

Case Study



STEM Equity Project

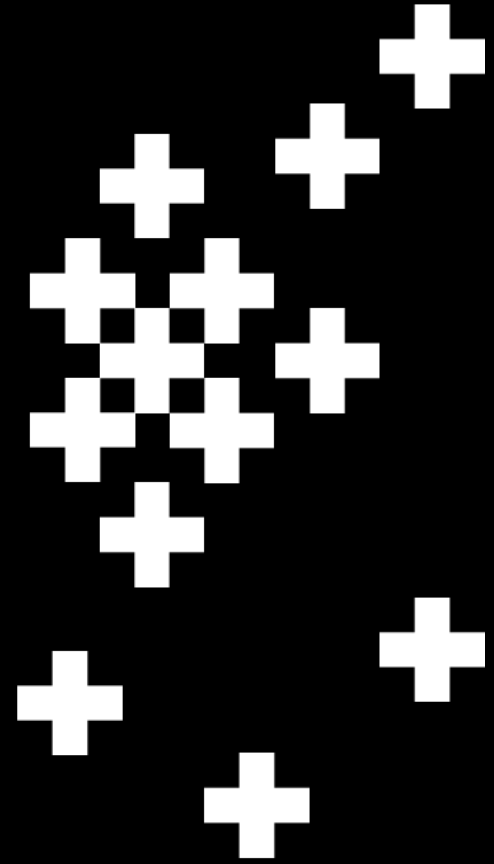
Directed Industry & Academia Backed Engagement Supported by STEM Apprentices, Over a Multi-Week Period in Rural Secondary Schools.

Jack Marley McIntyre BEng(Hons) MIET

Engineering Associate of Research & Project Lead

UHI Inverness Engineering Technology

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Skills
Development
Scotland

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“Encouraging women into STEM careers in rural locations is particularly important to develop a diverse workforce and address emerging skills gaps”

Carrie Higgins, Head of Tertiary Education. UHI Inverness

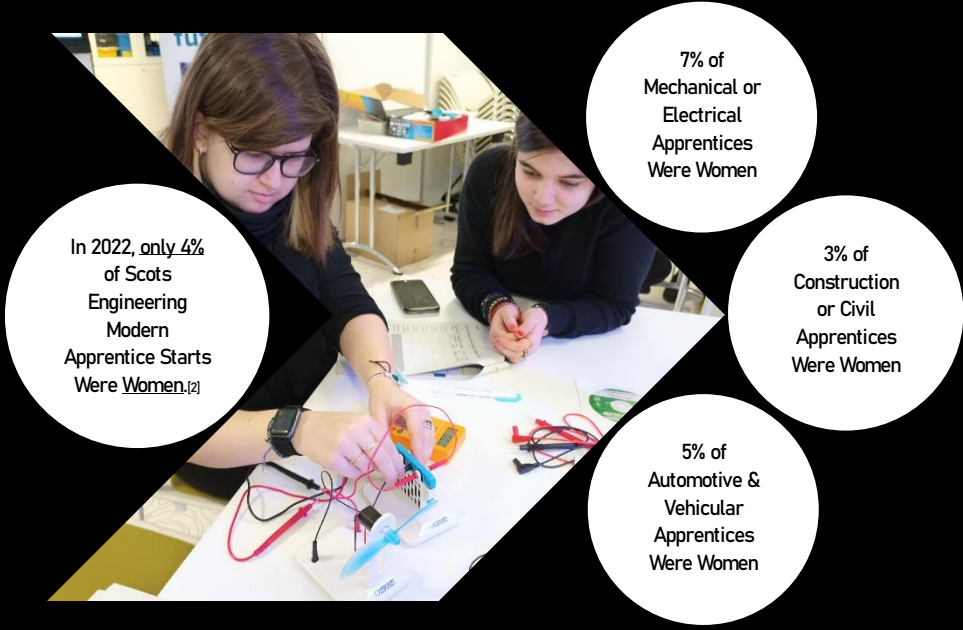
At A Glance

Within Scotland, female applications into STEM related further education and employment are stubbornly low, this is in comparison to males in both technical and industrial fields of study/work.

Data from UCAS for UK applicants in January 2022 towards Engineering & Technological studies (CAH10) show that only 19.1% of applicants identified as Women. In Scotland, it was even lower at 16.9%.^[1]

For Computer based studies (CAH11), the percentage of applications by UK women were comparable to Engineering at 19.4%. Scotland has shown improvement with a stronger 23.7% of women applicants to male applicants. This raises an important question:

Why is Engineering & Technology seen far less favourably than other STEM fields in Scotland, including computer-based studies?



