BRING IT ON

In partnership with

The Big Bang Near Me

Impact Report 2019

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Introduction

The engineering sector is of vital importance to the UK, yet demand for people with engineering skills is not being met by supply through the UK education pipeline. Concerted effort is needed to address the shortfall of engineers if engineering's economic and social contributions are to be maintained. The UK government has rightly identified increasing the UK population's STEM skills as a priority and a pillar of its industrial strategy.

According to the STEM Skills Indicator published in April 2018, seven in ten businesses in STEM sectors found it difficult to hire staff (2017/18), resulting in a shortfall of over 173,400 workers and an average of 10 unfilled roles per business.

In the face of technological advancements and a changing political and economic landscape, developing the pipeline to address the skills needs of the engineering sector remains a key challenge.

Running since 2010, EngineeringUK's Engineering Brand Monitor (EBM) is the authoritative voice on the views, perceptions and understanding of engineering among young people, teachers and the public.

Our 2019 survey highlights some areas of positivity:

- A majority of those who would consider a career in engineering knew what to do next in order to become an engineer.
- A significant increase (2017-2019) in the proportion of 16-19 year olds who would consider a career in engineering.
- A vast majority of teachers and parents would recommend a career in engineering.

However, there are a number of keys areas for improvement:

- Engineering lags behind other STEM areas in terms of knowledge, perceptions and desirability.
- Confidence to deliver careers advice on engineering among teachers and parents is low.
- There were clear gender differences across the board - Girls knew less about engineering, viewed it more negatively, were less likely to consider a career in the industry and, were less likely to know what to do next in order to become an engineer.

Our 2019 EBM highlights some clear areas of learning for the STEM outreach community:

- The more they know about engineering, the more likely young people are to perceive the profession positively and to consider a career in the industry.
- Those attending a STEM event in the last 12 months were over 3 times as likely to consider a career in engineering, than those who had not.

- Our EBM shows that pay is an important factor in career choice so we need to ensure young people are fully aware of salaries (the majority of 16-19 year olds underestimated the starting salary of an engineer).

When it comes to knowledge of engineering, a surprisingly low number of students, under a quarter (24%), actually know what engineers do. When we asked pupils 'how positively or negatively do you view engineering?', only half of pupils actually viewed engineering positively and, when asked 'Do you think you would ever consider a career in engineering?' only half of 11-19 year olds would consider it – this tells us there is a lot more work to do.

In a drive to inspire the next generation of North East engineers, Bring it On! showcases the very best of North East engineering to young people (aged 9-14) from across the region.

The zoned event provides students and teachers with the opportunity to meet and engage with engineers from companies across the following sectors:

- Automotive/Rail/Aerospace
- Creative & Digital Technology
- Civil/Structural/Construction Engineering
- Subsea/Oil & Gas/Renewables/Energy
- Chemicals/Processing/Biotechnology

In 2019, in a bid to simplify the STEM landscape for schools and businesses, Bring it On! hosted the North East's Big Bang Near Me. The collaboration with Big Bang presented young people and teachers with an opportunity to participate in a wide variety of more generic STEM engagement opportunities. It also enabled young people from across the region to exhibit and present their science and engineering projects as part of the Big Bang UK Young Scientists and Engineers Competition.

Evaluating the event

This report provides analysis and evaluation on the Bring it On! /Big Bang event that took place on the 9th & 10th October 2019, at the Beacon of Light in Sunderland.

The student experience was evaluated using EngineeringUK's Common Evaluation System the 'Engineering Brand Monitor' (EBM). Teacher feedback was gathered via questionnaires completed at the end of each day and exhibitor feedback via a post event online survey.

Engineering Brand Monitor Evaluation

A nationally representative survey of perceptions of engineers, engineering and STEM among the general public, educators and pupils, the EBM provides an understanding of the environment in which we operate and produces comparable results year-on-year. EBM sets a baseline, or benchmark, for outreach programme evaluations, allowing us to measure and demonstrate the impact that programmes are having in a robust and trusted manner.

Methodology

The following evaluation results are compiled from pre and post event EBM questionnaires.

The pre and post questionnaires featured three core knowledge and perceptions questions taken from the full EBM questionnaire:

- *How much do you know about what people working in these areas do? (Science, Technology, Engineering)*
- *How positive or negative is your view of the following? (Science, Technology, Engineering, Maths)*
- *How desirable do you believe a career in the following areas to be? (Science, Technology, Engineering)*

To establish a baseline for existing knowledge and perceptions before taking part, the pre event questionnaires were completed by a cohort of students in schools across the region in advance of the event. The post event questionnaires were completed at the end of the day, prior to departure.

Each of the core questions requires students to respond on a five point Likert Scale, which is used to allow individuals to express how much they agree or disagree with a particular statement. Use of a Likert scale is the most widely used approach to scaling responses in survey research,

Analysis of the results focuses on number of positive responses to each row of each individual question. Positive responses are numbers '4' and '5' on the scale combined (highlighted in green in the example below):

EXAMPLE Q3	**How desirable do you believe a career in the following areas to be? Please choose a number 1-5.** *Please tick one answer for each row.* PLEASE TICK ONE BOX ONLY					
		Not at all desirable				Very Desirable
		1	2	3	4	5
	Science	❑	❑	❑	❑	❑
	Technology	❑	❑	❑	❑	❑
	Engineering	❑	❑	❑	❑	❑

Results are calculated by counting the number of times pupils ticked options '4' and '5' in each scale/row, divided by the total number of respondents (fully completed questionnaires only) and multiplied by 100 to obtain the figure for the percentage of positive responses (rounding the first decimal place up or down to a whole number).

Finally, it should be noted that all responses are 'self-reported', meaning that respondents are asked to identify their own knowledge of engineering, for example, but it is not otherwise assessed. It may

be that a participant believes they know a lot about engineering, but since the questionnaire does not objectively test participant's knowledge (by asking specific questions about what engineering entails, for example), there may be some bias in the results.

Findings

Part 1 - Secondary School Evaluation results (students age 12-14)

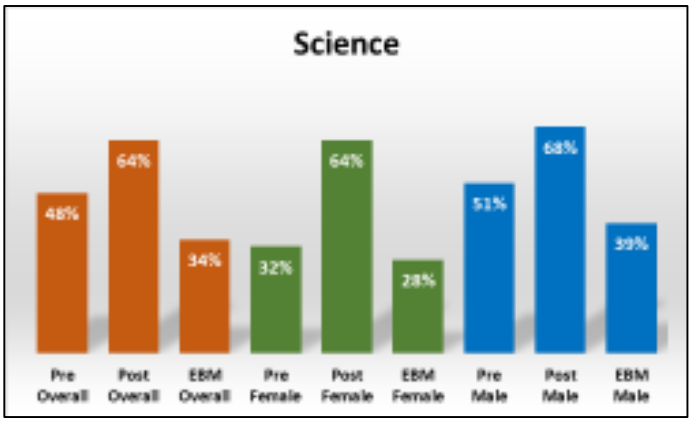
The following analysis of the findings illustrates the combined pre and post evaluation results from a cohort of randomly selected students from secondary schools across the region.

Each of the charts below illustrates 3 sets of data, comparing students' pre & post event core knowledge and perceptions responses alongside the EBM 2019 national data set.

Question 1 - **How much do you know about what people working in the following areas do?**

Science

Overall results from the pre event questionnaire, assessing the students' baseline knowledge about what people working in Science do, reflects positively against the EBM 2019 data set, indicating higher levels of understanding about what people working in science do compared to their peer group nationally.



In comparison to overall pre event data, combined post event results illustrate a **16 percentage point increase** in students' knowledge about what people working in Science do.

