



Environmental Sustainability and Engineering

Findings from the Engineering
Brand Monitor 2020/21

September 2022

Introduction

In recent years there has been increased focus on and importance given to climate change and environmental sustainability, with high profile events and targets such as the 26th UN Climate Change Conference of the Parties (COP26)¹ and the challenge set to bring global energy-related carbon dioxide emissions to net zero by 2050². This, alongside the effects of the Covid-19 pandemic, which has shown rising awareness and social consciousness regarding the importance of environmental sustainability amongst young people³, suggest that linking positive action on the environment to engineering may increase their interest in careers in engineering in the future.

EngineeringUK's Engineering Brand Monitor (EBM) is an annual survey designed to find out knowledge, perceptions and understanding of STEM and engineering. In 2021 The EBM surveyed 2,840 young people and their parents, and a further 528 STEM secondary school teachers. Respondents were asked about their views on environmental sustainability and links with engineering through the following question:

How much do you agree or disagree with the following statement?

- *Engineers are important for improving the environment (young people)*
- *Engineers are important for improving environmental sustainability (adults)*

In addition, young people were also asked:

Which of the following factors do you think would be important to you when deciding upon a career? With one response option being: Improving environmental sustainability

Through looking at these questions alongside the other questions asked in the survey, we were able to explore responses by gender, ethnicity, age, eligibility for free school meals, disability, household income and parental education, and identify if there were the same differences observed between groups as is commonly seen in responses related to knowledge of, and interest in, careers in science and engineering.

We then explored opinions on the link between environmental sustainability and engineering, and how this correlates with interest in engineering as a future career for young people, as this may be a way to engage more young people with engineering going forward.

Finally, we investigated the views of the adults who have most influence over young people; teachers and parents. We were able to look at the link between responses provided by young people and their parents in order to investigate potential influence parents have on their children regarding the environment and the role engineers have to play in environmental sustainability. Furthermore, we looked at the opinions of teachers and whether they differed by the characteristics of the teacher, such as gender, ethnicity and number of years teaching, and the characteristics of the school in which they teach, such as level of free school meal eligibility and size of school with the aim of identifying where there may be gaps in knowledge and whether improvements could be made.

¹ [UN Climate Change Conference UK 2021](#) [online] accessed 13/09/2022.

² IEA - '[Net Zero by 2050: A Roadmap for the Global Energy Sector](#)' [online] accessed 13/09/2022.

³ Engineering UK - '[Young people and Covid-19](#)' [online] accessed 13/09/2022.

Key findings

- Overall, **70%** of young people agreed that **‘engineers are important for improving the environment’** and a further **26%** were unsure.
- **17%** of young people selected **‘improving environmental sustainability’** as an important factor in their future career choice; **6%** included this in their top 3 factors. This is a low proportion of young people compared to over **40%** for the most popular options of **‘something I am interested in’** and **‘pay’**.
- There appeared to be a **relationship with opinion and socioeconomic background**, with respondents more likely to agree to the statements the greater their household income or parental education.
- There is a **strong link between views on the role of engineers related to the environment and interest in engineering as a career**. Pupils who agreed that **‘engineers are important for improving the environment’** were almost **7 times** more likely to be interested in a career that involves engineering than those who did not agree.
- Those who selected **‘improving environmental sustainability’** as an important career factor were **3 times** more likely to be interested in a career that involves engineering than those who did not, suggesting that **education on environmental sustainability could increase interest in future engineering careers**.
- Interest in a career involving engineering was highly correlated with an interest in improving environmental sustainability and understanding of engineers being important for improving the environment; **91%** of young people who agreed with both were interested in an engineering career, compared with **39%** of those who disagreed with both.
- Overall, **82%** of parents agreed that **‘engineers are important for improving environmental sustainability’**, however levels of agreement varied by a number of socio-economic factors such as household income.
- Parental opinion had strong influence, with **77%** of young people whose parents agreed that **‘engineers are important for improving environmental sustainability’** also agreeing, compared with **49%** of young people whose parents did not agree.
- **95%** of teachers agreed that **‘engineers are important for improving environmental sustainability’** and there was little variation between groups, though higher agreement among those who had been teaching for more than **10 years**.