Rural Ambitions Impacted by Disengagement

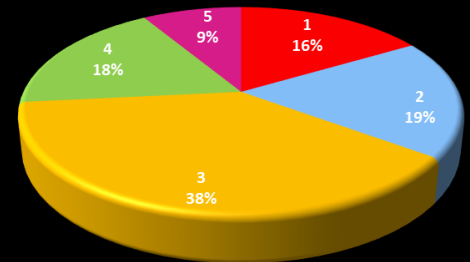
Between 2021 and 2022, UHI Inverness and Skills Development Scotland conducted a research survey (Woman into STEM – Rural) with rural central highlands young people and trans youth to gauge interest in STEM, further education & training, and ambitions for post-secondary education transition.

We found that among our surveyed group (15+ year olds), approximately half of respondents replied with neutral or disengaged responses to both interest in STEM and plans for future training/employment.

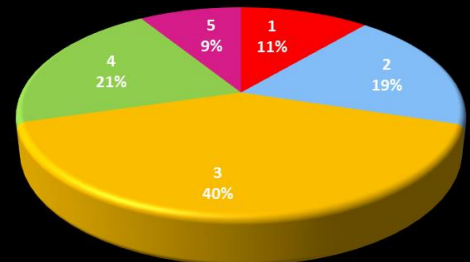
Common consensus among the surveyed group was that the two most important factors in deciding what to do after secondary school was: *Going to University* and *The Average Salary of a Career*.

Coupled with the general sentiment amid the survey group of wanting to leave the Highlands (35% wanting to leave and 38% apathetic to staying), This reinforces the current perception that young people are leaving the Highlands at the first opportunity for Higher Education prospects or pay.

However, we find that a majority of responses also showed that a firm decision on their future plans was not yet reached, leaving space for local directed mentorship and advice at this stage of their education.



Percentage of 15-18 Year-Olds Surveyed Who Wanted to Remain in the Highlands. (5 – Highest, 1 – Lowest) (n=647)



15-18 Year-Olds Who Wanted to Leave the Highland Region For University then Return. (5 – Highest, 1 – Lowest) (n=643)



We found that Apprenticeships were the lowest considered area for future career choice.

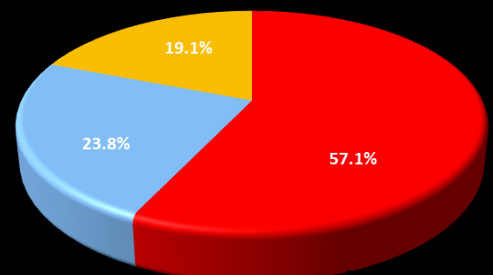
Comments from Apprentices state:

“There’s a lot of negativity about apprenticeships from a lack of understanding...”

“The grades to get in are low which sets the bar low...”

“People were asking ‘are you sure you don’t want to get a degree?’...”

I have Chosen a STEM Career...



I Don't Want a STEM Career...

I Haven't Decided on my Future After Secondary School...

15-18 Year-Olds Asked to Choose a Sentence which accurately describes their future. (5 – Highest, 1 – Lowest) (n=648)



“STEM Equity is an Egalitarian idea that embodies the fact that regardless of a person’s race, nationality, gender or sexuality, we all can succeed in STEM Education & Work equally”

Jack Marley McIntyre, STEM Equity Project Lead. UHI Inverness

“If Schools Would Give People More Exposure to What They Could Do...”

As our survey continued, we broached the subject of preferred ways of STEM outreach.

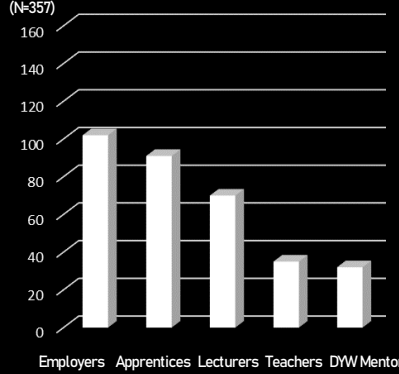
We first shared data from the Office of National Statistics (2021) which showed that 17.4% of young people (16-24 years old) changed career in 2021 & 19.7% changed career in 2020^[3].

This had no effect on pupils wanting to know more about STEM apprenticeships (51.6% of 159 pupils said no change of interest).

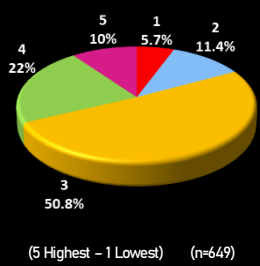
However, we also found that 28.9% of the following survey group (n=494) did want to have the opportunity to attend a STEM Apprenticeship Workshop.

54.3% of answers from that group were unsure about STEM Apprenticeship Workshops and thus hints that it is the lack of understanding of what a STEM Apprenticeship is, that is a major factor.

“Who Would Pupils Prefer to Deliver a STEM Workshop?”



“Does Inverness Have More Career/STEM Workshop Opportunities?”

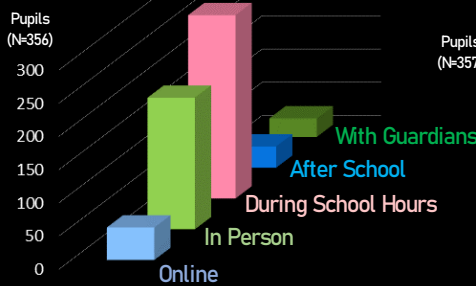


The Top Three Answers To “What STEM Careers Would You Most Like to Hear About?”

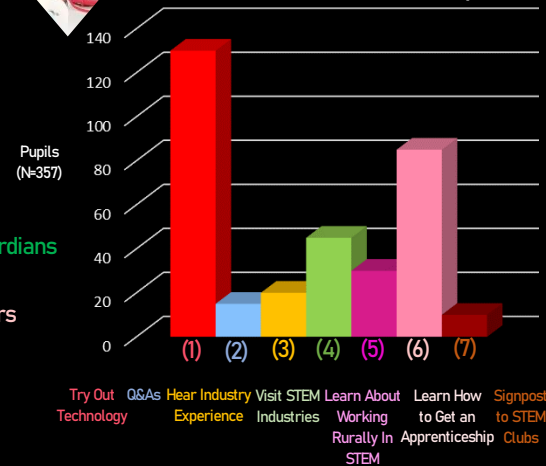
- Electronics & Programming
- Robotics Engineering
- Sustainability & Renewables



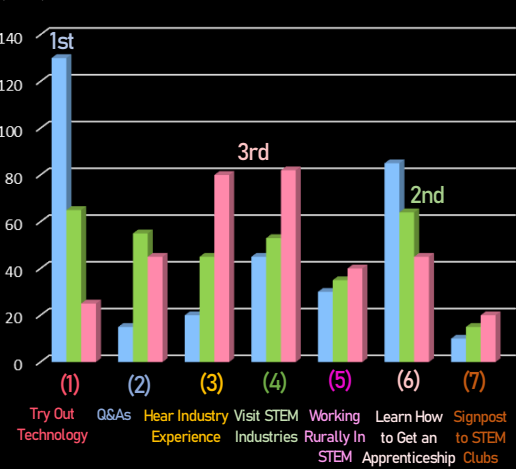
“How Would You Like a STEM Workshop to be Delivered?”



“What Do You Want to See the Most at a STEM Workshop?”



1st, 2nd, & 3rd Choices for “What Pupils Want to See the Most at a STEM Workshop.”

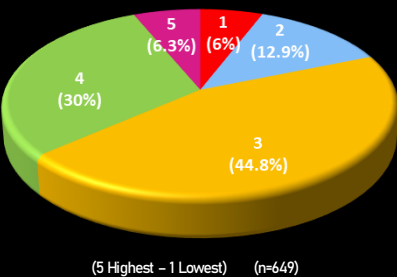


“Not Just an Information Session with People Talking...”

Our Conclusions from the pupil survey were that: the workshop provision sought by pupils needs to be in person and during school hours. Given the period that this survey was created and answered (2021 – Height of Covid-19 Pandemic), this statement must be tempered with potential bias against video conferencing.

The top activities sought were: Trying Technology (1st), Learning About Apprenticeships (2nd) and learning about local STEM Industries (3rd). Coupled with an interest in High-Tech Engineering, with an appetite to learn from current apprentices and employers, we had a foundation from where to develop a series of workshops.

“Does Attending Careers Events & Workshops Help with Choosing a Future Career Path?”



A Coalition of STEM Organisations

As the project progressed to the workshop development and provision stage, the feedback from pupils highlighted that they were interested in learning more about local STEM businesses.

With an eagerness among Highland pupils to have provision conducted by both Employers and Apprentices, we identified a novel opportunity to include our local industry partners in this project.

We created a coalition of local STEM businesses and education organisations to allow for the workshops to be comparable to the work these organisations are concerned in within the region.



The STEM Equity Project Plan

We Settled on a plan that would allow a regular, direct & informal series of interactions between the mentor team and the pupils participating in the projects.