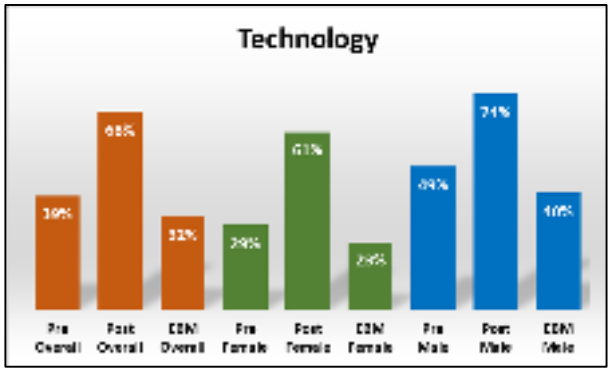
Looking in more detail, pre event results indicate that our female survey respondents went into the event with a lower level of knowledge about what people working in science do compared to their male counterparts. That said, the girls' pre event knowledge does reflect positively against the EBM 2019 data set for 11-14 year old females, indicating a higher level of baseline knowledge than their female peer group nationally, before participating in the event.

Pre event results recorded by our male survey respondents also indicate a higher level of baseline knowledge than male counterparts across the UK.

Post event results indicate the event had a positive impact on increasing students' knowledge about careers in science. Respondents' more informed post event results show:

- a **32 percentage point increase** in the girls' knowledge and a **17 percentage point increase** in the boys' knowledge about what people working in science do.

Technology



Overall results from the pre event questionnaire, assessing the students' baseline knowledge about what people working in technology do, reflects positively against the EBM 2019 data set, indicating slightly higher levels of understanding about what people working in technology do compared to their peer group nationally.

In comparison to overall pre event data, combined post event results illustrate a **29 percentage point increase** in students' knowledge about what people working in Science do.

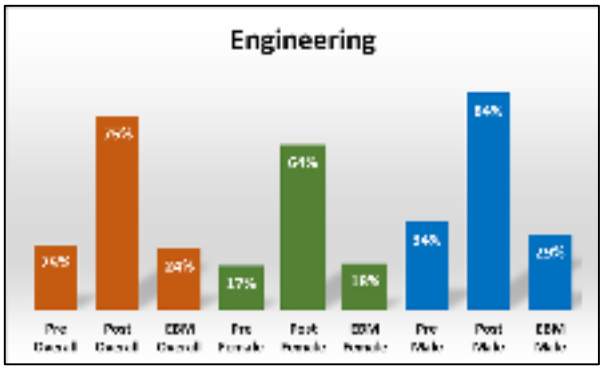
Looking in more detail, pre event results indicate that our female survey respondents went into the event with a lower level of knowledge about what people working in technology do compared to their male counterparts, but slightly higher than their female peer group nationally.

Pre event results recorded by our male survey respondents also indicate a higher level of baseline knowledge about what people working in technology do, compared to the EBM 2019 national data set for 11-14 year old males.

Post event results indicate the event had a positive impact on broadening students' knowledge about careers in technology. Respondents' more informed post event results show:

- a **32 percentage point increase** in the girls' knowledge and a **25 percentage point increase** in the boys' knowledge about what people working in technology do.

Engineering



Overall results from the pre event questionnaire, assessing students' baseline knowledge about what people working in engineering do is on par with the EBM 2019 data set recorded by the respondents' peer group nationally.

In comparison to overall pre event data, combined post event results illustrate a **50 percentage point increase** in students' knowledge about what people working in Engineering do.

Looking in more detail, pre event results indicate that our female survey respondents went into the event with a lower level of knowledge about what people working in Engineering do compared to their male counterparts, but on par with the EBM 2019 national data set for 11-14 year old females.

Pre event results recorded by our male survey respondents indicate a slightly higher level of baseline knowledge about what people working in engineering do compared to results recorded by their 11-14 year old male peer group nationally.

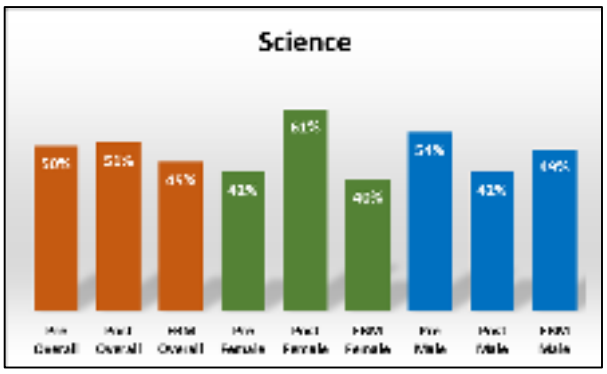
Post event results indicate the event had a positive impact on expanding students' knowledge about careers in engineering. Respondents' more informed post event results show:

- a **47 percentage point increase** in the girls' knowledge and a **50 percentage point increase** in the boys' knowledge about what people working in engineering do.

The increase in students' knowledge and about engineering is particularly pleasing. The event was designed to showcase engineering to young people and the results indicate our exhibitors hit the mark in terms of content, providing a very positive engineering focused learning experience for participants.

Question 2 – How desirable do you believe a career in the following areas to be?

Science



Overall results from the pre event questionnaire, assessing the students' baseline desirability for a career in science are slightly higher than the EBM 2019 data set recorded by their peer group nationally.

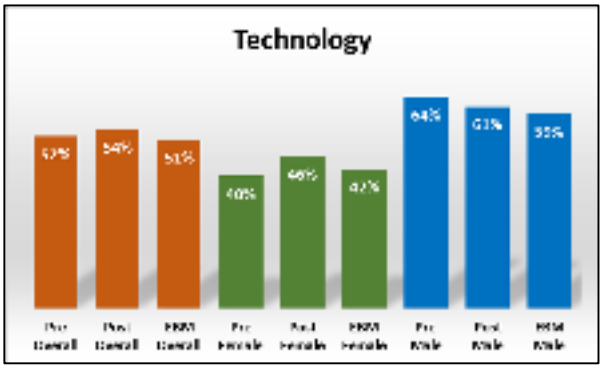
In comparison to overall pre event data, combined post event results illustrate a small **1 percentage point increase** in students' desirability for a career in science.

Looking in more detail, pre event results illustrate that our female survey respondents went into the event with a lower level of desirability for a career in science than their male counterparts, although slightly above the EBM 2019 national data set for 11-14 year old females.

Post event results indicate the event had a positive impact on increasing the girls' awareness and understanding of the variety of careers in science, reflected in a **19 percentage point increase** in their desirability for a career in the sector.

Pre event results recorded by our male survey respondents illustrate a higher level of desirability for a career in science compared to the EBM 2019 national data set for 11-14 year old males. An indicator that they generally have more awareness and understanding about careers in the sector. The post event results reflect a **12 percentage point decrease** in the boys' desirability. This decrease does not detract from their basic level of knowledge, awareness and understanding, more so an indicator that they are making knowledge enhanced decisions about careers in the sector having participated in the event.

Technology



Overall results from the pre event questionnaire, assessing the students' baseline desirability for a career in technology are on par with the EBM 2019 data set recorded by their peer group nationally.

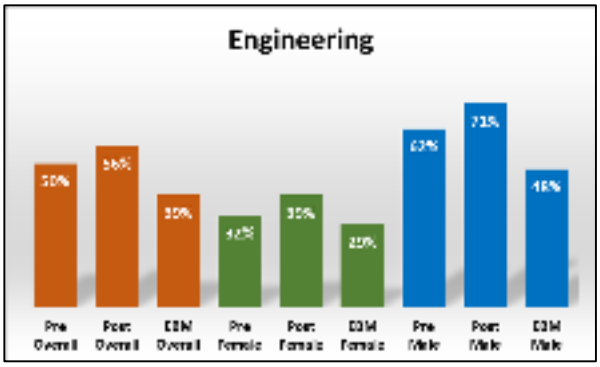
In comparison to overall pre event data, combined post event results illustrate a small **2 percentage point increase** in students' desirability for a career in Technology.

Looking in more detail, pre event results illustrate that our female survey respondents went into the event with a substantially lower level of desirability for a career in technology than the boys and slightly below the EBM 2019 national data set for 11-14 year old females.

Post event results indicate the event had a positive effect on the girls, increasing their awareness and understanding of the variety of careers in Technology, reflected in a **6 percentage point increase** in their desirability for a career in the sector.

Pre event results recorded by our male survey respondents illustrate a slightly higher level of desirability for a career in technology compared to the EBM 2019 national data set for 11-14 year old boys. An indicator that they generally have more awareness and understanding about careers in the sector than their peer group nationally. The post event results reflect a slight **3 percentage point decrease** in the boys' desirability. Again, this decrease does not detract from their basic level of knowledge, awareness and understanding, more so a reflection of informed decision making about what it means to have a career in technology and exposure to a wider breadth of career opportunities in engineering.

