2020 cohort

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**Does including currently active scientists from BAME and working class backgrounds in lessons raise student's science aspirations in my school context?**

**Introduction:** There has long been an underrepresentation of BAME and working class individuals in STEM careers (Joice and Tetlow, 2020). There have been a variety of suggestions as to why this is, including a lack of scientific capital, differing priorities of cultures, teacher expectations, and a lack of representation of scientists from ethnic minorities at all levels of science education (Moote *et al.*, 2020). The UK curriculum has come under recent scrutiny for its lack of diversity and there are calls to diversify and decolonise the curriculum at all levels of education (Gandolfi, 2021).

Various studies have identified a link between role models that are of similar backgrounds to the individual and student engagement and career aspirations in STEM (Shin, Levy and London, 2016; Lawner *et al.*, 2019). This has also been reported in other fields and careers (Lee, Fernandez and Martin, 2015).

The importance of role models to working class students and students from deprived backgrounds has also been reported(Tuck and Yang, 2013; Hout *et al.*, 2011). In my school there are both high numbers of non-white and mixed race students and high levels of students who are eligible for free school meals. Schools with a high Free School Meals (FSM) eligibility have been reported to have lower levels of uptake for the separate sciences at GCSE(Ofsted, 2013). This is something that is true at my school, with only 5% of students taking triple science compared to 25% of students taking triple science nationally, data taken from 2016 (Department for Education; Gibb, 2014). At my school, of the year 10 year group as a whole 37.9% of students are eligible for free school meals, however of the year 10 students taking triple science only 16.67% of students are eligible for free school meals. I therefore wanted to investigate if inclusion of more diverse scientists in the curriculum could influence students feelings about science and increase scientific aspirations.

**Methodology**

Students were shown a slide giving information about a scientist at the beginning of every science lesson for a term. The students chosen were two year 8 classes, one taught by myself and one by another teacher. The criteria for the scientists chosen were that they should be currently or very recently working, in a job related to science but not just the very top science jobs as these may not feel realistic to students, and from a community represented by the student demographic. I conducted questionnaires before and after to assess student feeling on science, scientists and their own scientific abilities. The questionnaires were mostly conducted on a Likert scale from 1-5 with 5 meaning strongly agree and 1 meaning strongly disagree. This meant that statistical analysis could be carried out to see if there was a significant effect on student feelings. Paired t-tests were conducted with a threshold of $<0.05$ for significance.

**Findings and next steps**

Of the questions asked to try and probe student feelings on their own scientific abilities, there were two that showed a significant change after the intervention. The first was 'I think of myself as a sciencey person'. Students were asked to answer questions on a likert scale from 1, strongly

disagree, to 5, strongly agree. For this question student opinion changed from a mean of 2.8 before to 3.2 after with a significance of 0.007. The other question that saw a statistically significant change was 'People like me can be scientists' where the mean score went from 3.6 to 4.0, p = 0.04. There was also an increase from 3.0 to 3.3 in 'I would like to do a job related to science' although this was not statistically significant. Answers to the questions 'I feel confident to answer a question in science' and 'I am good at science' remained largely unchanged.

I then analysed questions that I designed to attempt to probe students views on scientists. There were no significant changes for any of these questions, however there were some trends in the data. . There were trends in students agreeing less after the intervention with the statements 'scientists are usually from richer families' and 'most scientists are similar people to each other'.

Thirdly I looked at students views on taking the triple science qualification at GCSE as opposed to the combined science option. Although there was no significant change in the whole class data, there were two questions that had near significant trends in the answers. The first was 'I would like to take triple science' (3.3 before and 3.6 after, p = 0.067). The second was 'I think triple science is a good option for people like me' (3.2 to 3.6, p = 0.09). This shows a trend upwards in student attitudes towards triple science between the first and second questionnaire. Although we cannot prove that there is causation and not correlation, it is an interesting finding from the study.

Currently the only scientists named in my school's KS3 curriculum are white European men. Based on this data I would suggest that more scientists of other ethnicities are specifically named and included in our KS3 curriculum. The data suggests that this may have a positive impact and is unlikely to have a negative impact. It would also be of interest to conduct similar research with other year groups, including those at KS4.

In addition if these studies in other year groups were successful the intervention could be extended to other faculties to try a similar intervention with BAME professionals in other subjects.

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