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Student experience of school science and its relationship to post-16 science take-up

Shaista Shirazi
Centre for Studies in Science and Mathematics Education
School of Education
University of Leeds
Leeds LS2 9JT
Email address for correspondence: edsms@leeds.ac.uk

A number of authors (e.g. Boe, 2012; Lyons, 2006; Hampden Thompson and Bennett, 2011) have written about the reasons that students are encouraged or discouraged from taking up science past compulsory age (post-16). Concurrently, a number of official publications and records have documented and discussed the many factors involved in the operational decisions taken by secondary age students. However, there is a gap in knowledge about the role of school science experience in the decision to take up science further. The current study highlights the three main factors that are relevant to understanding the role played in the process by school science experience. These are

- An interest in science
- A utility value of science
- Success in science

The study makes use of the storyline tool adapted from the field of training teachers and health services to explore the recollections of the key actors – students who have just made their decisions to take science or not post-16. While there are some nuances of interpretation, there is an overwhelming view that the above three factors play a key role in the decision to take up science or not and that they in turn, are shaped by experiences of school science.

Analysis and interpretation of interviews and surveys form the core of this study as it is recognised that there is value in conducting a small number of interviews and surveys with the individuals who are involved directly with the experience of school science. These key individuals are provided the opportunity to reflect their school science experience over a course of six years and the reasons why they chose to take up science or not at A-level. This facilitates the exploration of informal links between various factors which are not always evident from documentary sources.

The emergence of interrelationships between the three key influences on decisions to take science or not post-16 and the finding that most students do not make their decisions to take science until their GCSE years makes it clear that this research could potentially play an important role in convincing current policy-makers that investment in early careers guidance would benefit society and the economy by reducing the risk of young people drifting through secondary school without career aims and leaving school with qualifications that limit their future careers.

In keeping with the theme of the current edition (Impact: Research and Education), this article summarises the three main ways that the study can have an impact on research and education.

Academic impact. The academic impact of the study has many facets; firstly, it makes a contribution to knowledge about the factors that influence student decisions to take science

post-16. There is a current gap in knowledge about the way that school science experience influences students' choice to take science or not post-16. Secondly, the evidence from this study contributes to and enhances our understanding of the decision-making process in students and the timing of this process.

The researcher has already had an impact on initial teacher education practice through the provision of professional training and guidance. Professional development materials to support learning and teaching of science in secondary school have been developed to put the findings in action. This approach has an impact on practice and it is believed that scale is not important as long as there is some evidence of impact on a single pupil, teacher or school. Trainee teachers taught by the researcher are encouraged to reflect on their practice to address issues of interest in science and awareness of the value of science for students choosing both science and non-science careers.

Theoretical impact. The study provides theoretical impact in two ways; firstly, it forwards a new theoretical framework to help understand students' decisions to take science post-16 adding to existing studies that highlight one or another of the three factors but not all three together. Secondly, it involves the adaptation and application of the storyline method (see Gergen and Gergen, 1986) in a retrospective study of student experiences. This pioneering use of a little-known methodology from another field will impact on other research conducted in the future by raising awareness of the method as well as an account of its potential and its limitations. Another possible theoretical impact is the use of this method in place of or in conjunction with other more common methods of collecting longitudinal retrospective data thereby reducing the time and cost involved in traditional longitudinal studies.

Economic and societal impact. The study can also contribute directly or indirectly to the impact of renewed interest in careers guidance services or it may inform research in cognate fields to make a contribution to the overall impact. For example, the economic and societal impact that this study contributes to directly is in highlighting the benefits of early career guidance for students in secondary school.

It is widely documented (e.g. Cleaves, 2005) that a lack of knowledge about science occupations and science work particularly affects those who decide against taking science past the age of 16. Although the importance of careers advice is apparent in the Education Act (2011) which states that all schools have a statutory duty to secure impartial careers guidance for pupils aged 13- 17, careers guidance has suffered a chequered history[i]. The current study will add to the literature about the importance of early careers education of young people (e.g. Wade et al., 2011; Marson-Smith et al., 2009) and is hoped will have a direct or indirect impact on policy as well as practice.

In conclusion, this article looks at the impact that the current study being discussed will have in academic and economic terms. Some of the outcomes of the impact are measurable

such as articles or reports as well as citations. Other outcomes can be measured by the impact of trainee teachers who have undergone training with the materials developed and the implementation of the framework or methodology in other research studies. However, it is acknowledged that some of the impact outcomes are not measurable; for example how to account for impact on policy.

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[i] Under the New Labour government, Connexions was able to provide careers guidance to young people aged 13-19 although the variability in quality was widely criticised (eg Morris, Rickinson and Davies 2001). However this service was put into a state of flux following a change in funding by the Department for Education and in April 2012, a publicly funded National Careers Service was launched to bring together elements of careers services for young people. Although ostensibly for young people aged 13 or over, the agency only provides website and phone advice to young people aged over 18 with no face-to-face contact.