Engineering



Combined results from the pre event questionnaire, assessing the students' baseline desirability for a career in engineering reflect positively against the overall EBM 2019 data set recorded by their peer group nationally, indicating a higher level of understanding about engineering careers.

In comparison to overall pre event data, post event results illustrate a combined **6 percentage point increase** in students' desirability for a career in Engineering.

Looking in more detail, pre event results illustrate that our female survey respondents went into the event with a substantially lower level of desirability for a career in engineering than the boys, although slightly higher than the EBM 2019 data set for 11-14 year old females.

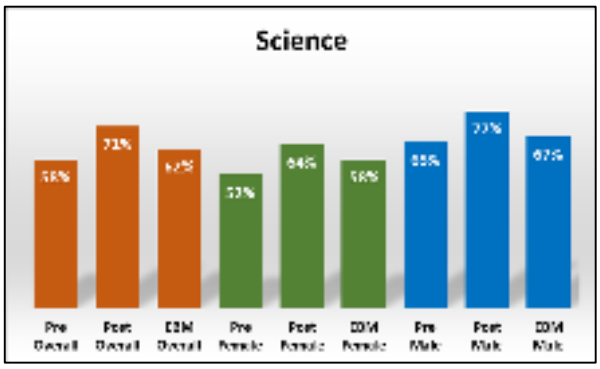
Post event results indicate the event had a positive effect on the girls, broadening their awareness and understanding of engineering, reflected in a **7 percentage point increase** in their desirability for careers, likely across a variety of engineering sectors.

Pre event results recorded by our male survey respondents illustrate almost a **30%** higher level of desirability for a career in engineering compared to the EBM 2019 data set for 11-14 year old boys. This is an indicator that they generally have more awareness and understanding about engineering than their peer group nationally.

It is pleasing to see that the boys' post event results reflect a **9 percentage point increase** in their baseline desirability, an indicator that the event expanded their understanding and awareness, likely across a breadth of career opportunities in engineering.

Question 3 – How Positive or negative is your view of each of the following?

Science



Combined results from the pre event questionnaire, assessing positive/negative baseline perceptions of Science, fall slightly below the EBM 2019 data set. An indicator that respondents' knowledge, awareness and understanding about the importance of STEM subjects to careers lags a little behind that of their peers in other parts of the UK.

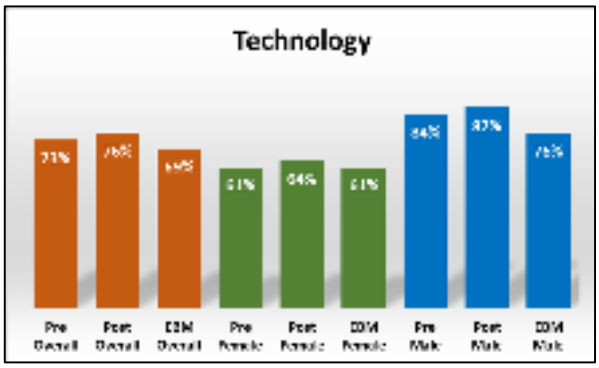
In comparison to overall pre event data, post event results illustrate a combined **13 percentage point increase** in students' positive perceptions about science.

Looking in more detail, pre event results illustrate that our female survey respondents went into the event with a **25%** less positive outlook about science than the boys, and slightly below the EBM 2019 data set for 11-14 year old females.

Post event results indicate Bring it On! had a positive effect on the girls, broadening their understanding of the use of science in the workplace, reflected in a **12 percentage point increase** in their positive perceptions of science, likely across a variety of STEM sectors.

The pre event results recorded by our male survey respondents are on par with the EBM 2019 data set for 11-14 year old boys. Their post event results reflect an **12 percentage point increase** in their positivity about science, likely the result of enhanced knowledge and awareness of its importance to a breadth of STEM careers.

Technology



Combined results from the pre event questionnaire, assessing students' baseline positive/negative perceptions of Technology, reflect positively against the EBM 2019 data set. An indicator that respondents have a slightly more positive outlook about technology than their peers in other parts of the UK.

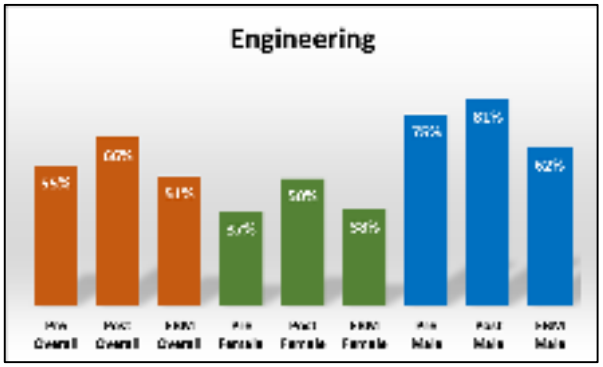
In comparison to overall pre event data, combined post event results illustrate a slight **3 percentage point increase** in students' positive perceptions about technology.

Looking in more detail, pre event results recorded by our female respondents are on par with the EBM 2019 data set for 11-14 year old females. However, they reflect slightly less positivity than the results recorded by our male survey respondents.

Post event results indicate that Bring it On! slightly improved the girls' positive perceptions about technology, reflected in a **3 percentage point increase** in their positivity about of the use of technology in the workplace.

The pre event results recorded by our male survey respondents illustrate a higher level of positivity about technology in comparison to the EBM 2019 data set for 11-14 year old boys. As with our female respondents, the boys' post event results reflect only a slight increase in their positivity about technology (a **3 percentage point increase**). However, their pre event results do show they had a relatively high level of positivity about technology prior to participation.

Engineering



Combined results from the pre event questionnaire, assessing students' baseline positive/negative perceptions of Engineering, reflect positively against the EBM 2019 data set, but only slightly. An indicator that our respondents have a, marginally, more positive outlook about engineering than their peers in other parts of the UK.

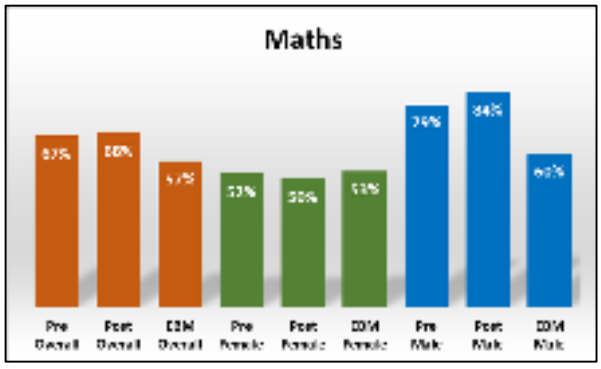
In comparison to overall pre event data, combined post event results illustrate an **11 percentage point increase** in students' positive perceptions about Engineering.

Looking in more detail, pre event results recorded by our female respondents reflect negatively against the EBM 2019 data set for 11-14 year old females, and illustrate substantially lower levels of positivity about engineering than our male respondents.

Post event results indicate that the event increased the girls' positive perceptions about engineering, reflected in a **13 percentage point increase** in their positivity about it. A likely result of engaging with inspiring engineers from a wide variety of engineering sectors, enhancing knowledge, understanding and awareness about the amazing opportunity presented by a career in engineering.

The pre event results recorded by our male respondents illustrate higher levels of positivity about engineering in comparison to the EBM 2019 data set for 11-14 year old boys. Once again the boys' post event results reflect only a slight increase in their positivity about engineering (a **6 percentage point increase**). However, their pre event results do show they had a relatively high level of positivity about engineering prior to the event which has been enhanced through participation.

Maths



Combined results from the pre event questionnaire, assessing students' baseline positive/negative perceptions of maths, reflect positively against the EBM 2019 data set. An indicator that our respondents generally have more positive outlook about maths than their peers in other parts of the UK.

In comparison to overall pre event data, combined post event results illustrate a slight **1 percentage point increase** in students' positive perceptions about maths.

