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YORK
ST JOHN
UNIVERSITY

Impact Evaluation Report:

People Like Me STEM Workshop

successful**futures** 
NYBEP education and business in partnership

 futurehy

 ofs Uni Connect
Programme



Background

There continues to be a STEM skills gap in the UK with demand for STEM qualified individuals in areas such as engineering, healthcare and accountancy outweighing those currently pursuing STEM careers (STEM Learning, 2018). In this regard, work is sorely needed to better understand how more young people can be encouraged to study STEM subjects in Higher Education.

This work also intersects with efforts to increase participation in Higher Education among under-represented groups. Notably, in this regard, the All-Party Parliamentary Group on Diversity and Inclusion in Science, Technology, Engineering and Maths (STEM) was established in 2018 with the aim of promoting greater inclusion in STEM and have repeatedly called for greater equity in learning opportunities in STEM for all students and an increase in the number of under-represented groups pursuing STEM careers, especially females.

Research has found that female students tend not to study STEM subjects for various reasons that include differences in academic confidence in studying STEM and lower sense of belonging and identification with STEM subjects. Underlying these reasons are thought to be stubborn sociocultural processes such as gender-STEM stereotyping and gendered socialization (Eddy & Brownell, 2016).

Intervention work designed to redress gender disparities and encourage more females to pursue STEM in higher education have produced mixed feelings. However, the most effective interventions are those that focus on increasing knowledge, ability, motivation and feelings of belonging in STEM, and may include the use of mentors and role models (van den Hurk, Meelissen, & van Langen, 2019).

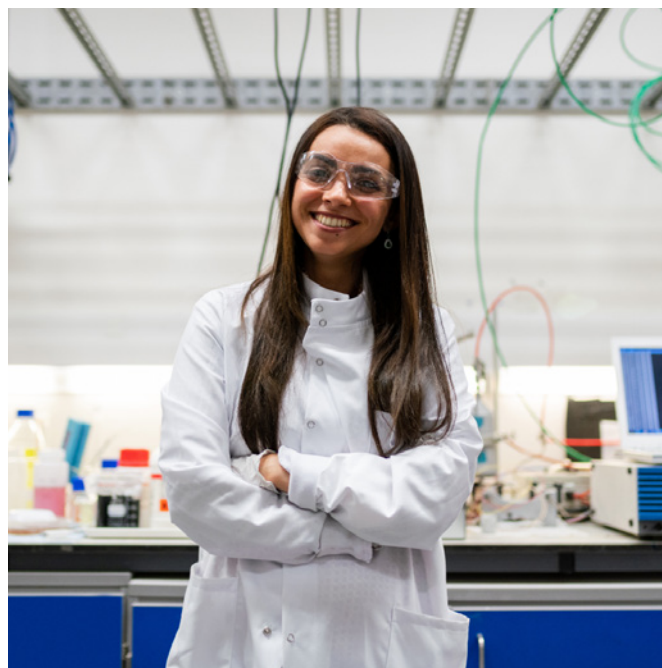
Aim and scope of evaluation

Here we report the evaluation of the impact of part of the outreach intervention programme undertaken by FutureHY. The specific part of the outreach intervention programme is the People Like Me STEM workshop aimed at increasing knowledge, confidence, and aspirations associated with a career in STEM among young females.

Research questions / hypotheses

Our research question was; can a short workshop improve reported knowledge, confidence, and aspirations associated with a career in STEM in young females?

The content of the workshop was designed to increase familiarity with STEM and STEM subjects, improve basic knowledge of STEM employment and employers, offer positive female examples, and reinforce accessibility of STEM as an area of study and focus of a career.





Characteristics of outreach

<p>Detailed description</p>	<p>People Like Me STEM workshop</p> <p>The workshop aimed to increase girls' (i) knowledge of STEM subjects and STEM jobs, (ii) confidence in planning a future career, and (iii) aspirations to pursue a STEM job</p> <p>The workshop was facilitated by North Yorkshire Business and Education Partnership Ltd (NYBEP) and delivered by local employers from STEM</p> <p>The content focused on local employers providing information regarding their company, related careers and skills, and their own personal career journey</p> <p>Additional information included highlighting STEM subjects, STEM career salaries, areas of possible employment and employers, and women case studies in STEM</p>
<p>Activity type</p>	<p>Skills and Attainment (Workshop)</p>
<p>Timing, duration and frequency of activity</p>	<p>A standalone session</p> <p>Lasting approximately two hours</p> <p>Delivered once</p>
<p>Mode of delivery</p>	<p>Delivered on-site at school/FE colleges</p> <p>Face-to-face in a classroom setting</p>
<p>Target group or groups</p>	<p>Target group was female students</p> <p>Year 9 students (age 13-14)</p> <p>Year 10 students (age 14-15)</p>

Outcomes

Outcomes for NCOP / Uni Connect target learners	<p>Knowledge about Higher Education</p> <p>Confidence in ability to succeed at higher education</p> <p>Ability to make informed choices about KS5 study to facilitate access to higher education</p> <p>Understanding of the benefits of higher education relative to other progression routes</p> <p>Likelihood of applying to higher education</p>
Outcomes for parents	None
Outcomes for teachers / school staff	None

Methods used to evaluate impact of intervention

Type of evaluation	Type 2: Empirical Enquiry
Type of research approach	Primary quantitative (pre-test/post-test design)
Rationale	The approach was adopted for pragmatic reasons and the difficulty associated with creating a control or comparison group in the setting, as well as meeting the expectations and time provided by partner schools
Data collection methods	<p>Survey</p> <p>Questions and response formats are reported in Table 1</p>
Sampling and response rate	<p>The current sample represents a subsample of the total students who received the workshop</p> <p>The survey was completed by 378 year 9 and year 10 girls (age 13-15)</p> <p>Of these, between 354 to 364 completed questions on both pre-test and post-test surveys</p> <p>The sampling strategy was one of convenience (based on availability and additional time to complete the survey) and purposeful (all students who had completed the workshop)</p> <p>Students were from twelve colleges and high schools in the North Yorkshire region</p>
Timeframe for evaluation	<p>Survey was completed immediately before and immediately after the People Like Me STEM workshop</p> <p>Workshops were delivered in February, March, May and June, 2020</p>
Approach to data analysis	<p>Descriptive statistics (means and standard deviations)</p> <p>Change scores (percentage change)</p> <p>Paired samples t-test</p> <p>Effect size to quantify the size of change (Cohen's d_z; Lakens, 2013)</p>

Table 1. Response format of the questions and scoring (1 to 10)

Question

How do you feel about the following...?

	1 Lower	2	3	4	5	6	7	8	9	10 Higher
Your knowledge of the STEM jobs available to you										
How your skills and abilities can be applied to subjects and careers										
Your understanding of the benefits of studying a STEM subject										
Your confidence speaking to people about their career and your future										
Your knowledge of the variety of STEM subjects available to study										
Your ability to apply existing knowledge to problem solving										
Your aspiration to work in a STEM career in the future										
The importance of thinking about your future										
A career in STEM is for people like me										
Was the information presented in a way which was clear and easy to understand?					Yes	No				
Would you recommend this activity to a friend?					Yes	No				

Table 2. Scores for all respondents

Question	Respondents	Time 1 Mean	Time 1 SD	Respondents	Time 2 Mean	Time 2 SD
Your knowledge of the STEM jobs available to you	374	3.93	2.16	363	7.65	1.88
How your skills and abilities can be applied to subjects and careers	370	4.60	2.30	361	7.38	1.83
Your understanding of the benefits of studying a STEM subject	376	4.52	2.45	364	7.43	2.03
Your confidence speaking to people about their career and your future	378	4.18	2.49	364	6.34	2.37
Your knowledge of the variety of STEM subjects available to study	372	4.26	2.21	364	7.33	1.91
Your ability to apply existing knowledge to problem solving	375	6.42	2.47	359	7.82	2.03
Your aspiration to work in a STEM career in the future	377	4.33	2.41	364	6.51	2.33
The importance of thinking about your future	376	7.61	2.32	359	8.49	1.90
A career in STEM is for people like me	376	4.35	2.47	363	6.64	2.39
	Respondents	% Yes	% No			
Was the information presented in a way which was clear and easy to understand?	361	98.9	1.1			
Would you recommend this activity to a friend	346	97.7	2.3			



Table 3. Scores for respondents who completed questions on both pre-event and post-event

Question	Respondents	Time 1 Mean	Time 1 SD	Time 2 Mean	Time 2 SD	% change	t	Effect size change
Your knowledge of the STEM jobs available to you	359	3.91	2.17	7.69	1.83	97%	31.31*	1.65
How your skills and abilities can be applied to subjects and careers	354	4.60	2.25	7.38	1.82	60%	25.76*	1.37
Your understanding of the benefits of studying a STEM subject	362	4.53	2.45	7.43	2.03	64%	24.48*	1.29
Your confidence speaking to people about their career and your future	364	4.14	2.47	6.34	2.36	53%	20.35*	1.07
Your knowledge of the variety of STEM subjects available to study	359	4.27	2.21	7.34	1.91	72%	27.08*	1.43
Your ability to apply existing knowledge to problem solving	357	6.45	2.41	7.81	2.03	21%	13.61*	0.72
Your aspiration to work in a STEM career in the future	364	4.38	2.41	6.51	2.33	49%	20.09*	1.05
The importance of thinking about your future	357	7.61	2.27	8.48	1.90	11%	10.29*	0.54
A career in STEM is for people like me	362	4.37	2.45	6.65	2.39	52%	20.40*	1.07

Note. *denotes a statistically significant difference between time 1 and time 2 scores ($p < .01$, two tailed). Effect size change denotes the magnitude of change in units of standard deviation (Cohen's d_z ; Lakens, 2013)

Results and conclusions

Results	<p>Descriptive statistics for all respondents are reported in Table 2</p> <p>Descriptive statistics for those who completed time 1 and time 2 questions are reported in Table 3, along with change scores (percentage change), results of pair-samples t-test, and effect size. Effect size is reported in units of standard deviation</p> <p>Key findings:</p> <p>There was a significant increase from pre-event to post-event in all questions</p> <p>The biggest increase was for knowledge of STEM subjects and jobs available</p>
Impact achieved	<p>Our evaluation indicates a positive impact of the People Like Me STEM workshop on the knowledge, understanding and aspirations of participants in regards to STEM subjects</p>
Contribution or attribution	<p>We consider the evaluation to provide evidence of a contribution (not attribution of causality) to the observed changes due to the type of design (pre-test/post-test design)</p>

Closing remarks

Our evaluation of the People Like Me STEM workshop indicates that this part of our outreach intervention programme has a positive impact on participants.

Students' reported knowledge, confidence, and aspirations associated with a career in STEM was significantly higher following the workshop than before the workshop.

Recommendations

1. The People Like Me STEM workshop is a valuable addition to resources aimed at increasing interest in studying and pursuing careers in STEM subjects for young females so should be utilised widely.
2. The workshop was especially good at increasing knowledge about STEM subjects and careers so would be particularly useful when this is the aim.
3. The inclusion of the female case studies and role models was considered essential in addressing gender-stereotypes in an authentic way and could be integrated into similar interventions for other under-represented groups.

References

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STEM Learning. (2018.) *STEM Skills Indicator*. STEM Learning: York.

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Note: This report was prepared by Professor Andrew Hill, Laura Fenwick, Rebecca Harland, and Helen Smith.



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