This was to inspire a greater sense of comradery between the similarly aged mentors and pupils (<8 years older). This was to demystify; Apprenticeships, post-secondary education and highlight equity through example.

For Workshops, we created 4 distinct activities which covered local industry and High-Tech Areas such as Embedded Systems & Renewable Energy.



From Apprentice to Ambassador

After developing the idea for our base level of STEM provision, we brought together a team of our high attainment women apprentices who at the time were linked to a selection of our partners in the STEM Equity coalition.

This team were put through a 6-week training & development regime, where they developed STEM Mentorship Skills and helped to produce the framework for the workshop provision.

Together with the Project Lead, this team effectively developed and provided 4 Industry STEM Inspired Workshops at Two Pilot Schools.

"Students Can See Science, Technology and Maths As 'Hard' Subjects, So Educators Have a Challenge in Inspiring Young People to Take Up STEM Subjects"

Dawne Bloodworth, Head of STEM Development, UHI STEM



Project Conclusions

Workshops Conducted

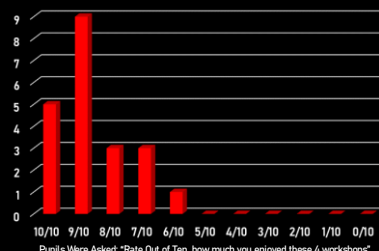
The 4 workshops developed started with a Scientific workshop based on the work of Diageo with an oil spill experiment and Cost Benefit Analysis mathematics.

The second workshop incorporated embedded electronics to highlight the work of Lifescan and High-Tech systems.

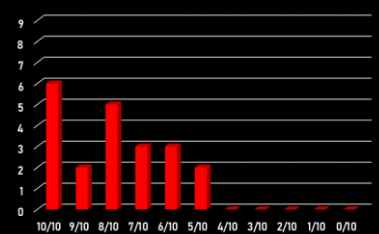
The third had a prime focus on renewable generation and High-Tech generation experiments with Hydrogen Fuel Cells. This workshop was supported by SDS's Digital Hub.

The Final workshop, conducted at Inverness Campus, allowed for a tour of the university, labs and a civil engineering challenge with bridge building.

Enjoyability Rating (/10)



STEM Impact Rating (/10)



Pupils Were Asked: "Rate Out of Ten, How Much These Workshops Inspire You to try a STEM Career"

Feedback from Pupils

Overall, we found that the interactions between the mentor team and the pupils were the novel factor in success that we estimated it would be from our survey.

The apprentices brought a friendly and knowledgeable presence to the project which has been highlighted on some post-project comments by pupils. This also gave the sessions a high enjoyability, with pupils excited to see their STEM Mentors for the next session.

As a result, the high enjoyability has spurred a general positive impact on the pupils with inspiration into STEM careers tracking positively across the board.

Reference Data

[1] 2022 cycle applicant figures – 26 January deadline (2022) UCAS. Available at: <https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-releases/applicant-releases-2022-cycle/2022-cycle-applicant-figures-26-january-deadline> (Accessed: March 1, 2023).

[2] Modern Apprenticeship Statistics Supplemental - (2022/23) (2023) Modern Apprenticeship Statistics Supplemental . Skills Development Scotland. Available at: <https://www.skillsdevelopmentscotland.co.uk/media/49982/modern-apprenticeship-supplementary-tables-quarter-3-2022-23.xlsx> (Accessed: March 1, 2023).

[3] Moore, H. (2022) Job changers and stayers, understanding earnings, UK: April 2012 to April 2021, Job changers and stayers. Office of National Statistics . Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/articles/jobchangersandstayersunderstandingearningsukapril2012toapril2021/april2012toapril2021#data-sources-and-quality> (Accessed: March 3, 2023).

For More Information, Visit:

<https://www.inverness.uhi.ac.uk/>

<https://www.uhi.ac.uk/en/about-uhi/stem/>

<https://www.uhi.ac.uk/en/research-enterprise/>

<https://www.inverness.uhi.ac.uk/subject-areas/engineering-technology/>

<https://www.skillsdevelopmentscotland.co.uk/publications-statistics/publications>

UHI Inverness Team:

Jack Marley McIntyre – (Lead)

Iain King – Head of Engineering Technology

Carrie Higgins – Head of Tertiary Education

Reina Edmiston – (Former)

Nadia Johal – (West Fraser)

Seonagh MacDonald – (Strathspey Rail)

Georgia Morrison – (Diageo)

University of the Highlands & Islands
UHI Inverness

School of Engineering Technology

1 Inverness Campus, Inverness

Highlands, IV2 5NA

jack.mcintyre.ic@uhi.ac.uk

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