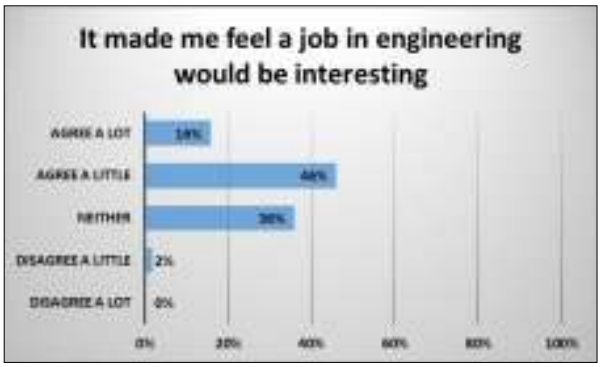
Looking in more detail, pre event results recorded by our female respondents are on par with the EBM 2019 data set for 11-14 year old females, but illustrate substantially lower levels of positivity about maths than their male counterparts.

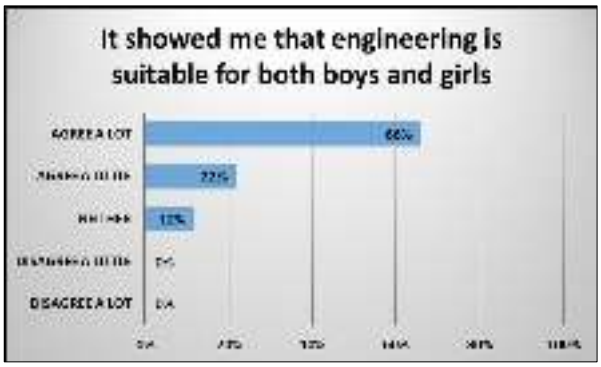
Post event results reflect a slight **2 percentage point decrease** in the girls' positivity about maths. This decrease is not necessarily a negative, in that they have had their eyes opened to a world of new possibilities outside of their current life experiences and academic understanding of individual STEM subjects. Injecting real-life relevance to what they are studying at school helps students to develop greater understanding of how different subjects interlink and the possible career opportunities that will arise from them. Fostering more informed understanding and decision making, in itself, is a huge positive.

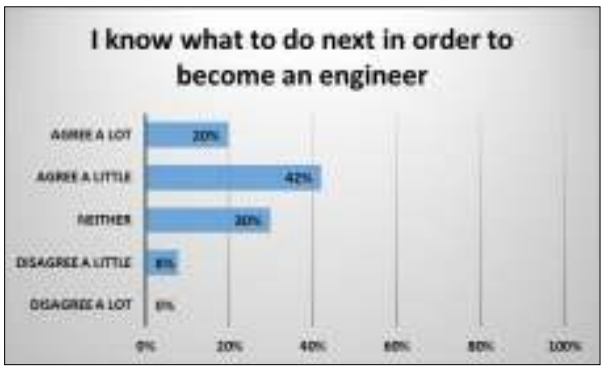
The pre event results recorded by our male respondents illustrate higher levels of positivity about maths in comparison to the EBM 2019 data set for 11-14 year old boys (almost **32%** higher) and substantially higher levels of positivity compared to the results recorded by our female respondents (almost **52%** higher). The boys' post event results reflect only a slight increase in their positivity about maths (**a 5 percentage point increase**). It is pleasing to see that participation in the event has further enhanced positive perceptions of the subject.

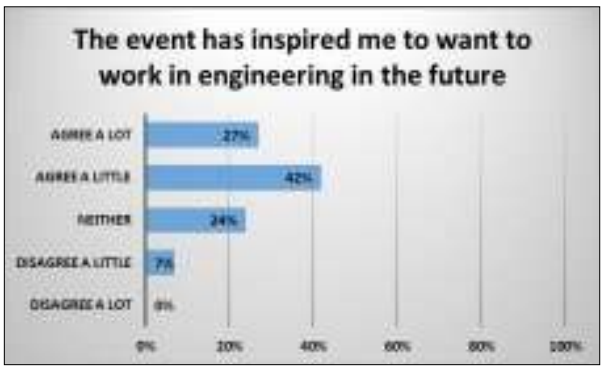
Additional Post Event Questionnaire Results (overall experience of the event and views on STEM)
Each of the charts below illustrates combined post event questionnaire results of our secondary school survey respondents.

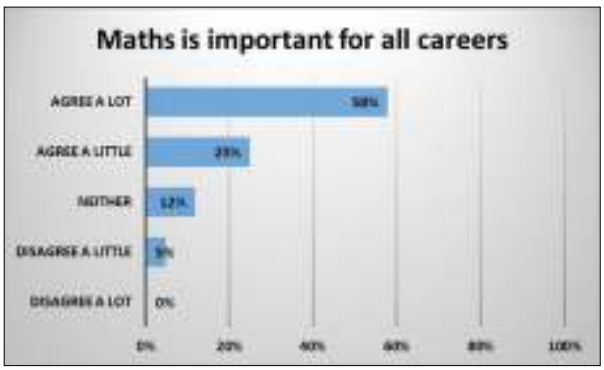
Question 4 - Students were asked to what extent they agreed with the following statements about the event. They were also asked if they had met any engineers.

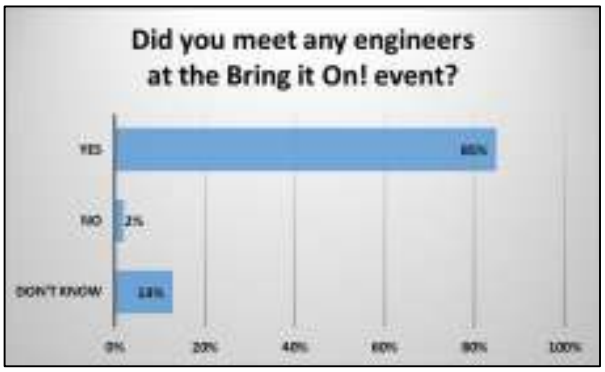












A key driver for Bring it On! is to inspire girls, as well as boys, about careers in engineering. Post event evaluation results indicate a positive impact, with **66%** of students agreeing 'a lot' that the programme showed them engineering is suitable for both boys and girls and **62%** of the students agreeing, to some extent, that the programme made them feel a job in engineering would be interesting.

Bring it On! did impart a level of knowledge and understanding to students about routes into engineering with **62%** of the students agreeing, to some extent, that they know what to do next in order to become an engineer. However, only **20%** of the students 'agree a lot' with this, highlighting the need to place more emphasis on routes into the sector at future Bring it On! events.

In terms of increasing desirability to want to work in engineering in the future, **69%** of the students agreed, to some extent, that the event has inspired them to want to do so.

Overall, the results indicate a good level of awareness among respondents about the importance of maths to careers with **83%** of the students agreeing, to some extent, that maths is important for all careers. The exhibition facilitated a great opportunity for young people to meet face to face with engineers and **85%** of students recognised that fact.

Part 2 - Primary School Evaluation results (students age 7-11)

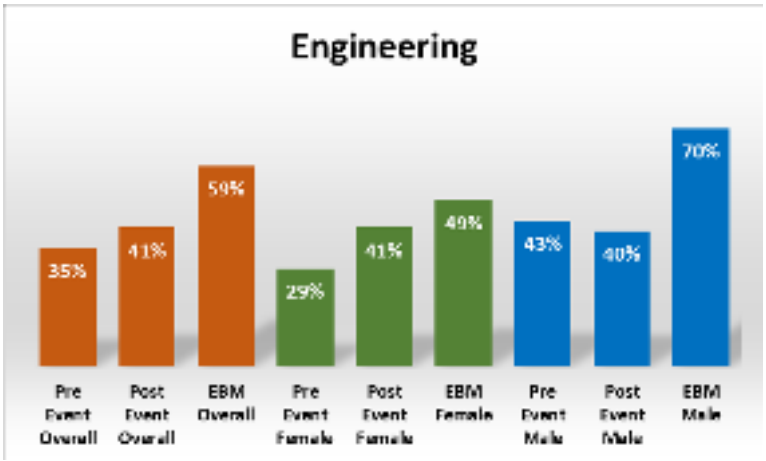
At Bring it On! 2019, we did some pre and post evaluation analysis with a cohort of Primary School students (age 7-11).