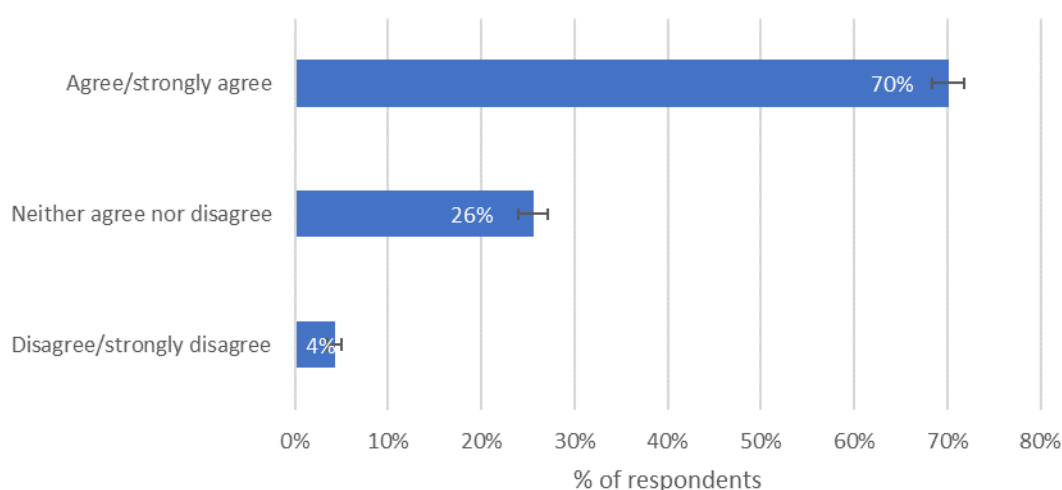
Young people, engineering and environmental sustainability

Engineers are important for improving the environment

Overall, 70% of young people agreed that **'engineers are important for improving the environment'**, with just 4% disagreeing with the statement and the remaining 26% neither agreeing nor disagreeing (Figure 1). This is encouraging as those who were unsure could be more easily persuaded to agree with some further education on the links between engineering and environmental sustainability.

Figure 1: Knowledge of the link between engineers and the environment among young people aged 11-19 years, 2021, UK

How much do you agree or disagree with the statement 'Engineers are important for improving the environment' (n=2,840)



Source- EngineeringUK Engineering Brand Monitor, 2021 - parent and young people

Q - How much do you agree or disagree with the following statements? 'Engineers are important for improving the environment'. Responses were provided on a five-point scale 1-Strongly Disagree/ 2-Disagree/ 3-Neither agree nor disagree/ 4-Agree/ 5-Strongly Agree

There was no statistically significant difference⁴ seen between responses by gender, with similar proportions of males and females responding positively to the association between engineering and improving the environment, denoted by overlapping error bars in figure 2, where confidence intervals⁵ - that is, the range of values that are believed to contain, with 95% probability, the true value - relating to this question can be used to determine where there are differences in levels of agreement between groups. We also observed similar levels of agreement across all ethnic groups, however older pupils were more likely to agree with the statement than younger pupils; 73% for those in Key Stage 5 (age 16-19 years) compared with 68% in Key Stage 3 (11-14 years), which highlights the need to embed key messages at an earlier age. Young people with a disability were less likely to agree (65% vs 72% of those with no disability).

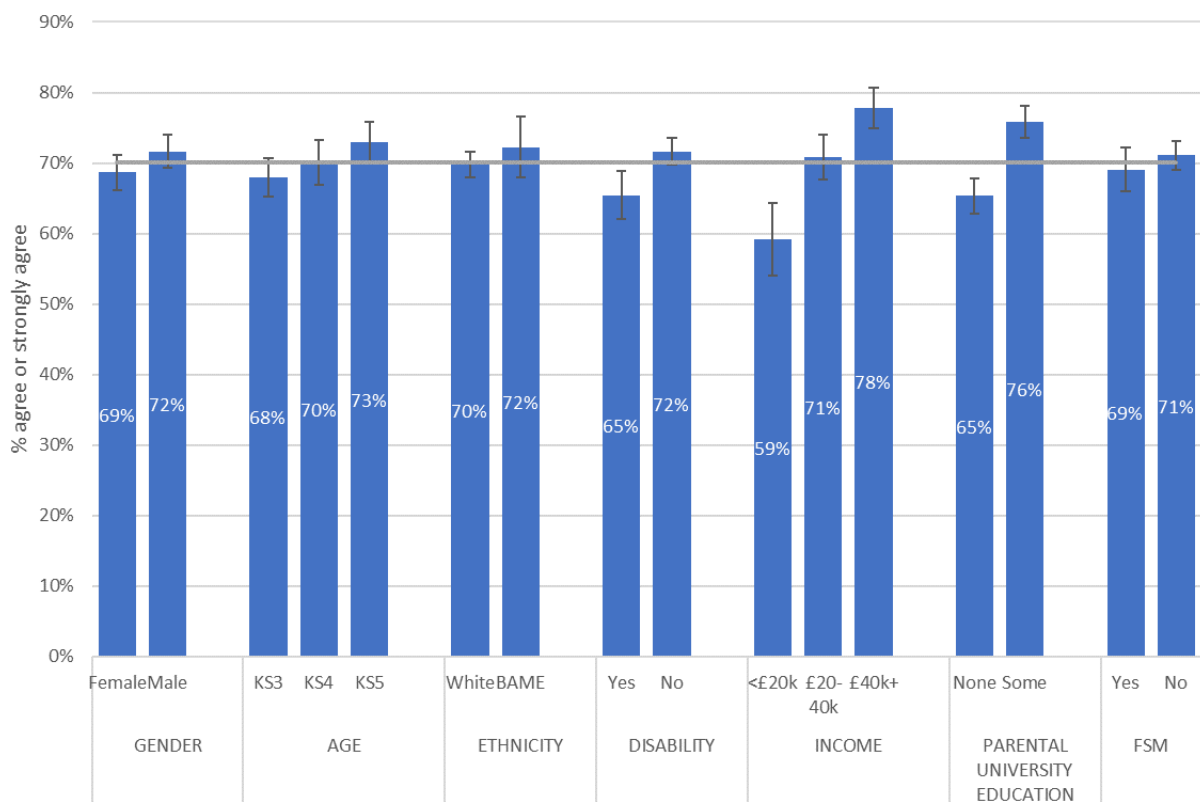
⁴ By statistically significant difference, we mean that any differences observed between groups in the survey is likely to be a true difference in responses observed within the actual population, and not due to sampling error. Throughout this report, we refer to statistical significance at the 95% level. This means that we can say - with 95% certainty - that the observed differences are due to differences in opinions, knowledge, or perceptions between the different groups within the overall population.

⁵ In this report, the confidence intervals are taken at the 95% certainty level. That is, we would be certain that the true value for the population lies within our range of values with 95% confidence.

There appeared to be a relationship between opinion and socio-economic background. There were lower levels of agreement that engineers are important for improving the environment among young people whose households had an income less than £20k, where 59% agreed, compared with 78% in households with an income over £40k. Agreement was also lower among young people whose parents had no university education at 65% compared with 76% where parents had some university education, which suggests that those from more socially-disadvantaged groups are less likely to associate engineers with improving the environment. However, there was no significant difference by eligibility for free school meals.

Figure 2: Knowledge of the link between engineers and the environment among young people aged 11-19 years, by personal characteristics, 2021, UK

How much do you agree or disagree with the statement 'Engineers are important for improving the environment' (n=2,840)



Source- EngineeringUK Engineering Brand Monitor, 2021 - parent and young people

Q - How much do you agree or disagree with the following statements? 'Engineers are important for improving the environment'. Responses were provided on a five-point scale 1-Strongly Disagree/ 2-Disagree/ 3-Neither agree nor disagree/ 4-Agree/ 5-Strongly Agree

Notes:

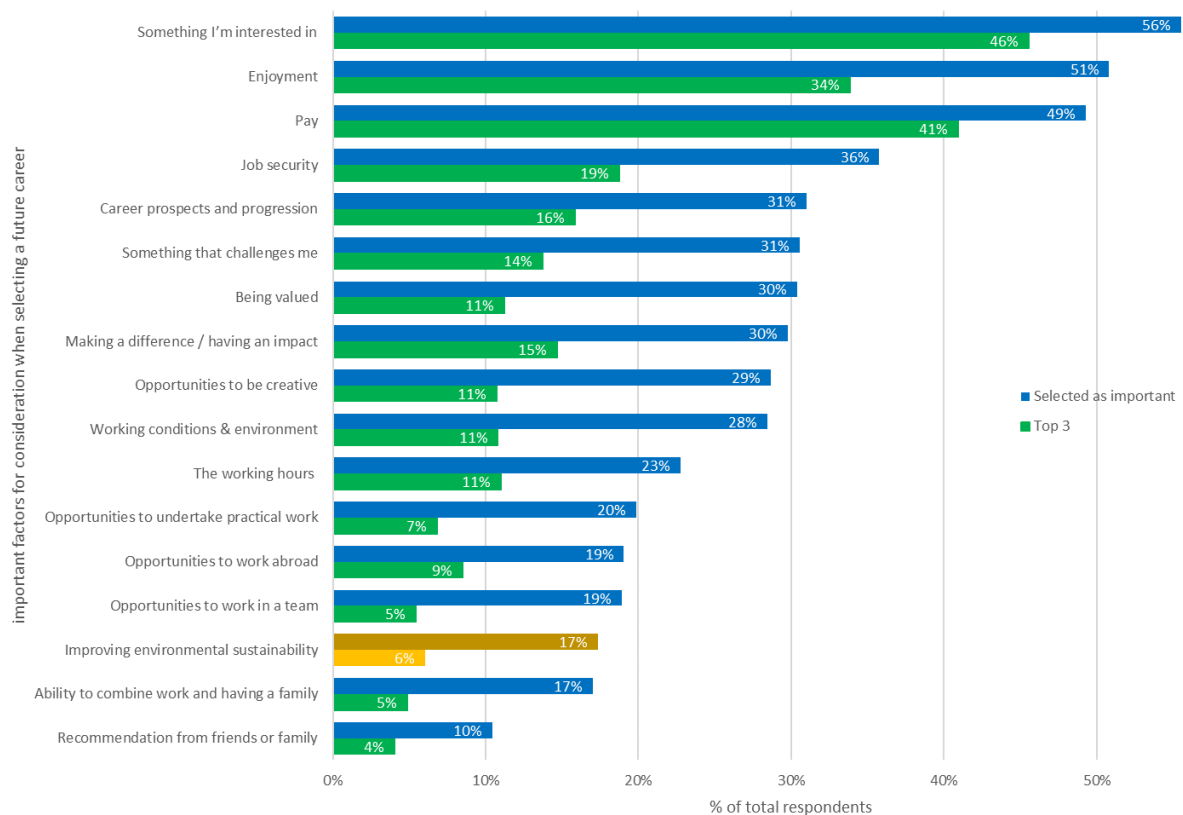
1. Due to small numbers, some groupings were combined to allow for analysis. Ethnic groups were combined into two groups (White vs Black and minority ethnic (BAME)) and 'parental university education' was derived from highest level of education (undergraduate and postgraduate degree combined vs other).
2. The grey line on the chart represents that 70% of the total sample of young people agreed or strongly agreed
3. Error bars represent the 95% confidence intervals. Where confidence intervals are overlapping there is no significant difference between groups. Distinct confidence intervals represent a significant difference between groups.

Improving environmental sustainability as an important factor in career choice

When asked what factors were important to them when deciding on a future career, 17% of respondents selected ‘improving environmental sustainability’ as an option, and just 6% included this in their top three important factors which is relatively low compared to other options.

Figure 3 shows the results for each of the options selected as an important factor in young people’s career choice (blue bars) and the proportion who selected them in their top three important factors (green bars). The most popular choices were ‘something I am interested in’, ‘enjoyment’ and ‘pay’ with around half of young people selecting them as an important factor in career choice and more than a third selecting them in their top three. ‘Improving environmental sustainability’ (orange and yellow bars) was the 15th most popular choice out of the 17 options as an important factor and 14th most popular choice when young people selected the three most important factors.

Figure 3: Important factors when deciding upon a career among young people aged 11-19 years, 2020/21, UK



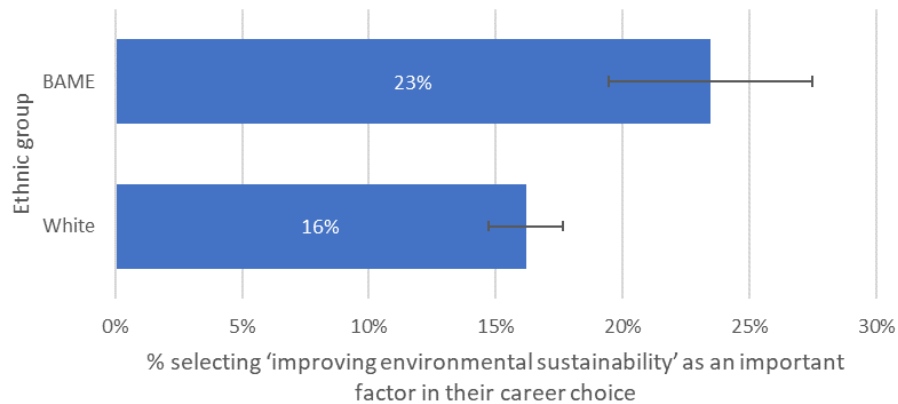
Source- EngineeringUK Engineering Brand Monitor, 2020 - parent and young people

Q - Which of the following factors do you think would be important to you when deciding upon a career? Please select all that apply.

Q - Please click to rank the top three factors you feel would be most important when deciding upon a career, from 1 [most important] to 3. Percentages shown include all respondents selecting the option in any order of their top 3 choices.

There was no variation between groups when considering the selection of ‘improving environmental sustainability’ as an important factor by gender, age or region. However, there were notable differences by ethnicity (Figure 4) with 16% of young White pupils indicating ‘improving environmental sustainability’ was an important factor in their career choice compared with 23% of Black and Minority ethnic minority pupils (BAME).

Figure 4: Young people aged 11-19 years selecting ‘improving environmental sustainability’ as an important factor when deciding upon a career, by ethnicity, 2021, UK



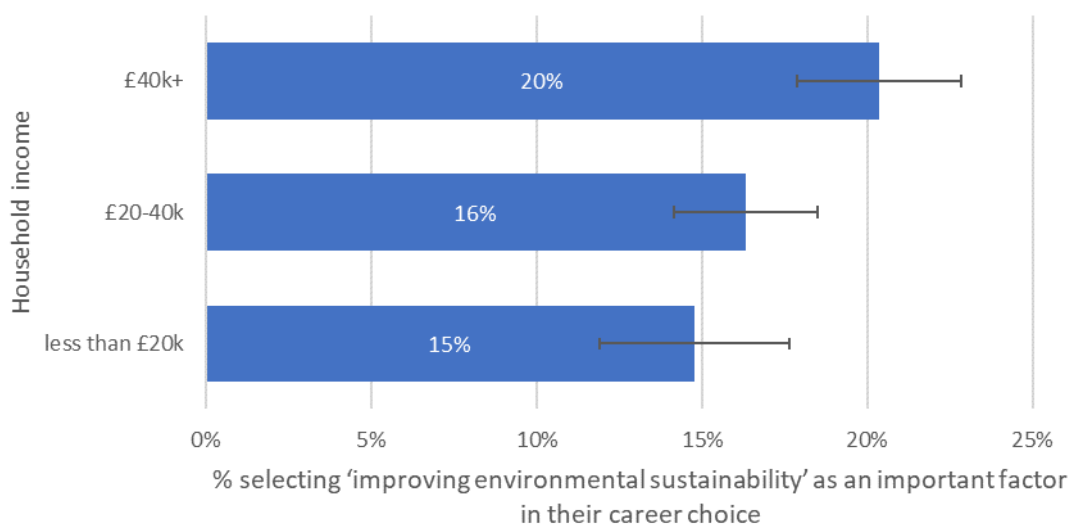
Source- EngineeringUK Engineering Brand Monitor, 2020 - parent and young people

Q - Which of the following factors do you think would be important to you when deciding upon a career?
Improving environmental sustainability

Note. Due to small numbers, some groupings were combined to allow for analysis. Ethnic groups were combined into two groups (White vs Black and minority ethnic (BAME))

Again, we found indicators of socioeconomic background had some effect on the importance given to environmental sustainability in the future. By household income, 15% of young people living in a household with income under £20k selected that improving environmental sustainability is an important factor in their future career choice compared with 20% of young people living in a household with income over £40k (Figure 5). Similarly, young people whose parents have some university education had a higher proportion selecting this as an option at 19% compared with 16% of those whose parents had no university education.

Figure 5: Young people aged 11-19 years selecting ‘improving environmental sustainability’ as an important factor when deciding upon a career, by household income, 2021, UK



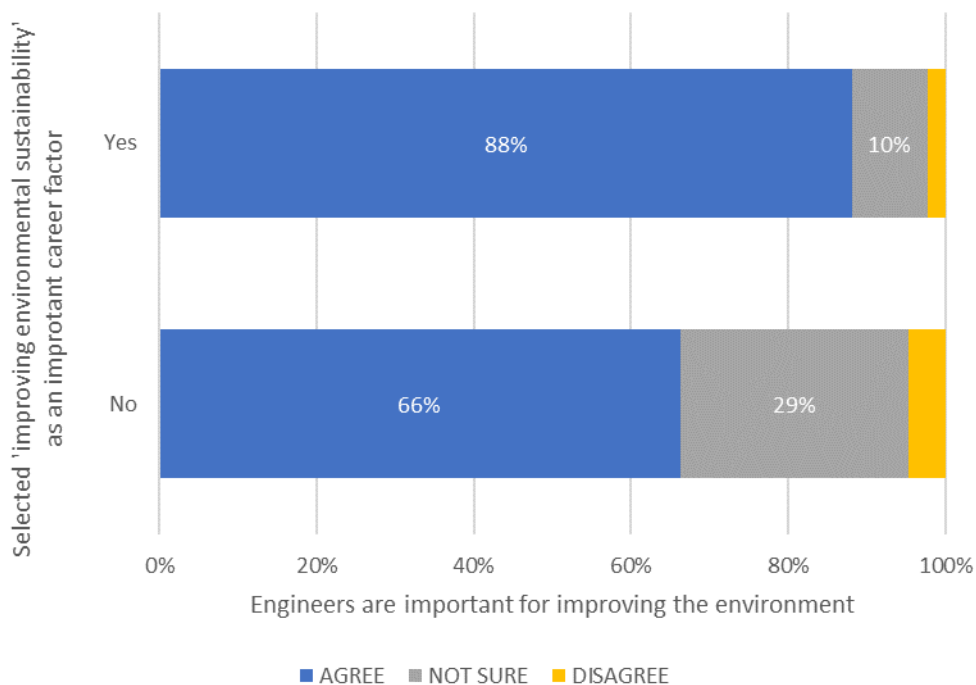
Source- EngineeringUK Engineering Brand Monitor, 2020 - parent and young people

Q - Which of the following factors do you think would be important to you when deciding upon a career?
Improving environmental sustainability

There was a clear association between the responses of young people to the two questions. 88% of young people who selected that ‘improving environmental sustainability’ was an important factor when deciding on a future career had also agreed that ‘engineers are important for improving the environment’. This compares to 66% of those who did not select it as an important factor (Figure 6), which suggests that young people who wanted to improve the environment were aware of the importance of the role of engineers in doing so.

It is also important to note that 29% of young people who did not select it as an important factor were not sure about whether engineers are important for improving the environment, with just a small proportion in both groups disagreeing with the statement. This outlines the importance of education on improving environmental sustainability and how this could also improve understanding of engineers’ role among young people.

Figure 6: Association between selecting ‘improving environmental sustainability’ as an important factor when deciding upon a career and believing ‘engineers are important for improving the environment’, among young people aged 11-19 years, by household income, 2020/21, UK



Source- EngineeringUK Engineering Brand Monitor, 2020 - parent and young people

Q - Which of the following factors do you think would be important to you when deciding upon a career?
Improving environmental sustainability

Q - How much do you agree or disagree with the following statements? ‘Engineers are important for improving the environment’. Responses were provided on a five-point scale 1-Strongly Disagree/ 2-Disagree/ 3-Neither agree nor disagree/ 4-Agree/ 5-Strongly Agree

Interest in an engineering career and environmental sustainability

There was a clear association between interest in a career that involves engineering and agreeing that engineers are important for improving the environment. In fact, pupils who agreed that ‘engineers are important for improving the environment’ were almost 7 times more likely to be interested in a career that involves engineering⁶ than their counterparts, and those who selected ‘improving environmental sustainability’ as an important career factor were 3 times more likely to be interested in a career that involves engineering⁷ than pupils who did not consider it an important factor.

Considering responses to the two questions together (Table 1), 91% of young people who selected that ‘improving environmental sustainability’ is an important career factor and agreed that ‘engineers are important for improving the environment’ were also interested in a career that involves engineering (n=370; 18% of respondents), and even 78% of young people who agreed ‘engineers are important’ but did not select ‘improving environmental sustainability’ as an important career factor were interested in a career that involves engineering (n=1,183; 55% of respondents). This compares to just 39% of those who did not agree with the statement and did not select environmental sustainability as an important factor (n=467; 23% of respondents) and 66% of those who did not agree ‘engineers are important for improving environmental sustainability’ but did select that as an important career factor (n=40; 2% of respondents).

Table 1: Improving environmental sustainability and interest in a career that involves engineering among young people aged 11-19 years, 2021, UK

Agree that 'Engineers are important for improving the environment'	Improving environmental sustainability is an important career factor	Interested in a career that involves engineering (%)	Likely or very likely to choose a career in engineering (%)	Selected 'engineer' in the top 3 jobs they would most like to do (%)
YES	YES	91%	77%	48%
YES	NO	78%	62%	32%
NO	YES	66%	51%	24%
NO	NO	39%	34%	13%

Source- EngineeringUK Engineering Brand Monitor, 2020 - parent and young people

Q - How much do you agree or disagree with the following statements? ‘Engineers are important for improving the environment’. Responses were provided on a five-point scale 1-Strongly Disagree/ 2-Disagree/ 3-Neither agree nor disagree/ 4-Agree/ 5-Strongly Agree

Q - Which of the following factors do you think would be important to you when deciding upon a career?

Improving environmental sustainability

Q - How interested are you in a future career that involves any of the following? Engineering

Furthermore, 77% of young people who agreed that ‘engineers are important for improving the environment’ and selected that ‘improving environmental sustainability’ as an important factor, were likely or very likely to choose a career in engineering. This group also saw the highest percentage selecting ‘engineering’ in their top 3 jobs they would most like to do when they finish full-time education at 48%. Comparing this to the group of young people who did not agree that ‘engineers are important for improving the environment’ and did not select ‘environmental sustainability’ as an important career factor, just 34% said they were likely to choose a career in engineering and 13% selected engineering in the top 3 jobs they would most like to do.

⁶ (odds ratio 6.8, 95% confidence intervals 4.3-10.8)

⁷ (odds ratio 3.1, 95% confidence intervals 2.5-3.8)

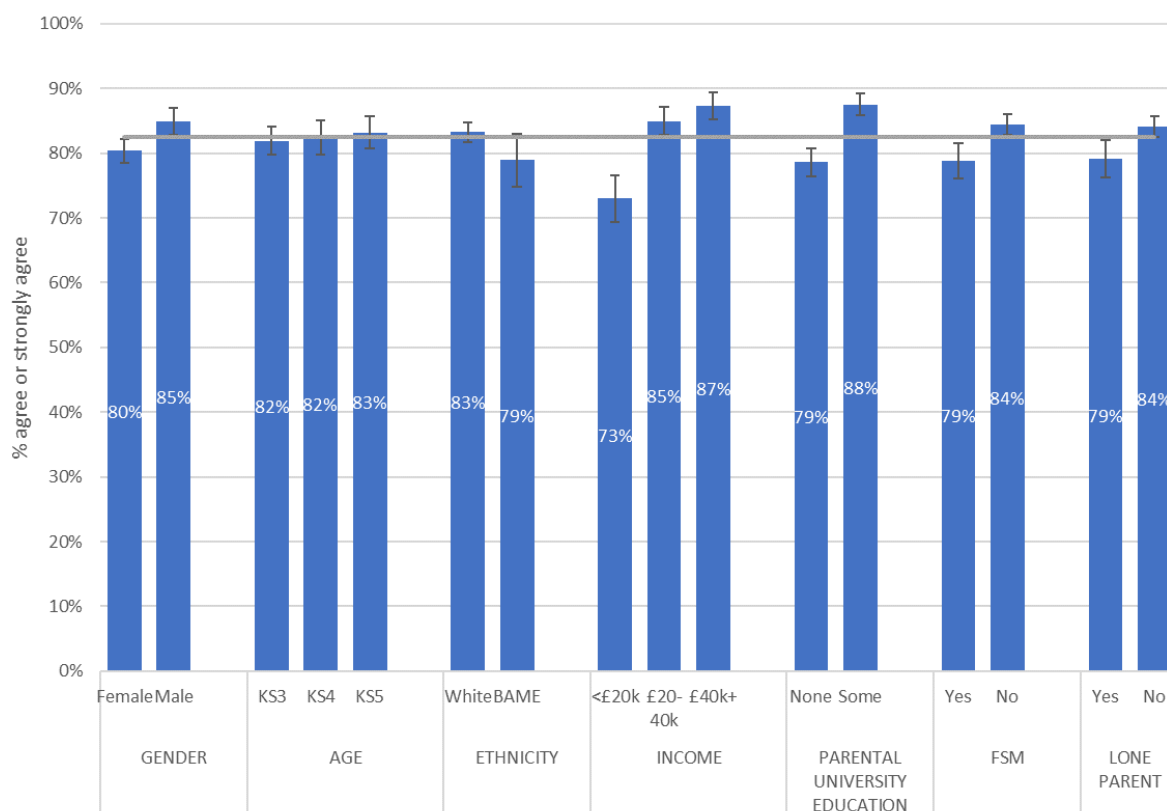
Parent and teacher views on engineering and environmental sustainability

Parents

Overall, 82% of parents surveyed agreed that ‘engineers are important for improving environmental sustainability’, though views varied by demographic characteristic and background. More men than women agreed with the statement, and education and income influenced rates of agreement, with 88% of parents with some university education agreeing compared with 79% of those with no university education. Also, just 73% of parents in households with income under £20k agreed with the statement compared to more than 85% in households with a higher income.

Figure 7: Knowledge of the link between engineers and the environment among parents, 2021, UK

How much do you agree or disagree with the statement ‘Engineers are important for improving environmental sustainability’ (n=2,840)



Source- EngineeringUK Engineering Brand Monitor, 2021 - parent and young people

Q - How much do you agree or disagree with the following statements? ‘Engineers are important for improving environmental sustainability’. Responses were provided on a five-point scale 1-Strongly Disagree/ 2-Disagree/ 3-Neither agree nor disagree/ 4-Agree/ 5-Strongly Agree

Notes:

1. Due to small numbers, some groupings were combined to allow for analysis. Ethnic groups were combined into two groups (White vs Black and minority ethnic (BAME)) and ‘parental university education’ was derived from highest level of education (undergraduate and postgraduate degree combined vs other).
2. The grey line on the chart represents that 82% of the total sample of parents agreed or strongly agreed.

