do you plan to have/are you in a STEM focused career?

54.4% plan to or have a STEM focused career, 25.7% do not plan to work in a STEM focused career and 19.9% are not sure if they want to work in this area.



Below shows the gender split of this question.



The results show that of the 112 young people who answered yes, 70% identify as female, 29% as male and 2% preferred not to say. Of the 53 young people who answered no to this question, 28% were male, 70%

as female and 2% preferred not to say. 40 young people answered that they don't know, 73% were female, 23% male, 3% preferred not to say and 1% other.

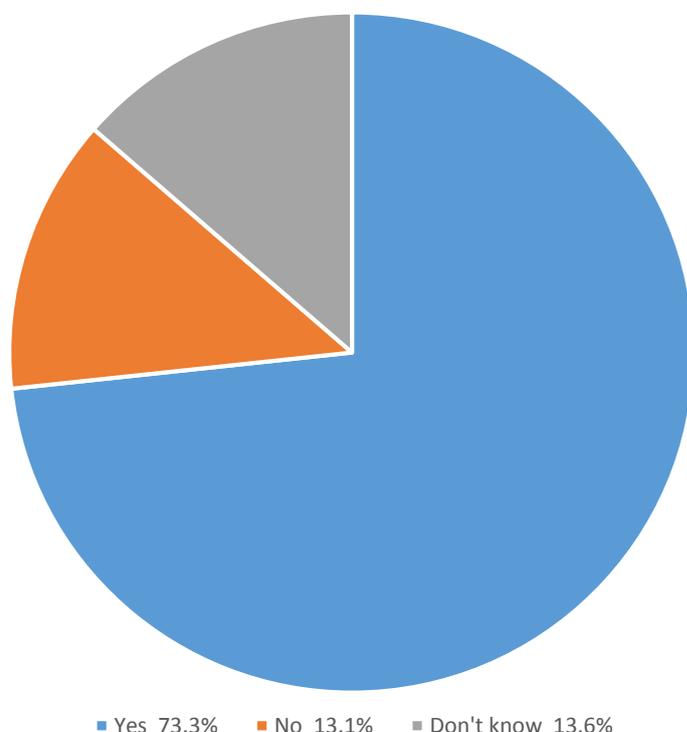
11.) What influenced this?

83 people responded to this question. The most common answer in what influenced them to have a STEM focused career is through the advice from teachers at school. Another influence that many mentioned was the fact they enjoyed STEM subjects and were interested in this area, and so following a STEM career path makes sense. The influence of family members was also mentioned, with parents either advising to follow this career path, or the young person wanting to follow in the footsteps of a parent in a STEM career.

12.) Do you understand the qualifications/courses you need to undertake to follow pathways into STEM career?

The results show that 73.3% understand the qualifications/courses they need to undertake to follow pathways into STEM career, 13.1% do not understand and 13.6% are unsure if they understand or not.

13.) Where did you get this information?



There were 88 responses for this question. Most responses mentioned that they got this information from career advisers, talks and parents evenings at school and also information given to them by teachers. Another main way that they get this information is through doing their own research online, by looking at university websites and also at My World of Work.

“Online, lots of universities provide the grades and subjects needed to get into their undergraduate courses online.”

“At school. We used to get big talks from companies, unis and colleges talking about what grades we need to do what kind of job.”

14.) Are there are aspects of STEM education and skills development which are important in life outside employment? Please give examples.

There were 86 responses to this question. The most common responses were that maths is important outside of work on a day to day basis, this is because it is useful when it comes to personal finance and bills. Other skills gained from STEM education and skills development is problem solving, critical and logical thinking and teamwork, all skills that young people feel are useful to have in your personal life. It is also mentioned that science gives you a greater understanding of the world and the environment, and also helps you to form your own opinions.

“Being good at mathematics helps with money matters.”

“... Maths is extremely useful on a day-to-day basis. And general science is really useful to have a better understanding of the world and how it works.”

Conclusion

The exploration has revealed a broad range of insights from the participating young people about their experiences, opinions and ideas around STEM education and training, and their attitudes towards STEM-related careers. As previously stated, we cannot necessarily assume that those engaged are wholly representative of the broader demographic; but this piece of work has provided a 'snapshot' of insight into young people's attitudes and opinions from across Scotland.

Looking at the results from the National Survey and the Online Task, it is clear to see that young people have had a mixed experience of STEM education and training and therefore have varied attitudes towards STEM-related careers.

Most young people who took part in the online task had positive views about future opportunities in STEM related careers, with the results showing that they felt with technology continuing to advance, and with a focus on renewable energy, there will therefore be more job opportunities in STEM careers.

The results from the survey show that the majority of young people have studied STEM subjects at National 5/Standard Grade level, and then this number drops through further education.

Most young people have had a good experience of being taught these subjects, and overall found the teaching to be engaging, challenging, interesting and enjoyable. However, there were some comments from these questions that explain that their enjoyment of STEM subjects can differ depending upon the teaching style.

The majority of young people who responded also feel they have an understanding of the careers that can lead on from taking STEM subjects at school, and about half of these young people plan to have a STEM focused career.

The majority of young people who took part are interested in STEM related careers, education and training opportunities. The responses for the Online Task show that young people will chose a career that offers them a good salary, gives them opportunities to travel, will be challenging and most importantly be a career that they will enjoy.

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