National data gathered via EngineeringUK's EBM is limited for this age group, but we can map desirability for careers in science and engineering against data recorded by their peer group nationally. Results as illustrated below.

Question 1 – How desirable do you believe a career in the following areas to be?

Engineering

Overall results from the pre event questionnaire, assessing desirability for a career in engineering fall below the results recorded in 2019 by the respondents' peer group nationally. This indicates lower levels of awareness, understanding or interest about careers in engineering among survey respondents.

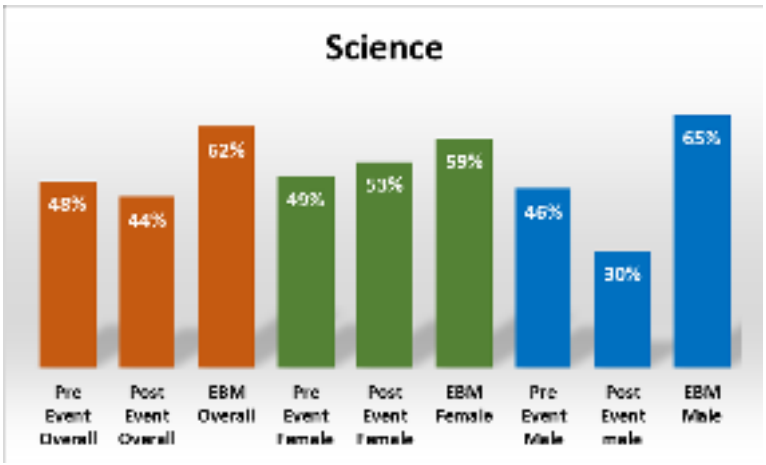


In comparison, overall post event results illustrate a **6 percentage point increase** in respondents' desirability for a career in engineering, although this increase still reflects negatively against that of their peer group nationally.

Looking at the results in more detail, and in line with the aforementioned gender differences in perceptions and understanding of engineering among young people, it is clear to see the girls' pre event desirability for a career in engineering falls way below that of their male classmates. However, post event results illustrate a **12 percentage point increase** in the girls' desirability for a career in engineering, an indicator that the event sparked interest, awareness and understanding about the breadth of careers, likely enhanced by the opportunity to meet some amazing female engineers. Yet, this post event increase still reflects negatively against results recorded by female peers across the UK.

The boys' post event results illustrate a **3 percentage point decrease** in their desirability for a career in engineering. This in itself is not necessarily a negative, in that they are making more informed decisions about their future. In fact, looking at other data gathered, pre and post results for the

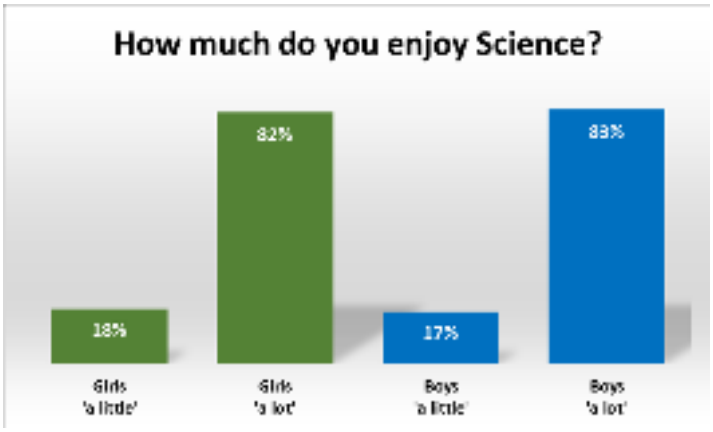
boys' desirability for a career in technology illustrated a **40% increase.** This may explain the slight drop in the engineering data recorded post event, having been exposed to a wider breadth of engineering than previously experienced.



Science

Overall results from the pre event questionnaire, assessing desirability for a career in science also fall below the results recorded in 2019 by the respondents' peer group nationally. Once again, this indicates lower levels of awareness, understanding or interest about careers in Science among survey respondents.

In comparison, overall post event results illustrate a **4 percentage point decrease** in respondents' desirability for a career in science, which reflects negatively against that of their peer group nationally.

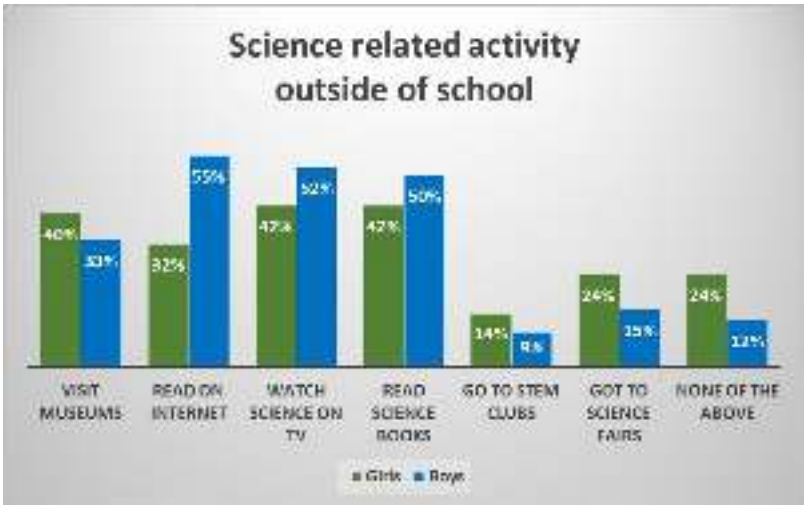


Pre event data gathered, as to the students' enjoyment of science is illustrated in the chart opposite. Results clearly highlight that both boys and girls enjoy the subject 'a lot'. The slight drop in desirability for careers in science, post event (**a 4 percentage point decrease for the girls and a 16 percentage point decrease for the boys**), is likely linked to broader post event knowledge they have about the types of careers there are in STEM, having been exposed to a huge variety of different engineering and technology companies at Bring it On! Meeting such inspiring role models has opened students' eyes to a multitude of new and exciting career possibilities.

Research shows that most students find science interesting but we are still facing a STEM skills gap. Science capital is a concept that can help us to understand why some young people participate in science post 16 and others do not. It is a measure of a person's engagement or relationship with science, how much they value it, whether they feel it is 'for them' and how connected it is to their life. It highlights the significance of what they know about science, how they think about it, what (science related activities) they do and who they know in shaping their attitudes and feelings about STEM.

Everyone's science capital is different and it can change across a lifetime. The more that you participate in positive science experiences, the more potential there is over time, to impact on and grow your science capital.

Our pre event evaluation results are reflective of the fact that most students find science interesting, with **82%** of our female respondents and **83%** of our male respondents indicating they enjoy science 'a lot'. There are 8 key dimensions to science capital, two of which, science media consumption and participation in out-of-school science learning concepts, we explored through our pre event evaluation. We wanted to find out how much science-related TV and science-related reading students did at home and how much they engaged with science-related internet content. Also, how much the students participated in informal science learning contexts such as visiting science museums, science clubs and science fairs outside of school.

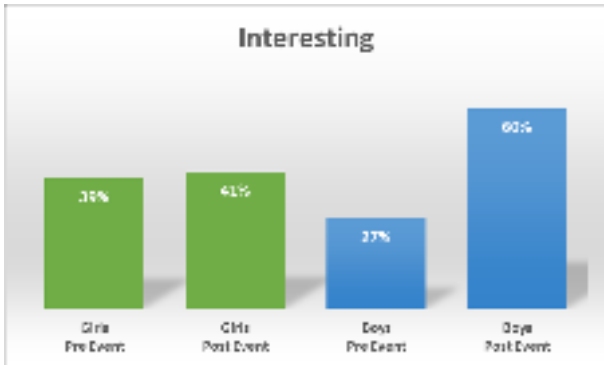


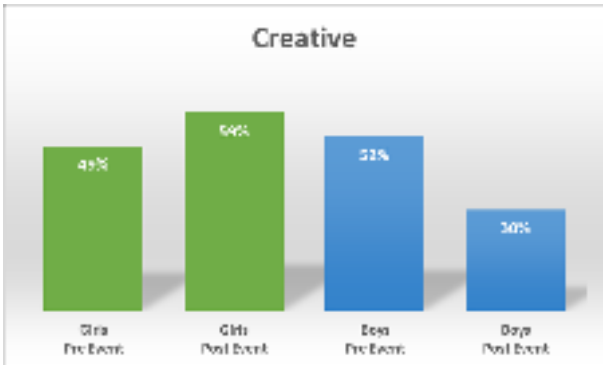
Results indicate higher levels of engagement with science inside the home environment - through reading of books and accessing science related content via the internet and TV - amongst the boys than girls.

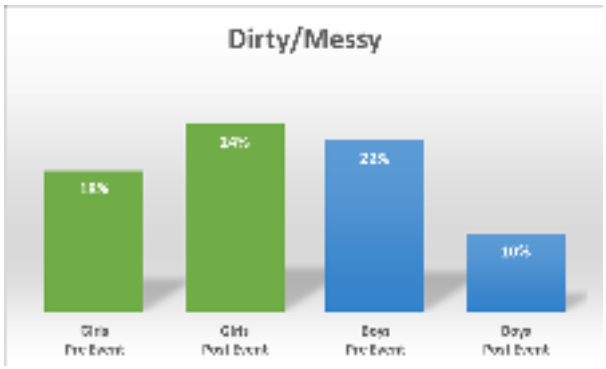
Results suggest the girls are more actively engaged than the boys with trips outside of the home environment, visiting museums and science fairs. However, overall levels of participation in science fairs, STEM clubs and visits to museums is low across the board. Enabling young people with low levels of science capital to participate in events like Bring it On! is essential to help develop their knowledge and understanding about the importance of science and innovation to modern society, helping to broaden opportunities and access to STEM-related jobs in the future.

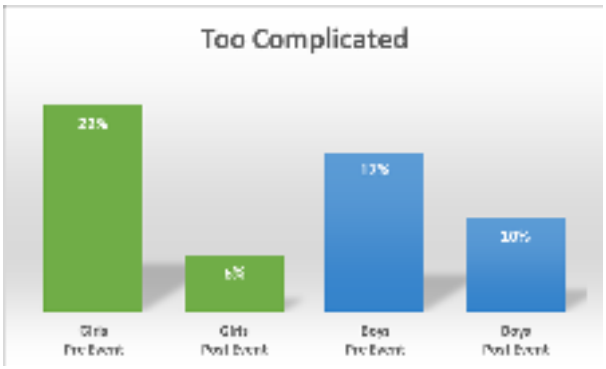
EngineeringUK's 2019 EBM data highlights clear gender differences among young people as to the reasons they view the engineering profession as undesirable, with girls more likely than boys to say that engineering was 'too technical/complicated, and 'dirty/greasy/messy/. Of those age 11-19 who reported a career in engineering to be undesirable, just over one fifth of girls felt it was because engineering was 'Too Technical' (**22%**) or 'Dirty/greasy/messy' (**23%**) compared with **16%** and **12%** of boys, respectively.

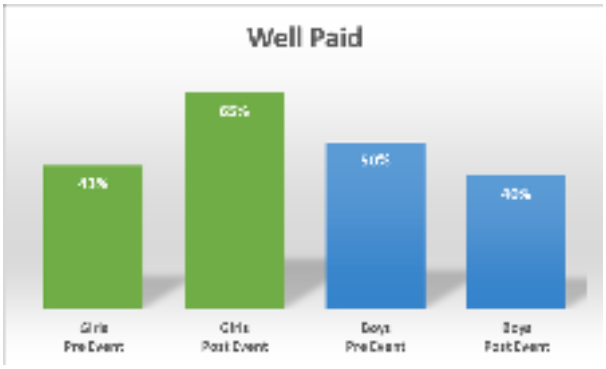
As part of the evaluation of the primary school respondents' experience of Bring it On!, we explored in more detail their pre and post perceptions of engineering careers by asking them to select from a group of words (Interesting, Creative, Dirty/Messy, Too Complicated, Well Paid) which they would use to describe a job in engineering. Results are illustrated in the charts below.









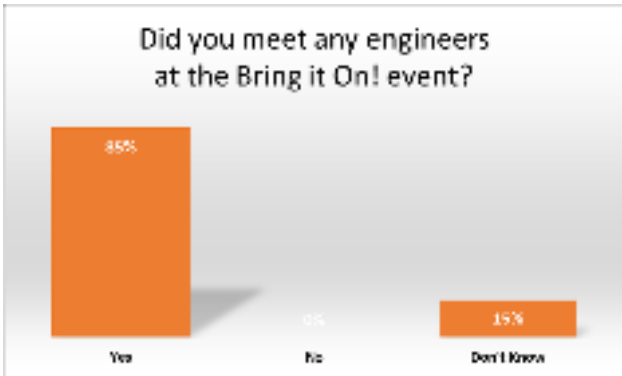


Overall results indicate a **41%** increase in the number of respondents who would use 'Interesting' to describe a job in engineering. However, it is evident the event impacted much more positively on the boys in relation to this than the girls.

We see a **20%** increase in the number of girls who would use the word 'Creative' to describe a job in engineering but a substantial decrease (**42%**) in the number of boys who would use it. Post event, a slightly higher number of girls would use the words 'Dirty/Messy' to describe a job in engineering but we see a large decrease (**54%**) in the number of boys who'd describe engineering in that way. It is pleasing to see a **72%** decrease in the number of girls and a **41%** decrease in the number of boys who'd describe a job in engineering as 'Too complicated'. Results indicate a **51%** increase in the number of girls who'd use 'Well Paid' to describe a job in engineering, although a **20%** decrease in the number of boys who'd describe it that way.

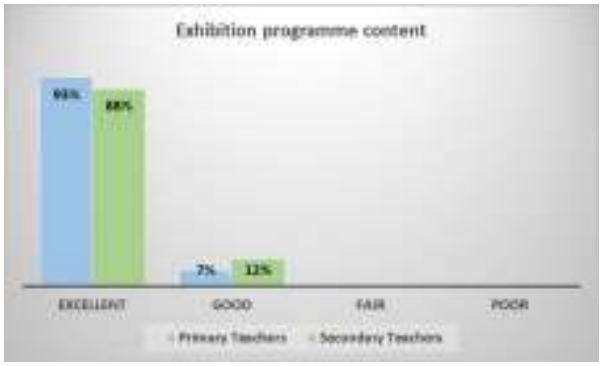
It is worth noting here that students self-select activities to engage with at Bring it On!, which shapes their experience of engineering and what it means to them. Increases/decreases are not necessarily a negative, in that students are making more informed responses post event, reflective of who the students spoke to and what questions they asked engineers about their jobs.

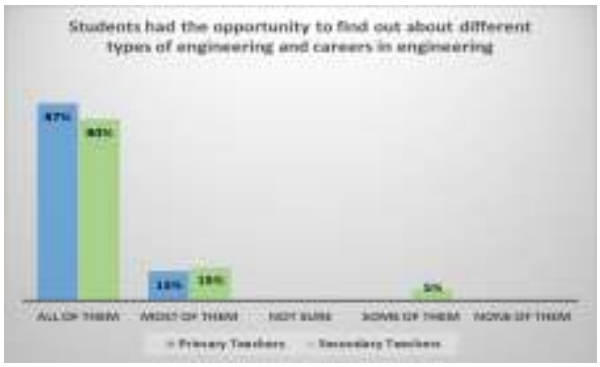
Bring it On! affords young people the opportunity to meet with engineers face to face and **85%** of our 7-11 year old respondents recognised that they had met engineers.