Additionally, parents whose children were eligible for free school meals had a lower agreement than those who did not (79% vs 84% respectively), and lone parents had a lower rate of agreement with the statement at 79% compared with other parents at 84%.

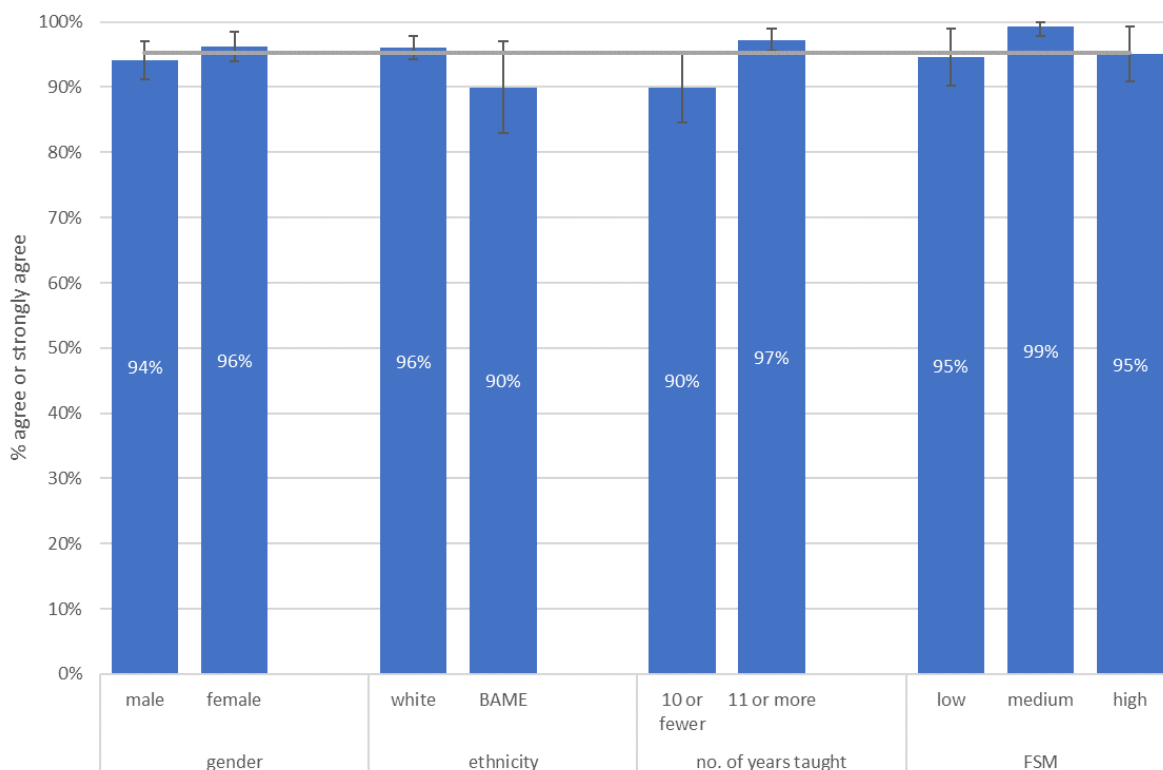
Furthermore, the view of the parents has shown to influence their child’s opinion on engineering and the environment, as 77% of young people whose parents agreed that engineers are important for improving environmental sustainability also agreed, compared with 49% of young people whose parent did not agree. This highlights the important link between views of young people and their parents and how further education of parents could also have a positive impact on the opinions of young people.

STEM secondary school teachers

An overwhelming majority of STEM secondary school teachers understand that ‘engineers are important for improving environmental sustainability’ with a 95% rate of agreement. There were no significant differences in response by gender, ethnicity or percentage of children eligible for free school meals, however those who had been teaching for 11 years or more were more likely to agree with the statement than those who had been teaching for 10 years or less (97% vs 90% respectively).

Figure 8: Knowledge of the link between engineers and the environment among STEM secondary school teachers, 2021, UK

How much do you agree or disagree with the statement ‘Engineers are important for improving environmental sustainability’ (n=528)



Source- EngineeringUK Engineering Brand Monitor, 2021 - parent and young people

Q - How much do you agree or disagree with the following statements? ‘Engineers are important for improving environmental sustainability’. Responses were provided on a five-point scale 1-Strongly Disagree/ 2-Disagree/ 3-Neither agree nor disagree/ 4-Agree/ 5-Strongly Agree