

# Engaging Schools in Cutting Edge Science: From the Educator's Perspective

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**Abstract** — The field of scientific research, by definition, is constantly developing new techniques and adapting current thinking in order to address pertinent issues. With curriculum constraints and exam-based teaching, it is becoming increasingly challenging to engage young people in new ideas and methods, and thus facilitate them in becoming the scientists of the future. A new project developed through collaboration between the Cothill Educational Trust and The Natural History Museum aims to develop a deeper understanding of biodiversity science in pre-GCSE aged children, kindling a real excitement for the science subjects at school.

**Index Terms** — education, engaging and enthusing, project development, scientific research.



## 1 INTRODUCTION

A recent government report has highlighted the current predicament faced by science and education. Whilst it is accepted that science and scientists are crucial globally at economic, environmental and social levels, less children are studying science subjects at school. This is especially true at GCSE and higher levels, where children choose their subjects. The danger is that if this trend continues, there will be a shortage of science professionals in the future [1]. It is therefore imperative that children have the opportunity to engage in science at an early age; to enthuse and inspire them to choose to continue to study science, and to realise the career opportunities available to them.

This view is shared within the scientific community, with an awareness that students are often unaware of current methods routinely used by scientists. “Exciting new areas of science typically do not appear in science classrooms and textbooks until many years after their inception. The result is that too many students are never afforded opportunities to learn about the cutting-edge discoveries that make biology so exciting to professional scientists [2].

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## **2 THE PARTNERSHIP**

In order to address these problems, a partnership was formed between two like-minded parties: the Cothill Educational Trust [3] and The Natural History Museum of London (NHM). Through a shared interest in combining research, learning and public engagement, a project began to develop to bring together educators and scientists.

### **2.1 THE EDUCATORS**

The Cothill Educational Trust was established in 1967 by the Trustees of Cothill House, a boys' boarding school, with the aim of providing first class education to children up to the age of 14. The Trust now incorporates seven schools, including the Château de Sauveterre in France, and the Old Malthouse, a science education centre used for the new collaboration between the Cothill Trust and the NHM.

### **2.2 THE SCIENTISTS**

The Natural History Museum is a well-known and respected organisation. Not only does it house internationally-respected scientists, but the association provides the project with an identifiable name within the public realm. A collection of scientists from the NHM are collaborating on the project, with a range of specialist expertise, including molecular genetics, botanical taxonomy and biodiversity conservation.

## **3 NEEDS IDENTIFIED AND AIMS AGREED**

In early 2009 a series of meetings were held to explore the potential of the project and agree the aims between the two partners. These meetings not only included representatives from the Cothill Trust and NHM scientists, but also involved staff from other NHM departments including Learning and Interactive media.

The needs and requirements of both parties were identified. Whilst the Cothill Trust required the support of the museum, both in terms of scientific expertise and project management, the NHM needed the experience of an educational partner and access to a suitable place in which to carry out the teaching. It was also imperative for the museum to involve suitable staff for the teaching aspect of the project. It required enthusiastic and personable presenters who can interact with children, but who are deemed specialists in order to provide "cutting edge" science and thus a premium "product".

Once the needs and provisional capacity of each partner had been determined, the combined project aims and deliverables could be decided. It was agreed that the NHM - Cothill Educational Trust Project 'Tree School' would establish proof-of-concept in joining scientific research objectives together with science education imperatives through botany and DNA barcoding. Specifically:

To design, pilot, optimise and communicate methods for involving schoolchildren

and other non-experts in international DNA barcoding campaigns.

To promote the development of a scientifically and environmentally literate citizenry.

To increase the scale on which biodiversity science can be undertaken.

A start-up phase was established in order to develop the relationship between Cothill and NHM, with the Cothill Educational Trust providing infrastructure, equipment, logistics, teachers, pupils and the Natural History Museum contributing the science and learning.

## **4 THE ROLE OF THE COTHILL EDUCATIONAL TRUST**

### **4.1 LOCATION**

The Old Malthouse, situated on the Isle of Purbeck, Dorset, has been developed into a field centre fully equipped to provide five-day residential courses for up to 32 children at any one time. The Old Malthouse was a boarding preparatory school, but closed in 2007. It has been completely refurbished, with dormitories for the children and individual rooms for the teachers and visiting scientists. The concept when redesigning the interior was to provide a safe and comfortable environment for all participants, to create a relaxed atmosphere for enhanced learning and enjoyment. The classroom blocks were also updated to create a laboratory for the DNA barcoding, and a herbarium area for the storage of specimens.

### **4.2 SCHOOLS**

The boarding and day schools managed by the Cothill Trust will be amongst the first schools participating in Tree School. Attendance will also be extended to state schools with links to Cothill, funded by charitable donations to the Trust. Following planned publicity, it is expected that schools will pay to attend Tree School, although state schools will continue to be subsidised by the trust.

The importance of the accompanying teaching staff can not be underestimated. They will maintain overall control of the classroom, in terms of discipline, but can also act as an intermediary between the children and the scientists. They can refer to recent lessons, to demonstrate how topics interact and overlap, and can also ask leading questions of their own to engage with the scientists.

## **5 CHALLENGES AND BENEFITS**

The initial phase of this project has seen a series of three trial workshops through the summer of 2010. The scientists have worked in collaboration with three of the Cothill Trust schools in order to ensure the smooth running of the project during 2011-2012.

## 5.1 THE CHALLENGES

The principal challenge faced at the onset of the project was to find a suitable location, which was able to provide accommodation, laboratory space and enough outdoor space and suitable 'field' locations. This need also brings with it a huge financial requirement, not only for the initial set up, but also for the continuing maintenance and upkeep of the site. The recruitment of enthusiastic scientists from the NHM proved to be straightforward, and a high demand from the teachers and pupils was established.

Modifications have been made between workshops, in order to pitch the science at the right level for the group attending. Timetable alterations have been needed, due to varying group sizes and unpredictable weather conditions.

## 5.2 POTENTIAL BENEFITS

The immediate benefits of Tree School are apparent, with the provision of learning for an increasing number of children.

The concept also has the potential for development, both for children and adults. A workshop specifically for teachers could provide ideas and training, and incorporate Continuing Professional Development opportunities. Interest has also been expressed by other non-scientific adults, which could perhaps be developed as a summer school event. The project design can also be applied to further scientific projects, and other academic subjects, all with the principal aim of engaging young people in the excitement of cutting edge research.

## 6 CONCLUSION

This endeavour is a marked change from the 'canned' experiments schools are required to provide during scientific learning. Whilst these lessons are an important aspect of understanding science, the inclusion of current, innovative scientific principals and experiments allow an insight into science and research, as well as an opportunity for the children to challenge their questioning skills and feed their desire for learning. It is important to fire an interest in science at a young age in order to secure the scientists of the future.

Following the pilot workshops, a continued enthusiasm for the subject has been reported once back at school. Many of the methods used at Tree School can be replicated away from the field centre, such as trying to identify and map the trees on the school premises. It is planned that once schools become engaged with this project, and have a long-term relationship with the NHM, ideas will be developed and lead to further collaborative projects.

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