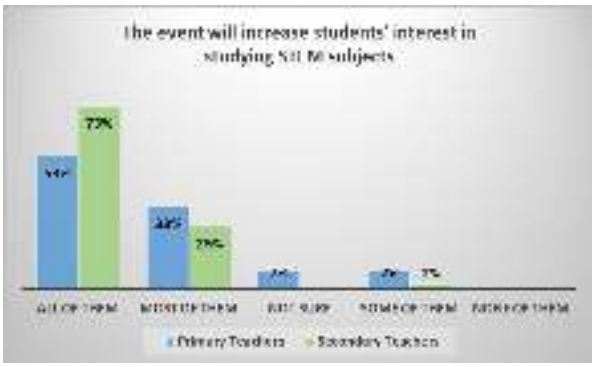


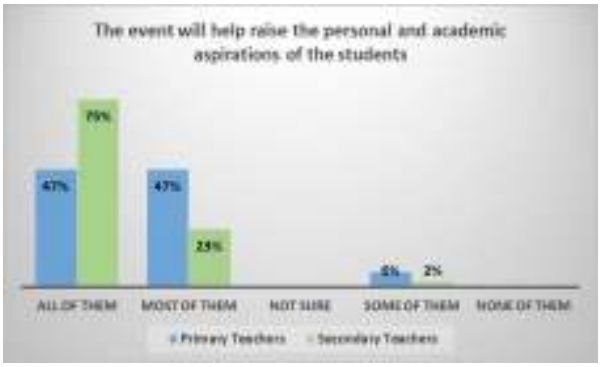
Part 3 – Teacher evaluations

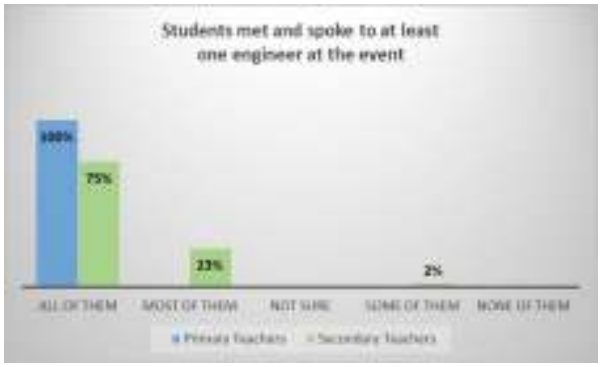
Teacher feedback forms were handed out to staff on arrival at the event, to be completed before returning to school. Feedback from both the primary and secondary school teachers is illustrated in the charts below:











100% of primary and **100%** of secondary teachers said that the event was beneficial to them, as well as their students. Comments included:

'Picked up ideas to use in the classroom and made contacts to develop school STEM work' - Primary

'I now have the contact details of some companies to come into school to do workshops' – Primary

'Good to make links with companies and individuals who can come into school to inspire more children' – Primary

'It allowed me to make links between what is taught in the classroom and how this then feeds into the real-world' – Primary

'I teach computing and some of the stands were relevant to my curriculum' - Secondary

'Great to see students enjoying the day. It opened my eyes to the opportunities available to our students!' – Secondary

'It has given me a better understanding of opportunities for our pupils in the wider world' – Secondary

*'*Perfect for GCSE content' – Secondary

100% of primary school teachers and **100%** of secondary school teachers rated the event, overall, as good or excellent. **100%** of all the teachers agreed that the event was a valuable experience for most/all of their students. **100%** of primary school teachers and **95%** of secondary school teachers agreed that the event provided most/all of their students with the opportunity to find out about different types of engineering and about careers in engineering.

Teachers provided some additional comments including:

'There were a wide range of stands and fields of engineering' – Secondary

'A varied programme which gave something for everyone' – Secondary

'Amazing day and fantastic opportunity for the students' – Secondary

'Fantastic day! Plenty of opportunity for students to be inspired and talk to industry' – Secondary

'It was great to talk to a range of industries which are happy to help with students projects and inspire young minds. Would certainly come back with a bigger group. Would be great to promote to 6th form as well' – Secondary

'Raised the profile of STEM for our children. Offered awe and wonder' – Primary

'Raised girls' aspirations' – Primary

'Children were all **100%** engaged' – Primary

'The event was a fantastic opportunity for our students. All students gave great feedback' – Primary

'Lots of new experiences for the children covering a wide range of areas' - Primary

Parents and teachers are well positioned to influence the educational and career aspirations of their children. **61%** of young people aged 11-19 surveyed as part of EngineeringUK's EBM (2019) stated they would consider going to parents/guardians for career advice and **56%** said they would go to teachers. Yet results from the EBM (2019) indicate that knowledge of engineering is limited for many parents and teachers. While **69%** of parents stated they had quite a positive view of engineering, and **86%** would recommend a career in engineering, only **32%** feel confident about giving advice to their children about a career in engineering. Similarly, **90%** of teachers said they have a positive view of engineering and **96%** would recommend a career in engineering, but only **45%** feel confident in giving engineering careers advice.

There is much work we can do as a community to enhance perceptions of the engineering profession among young people, parents and teachers. The Bring it On!/Big Bang North East event enabled young people and teachers to build their knowledge and understanding of what a career in engineering actually entails by providing the opportunity to meet a wide variety of different types of engineers and experience engagement with companies from a breadth of different engineering sectors.

100% of primary school and **98%** of secondary school teachers who completed the evaluation questionnaire indicated that most/all of their students met and spoke to at least one engineer.

86% of primary and **98%** of secondary teachers indicated that the event will increase most/all of their students' interest in studying STEM subjects. Teachers were also positive about the impact of the event in helping to raise the personal and academic aspirations of most/all of their students, with **94%** of primary and **98%** of secondary teachers agreeing it would do so.

Teachers provided some additional comments in response to the questions illustrated in the charts above. Comments included:

'A very positive side of the students was revealed, not just predictably enthusiastic ones but some of the less conventional more disruptive students showed they can excel in the STEM fields' – Secondary

'Really enjoyed the free flow as this suited our students much better. We made some excellent links for opportunities for our young people' – Secondary

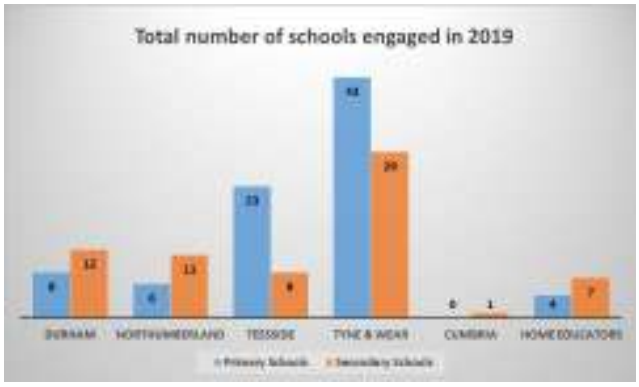
'Having both the Big Bang Fair and Bring it On! events together, makes a great day out!' – Secondary

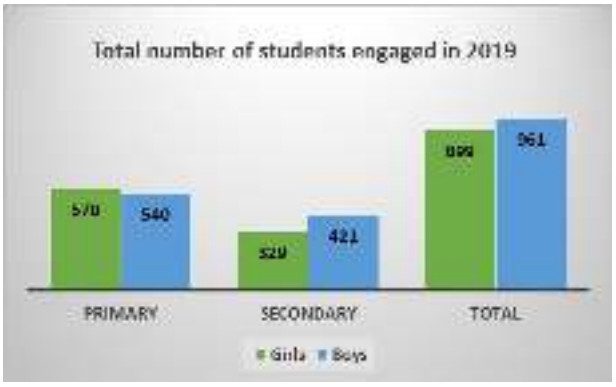
'My children thoroughly enjoyed the event. Lots of the children in my school would never have the opportunity to attend such an event if it were not attended by my school. It gives me great pleasure to witness the 'WOW' moments when a child experiences new things and are successful in achieving things they perceive as unachievable to them. This event is invaluable' - Primary

'It gave opportunities to children that we cannot provide in school' - Primary

Part 4 - Regional Impact

The charts below indicate the regional spread of schools that participated in the Bring it On!/Big Bang North East event in 2019, primary/secondary breakdown of schools, total number of students that attended over 2 days, and the gender split.





