Chapter 3
Chain Reaction:
The English Context

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ABSTRACT

This chapter describes aspects of the successes and obstacles in the delivery of chain reaction in school science classrooms in England. It offers an overview of recent education reform in England and moves on to discuss the implementation of the program and provides anecdotal evidence from teachers to support emerging themes from the delivery experience. Issues of "time" restraints and over-burdened "curricular" as barriers to the deployment of inquiry approaches are highlighted by identifying positive outcomes and offering implications for science education across Europe.

INTRODUCTION

This section begins with a description of recent key policy contexts for science education in England and, prior to devolution of education in 2007, Wales. The description sets the scene for a discussion of the implementation of the Chain Reaction project and its key outcomes in the participating English secondary schools. Three specific elements of the programme are highlighted which represent positive impacts of the programme and issues of concern as well as emphasising barriers to successful deployment of the inquiry approach. The section concludes with a summary of potential further research in the field of inquiry and reflections on our learning.

Science Education in England

Science has a long history in the English school system but prior to 1989 the provision made in different schools and for different school students was somewhat mixed. In the late 1970s, while science was a high-status, attractive subject for many students a number of groups were significantly under-represented with up to 40% of girls doing no science after the age of 14. To regularise education provision across England and Wales the National Curriculum (NC) was introduced in 1989. This mandated that 20%

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of student's time at ages 14-16 should be devoted to broad and balanced science with a corresponding importance at earlier ages. This was the first time that science became compulsory at primary level with all students from age 5 spending 10% of their time on science.

The 1989 NC signalled the first major effort by government to control provision in schools through curricular, as opposed to financial or assessment means and has formed the basis for many of the subsequent initiatives. The initial curriculum was revised in 1995 and has been clarified and developed by a flurry of government publications and advice since then. Other initiatives that impacted on the changing education system in England and Wales included National Strategies that suggested how the subject should be taught (as opposed to the content to be covered), the creation of a powerful inspection body, the Office for Standards in Education (OFSTED), to oversee teaching practice, a fall in the support offered locally through Local Education Authority (LEA) advisory teachers and a general reduction in the control and coordination of local educational services in favour of a more centrally-driven system leading to, since 2010, one with individual schools operating in isolation or small chains of academies.

As early as 1980, parents were given the right to choose the school their children attended as opposed to being allocated a place by the LEA. To help with these decisions, league tables of schools performance in public examinations were published locally and nationally. The results of OFSTED inspections were also published. This created a competition between schools with examination results as the prime differentiator. This replaced the LEA model based on cooperation between schools and forced schools to actively recruit 'good' students to bolster their results. Anecdotal evidence exists of schools refusing entry to students who did not appear to have good 'chances' in public examinations. The cumulative effect of these changes in the classroom has been to emphasise examination success with a consequent rise in the publication of recall-dominated revision guides as opposed to learning-focused curriculum resources and increased pressure on students and teachers to perform leading to a distinct chilling in the environment for an inquiry-based science experience that projects like Chain Reaction espouse.

However, throughout these changes science retained a privileged position as a 'core' subject, along with English and Mathematics, and remained compulsory for all students from ages 5 to 16. During this time the nature of science was constantly under discussion with arguments about the merits of integrated science (the course organised around topics, often with a socio-scientific element, with the three traditional disciplines covered through these topics) as opposed to coordinated (taught as three separate discipline streams but in the time available for two subjects) or an extended, separate, triple science model (leading to three separate GCSE qualifications) and the significance of inquiry in science. At the same time other subjects were being added to the curriculum and a set of cross-cutting themes were also developed (e.g. health education, citizenship).

An Over-Burdened Curriculum

Perhaps inevitably, by 2005 the curriculum was seen to be significantly overloaded with content and a full review was commissioned to identify tensions and produce suggestions for reform. This produced the 2008 version of the curriculum which claimed to be more flexible and have a reduced content load in science. The key objective of the secondary school curriculum, introduced in September 2008, was to provide a strong framework for exploring STEM subject study and careers and was supported by a programme of study for economic well-being and financial capability. Its aims were to: