

'Science is not for me': exploring children's engagement with science through the lens of identity

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Background

A considerable body of evidence now exists that, by age 15, compared to other school subjects, science is failing to engage young people (Jenkins & Nelson, 2005; Lyons, 2006; Osborne & Collins, 2001; Sjøbeg & Schreiner, 2005). Yet, student interest in science at age 10 has shown to be high with little gender differentiation (Murphy & Beggs, 2005) - the point of decline thus begins in the final year of primary school. This paper reports on a longitudinal research project that maps children's changing engagement and aspirations in relation to science during this critical 10-14 years age period.

The lack of student interest in STEM related careers in the UK is well documented (Haste, 2004; Jenkins & Nelson, 2005; Roberts, 2002) and of rising concern amongst industrialists who perceive it as a threat to the economic competitiveness both in the UK (HM Treasury, 2006) and abroad (European Commission, 2004; National Academy of Sciences: Committee on Science Engineering and Public Policy, 2005). Evidence suggests that whilst students recognize the importance of science, they perceive it to be less engaging than other school subjects and 'not for them' (Jenkin & Nelson, 2005). Girls are also significantly more negative about the physical sciences than boys (Murphy & Whitelegg, 2006; Osborne & Collins, 2001; Osborne, Simon, & Collins, 2003).

Research Questions

This paper seeks to explore how research-informed approaches can help to understand and address key challenges in enhancing participation, engagement and achievement in science and mathematics, in particular to address differences linked to socio-economic status, gender and ethnicity. The data for this paper comes from ASPIRES, an ongoing five year longitudinal study (funded by the UK ESRC Special Initiative on Science and Mathematics Education) that aims to develop an understanding of the processes underlying young people's aspiration formation and their engagement with science. In particular, the paper represents an attempt to both report initial findings and to set out some potentially useful concepts for working with as well as mapping key avenues for exploration over the next four years.

Methods

Data for the larger project consists of a quantitative survey, administered in Autumn 2009 to over 9,000 students at age 10 (to be repeated subsequently at ages 12 and 14) and qualitative, longitudinal tracking of 60 pupils and their parents (conducted Spring 2010, to be repeated at ages 12 and 14). This paper focuses on the qualitative data collected from pupils, but draws across to make parallels with the quantitative data in order to contextualise key points.

The paper draws on semi-structured interviews conducted with 60 Year 10 pupils from schools across the South East of England. The schools were drawn from the wider questionnaire sample and were purposively selected on the basis that they represented a range of 'types' of school and pupil populations (e.g. 'multiethnic urban'; 'white suburban middle-class'). The participating students thus differ markedly both in socio-economic status and ethnic diversity. Our approach seeks to develop a deeper understanding of its central focus, exploring not only what participants think but why they think it (Kitzinger, 1994). As such, the goal is not necessarily to produce data that can be generalized to larger populations, but rather, to explore the range of attitudes, values and beliefs that are commonly held, the strength of feeling, and the reasons for those beliefs. Interview topic guides were developed and piloted in Autumn 2009 and were informed by a series of discussion groups conducted with a separate sample of Year 10 pupils (see Archer et al., forthcoming). Students were assured of the confidentiality of the data and each interview lasted for approximately 30 minutes. Interviews were

conducted by the authors and were digitally audio-recorded and transcribed. A Foucauldian analysis of discourse (Burman and Parker, 1992) is applied to the data, which involves searching iteratively to identify the major themes, constructions and discourses articulated by these young students.

Frame

Our theoretical perspective is grounded in notions of identity which sees the lack of interest in school science is a product of the mismatch between the values communicated by school science, the manner in which it is taught, and the aspirations, ideals and developing identity of young adolescents. Indeed there is a large body of work which would indicate that students' sense of self-identity is a major factor in how they respond to school subjects (Head, 1979, 1985; Schreiner & Sjøberg, 2007). Our theoretical approach understands identity as both an embodied and a performed (Butler 1990) construction, that is both produced agentially by individuals and shaped by their specific structural locations (e.g. see Archer 2003; Archer & Francis 2006). Identities are understood, therefore, as discursively and contextually produced (i.e. produced through relationships and interactions within specific sites and spaces) - and as profoundly relational. That is, a sense of self is constructed as much through a sense of what/who one is not, as much as through the sense of who/what one is (Said 1978). Importantly as well, notions of identity are multifaceted and complex, being shaped in relation to intersecting axes of gender, ethnicity, social class, and so on, which can generate powerful notions of what is/not felt to be appropriate or normal for 'people like me' - which in turn can profoundly shape individuals' educational choices and trajectories (Bourdieu & Passeron 1977). The children's responses are thus analysed through the lens of identity, drawing on a theoretical framework which views identity as an embodied and a performed construction that is both produced by individuals and shaped by their specific structural locations.

Research findings

The analyses tease out the role of social class, gender, 'race' on children's engagement with science and their constructions of their future aspirations. Particular attention is given to an arising distinction between their stated enjoyment for 'doing' science and their resistance to 'being' a scientist. This doing/being dichotomy is explored in relation to discourses of masculinity, ethnicity and social class and it is argued that, even at this young age, it is possible to see the beginning of trends that later become solidified in the science engagement and preferences of older children. The discussion teases out implications for schooling and those engaged in trying to 'raise' young people's science aspirations.