Once again, schools from across the region visited the Bring it On! event. One teacher, from outside of the region travelled from Cumbria with a group of students to attend the event. She commented:

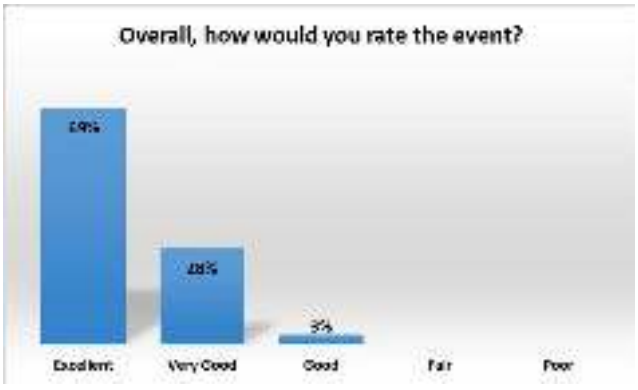
'Fantastic! All of us are buzzing. Please can we come back next year?'

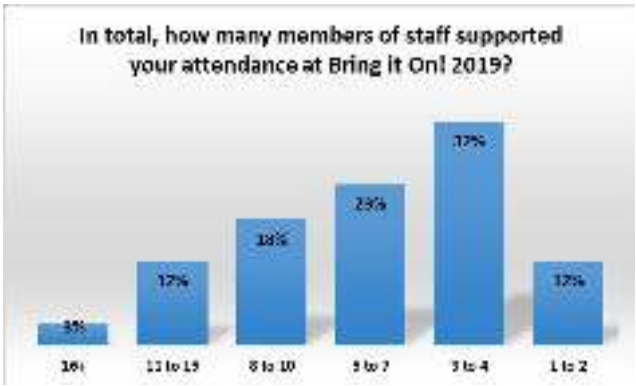
Teachers are encouraged to bring equal numbers of boys and girls to Bring it On! Overall, **51%** of primary and **44%** of secondary school students that attended the event were girls.

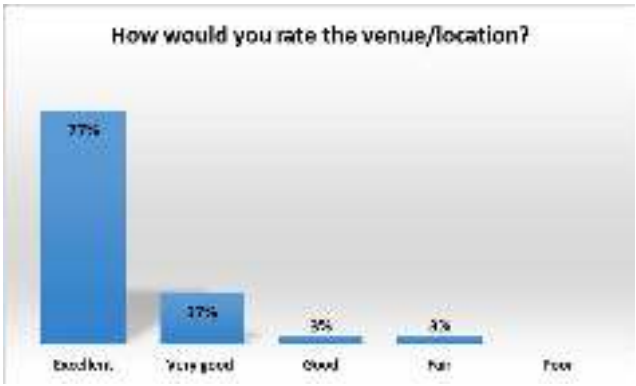
Part 5 - Employer Feedback

Engineering Employers from across the region supported the Bring it On!/Big Bang North East event. They provided feedback post event via an online survey.

Results as below:







100% of our survey respondents said that they would like to come back again in 2020. We asked the businesses to comment on what they like about the Bring it On Event, feedback included:

'It is a real life experience of engineering for young people'

'Very well organised and the school children who attended were very interested in engaging with exhibitors'

'The set up and lighting was impressive. All volunteers were fantastic and it was great to be surrounded by likeminded exhibitors'

'The range of different engineering and disciplines being exhibited in the exhibition. It was eye opening even as an engineer to see how much was out there under the umbrella of engineering'

'There was a wide range of stalls covering all areas of STEM and a good mix of STEM companies, societies and educational groups. There was a large number of children on both days helping create a busy and excited atmosphere'

'The level of organisation before and during, friendly, helpful staff. Great engagement for schools across the North East'

'It was just amazing in so many ways, great to engage with so many young people in such a short time period'

'Direct engagement with so many children, it's very easy to inspire a young person with face to face contact, enabling them to ask lots of questions and see how passionate we are about engineering. It really opens the minds of the young people when they see careers they never knew were accessible to them and gives them the chance to consider a career in an industry they had no idea about'

'Variation and multiple high level technology vendors in one space to show employment diversity for tech'

'This was our first year exhibiting and the company I work for are already talking about how we can make our stand and our activities bigger and better for next year. This is high praise indeed!'

Exhibitors also provided us with useful feedback about refreshments and parking at the venue, which we can use to help shape the 2020 event.

The North East Community of Professional Engineers
Once again this year, local volunteers of the professional Engineering Institutions came together in support of the event.

Representatives from the Institution of Mechanical Engineers, Institution of Civil Engineers, Institution of Engineering and Technology, Institution of Chemical Engineers, Institute of Measurement and Control, Chartered Institute of Building Services Engineers, Royal Academy of Engineering and the Welding Institute, provided interactive engaging activities throughout all the zoned areas, bringing an added dimension to the engagement with engineering employers.

Tomorrow's Engineers
All students who attended the Bring it On! received a backpack full of Tomorrow's Engineers careers information in anticipation that they would share their experience of the event with family members, and use the careers resources to expand their knowledge about different routes they can take into engineering careers and the breadth of opportunities available to them.

The Big Bang
UK Young Scientists & Engineers
Competition

Young Scientists and Engineers from across the region visited the Beacon of Light on the 10th October to exhibit and present their science and engineering projects to a panel of judges, at the North East regional finals of the national competition. All winners go on to the national finals at the Big Bang fair held in Birmingham in March 2020.

The Big Bang North East STEM Zone also provided young people and teachers with an opportunity to engage with a broad range of organisations operating in the STEM community.

Bring it On

In partnership with

The Big Bang Near Me

International VIP Guests visit Bring it On!

ALDRIN FAMILY FOUNDATION

Bring it On! 2019 welcomed VIPs– Dr Andrew Aldrin, President of the Aldrin Family Foundation and Jim Christensen, Executive Director of ShareSpace Education – on the second day of the two-day engineering event.

Dr Aldrin heads up the Aldrin Family Foundation, an organisation driven to create the next generation of space leaders, entrepreneurs and explorers …visionaries who will eventually take humankind beyond the confines of the Earth and the Moon to farther destinations, including Mars.

Dr Aldrin spent time talking to the students about space engineering and gave some insight into what it was like when he was an 11 year old watching his father Buzz Aldrin step onto the moon.

The inspiring talk and presentation sparked some great questions from students in the audience.

Another successful Event

The Bring it On!/Big Bang North East event was the culmination of a successful collaboration between a number of different organisations from across the region working together to inspire young people about north east engineering.

Using EngineeringUK's EBM Common Evaluation Questionnaire, has enabled measurement of the impact the exhibition had on participating students against a nationally representative survey of perceptions of engineers, engineering and STEM, and, best practices from other STEM focused engagement activities. In addition to this, undertaking the pre and post questionnaires enabled a direct comparison of results to evidence actual impact the exhibitors had on positively influencing students' knowledge and perceptions of engineering through participation in the event.

The results, as documented above in this report, highlight the real benefit of enabling students to meet face to face with all types of engineers, alongside the opportunity to see and experience, first-hand, examples of what we engineer and manufacture in the north east, shining a light on the breadth of engineering in this region and the associated career opportunities.

The Bring it On!/Big Bang North East event is one that would not take place without the backing of all the amazing organisations who work with us to make it happen.

To our 2019 funders Reece Foundation, Make it Sunderland, Institution of Mechanical Engineers, Cleveland Scientific Institution, Community Foundation, Rotary Club of Sunderland and Rotary Clubs across the North East, Lear Corporation, Costain, Emerson, Simpson Group, Institution of Civil Engineers, Institution of Measurement and Control, Royal Society of Chemistry and Paula McMahon, your financial and in-kind support enabled us to put on the event, promoting the world of North East engineering to just under 1900, 9-14 year olds from all corners of the region.

Thank you to all the businesses who brought the two day event to life with some amazing people and interactive activities. Your in-kind/financial commitment to hosting a stand has helped to inspire and raise the aspirations of all attendees. You have opened the eyes of young people to the many fantastic engineering careers available to them in this region and helped to educate and inform their teachers about the incredible world of engineers and engineering. Your support is greatly appreciated.

Thank you to all the volunteers who gave up their time to help facilitate delivery of the event. Your support was invaluable in helping to keep things moving across the 2 day programme.

You are all truly inspiring people, as reflected in the great feedback we received from students and teachers about the impact you have had on their knowledge and perceptions about engineering.

We look forward to working with you all again in 2020.