Cathedral outreach: student-led workshops for school curriculum enhancement in non-traditional environments

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300-800 word ABSTRACT

Universities in the United Kingdom have been driven to work with a larger pool of potential students than just the more traditional student (middle-class white male), in order to tackle the widely-accepted skills-shortage in the fields of science, technology, engineering and mathematics (STEM), whilst honoring their commitment to fair access to higher education. Student-led outreach programs have contributed significantly to this drive. Two such programs run by postgraduate students at the University of Southampton are the "Lightwave Roadshow" and "Southampton Accelerate!", which focus on photonics and particle physics, respectively. The program 'ambassadors' have developed activities to enhance areas of the national curriculum through presenting fundamental physical sciences and their applications to optics and photonics research. The activities have benefitted significantly from investment from international organizations, such as SPIE, OSA and the IEEE Photonics Society, and UK research councils, in conjunction with university recruitment and outreach strategies. New partnerships have been formed to expand outreach programs to work in non-traditional environments to challenge stereotypes of scientists. This paper presents two case studies of collaboration with education learning centers at Salisbury Cathedral and Winchester Cathedral. The paper outlines workshops and shows developed for pupils aged 6-14 years (UK key stages 2-4) on the electromagnetic spectrum, particle physics, telecommunications and the human eye using a combination of readily obtainable items, hand-built kits and elements from the EYEST Photonics Explorer kit. The activities are interactive to stimulate learning through active participation, complement the UK national curriculum and link the themes of science with the non-traditional setting of a cathedral. We present methods to evaluate the impact of the activity and tools to obtain qualitative feedback for continual program improvement. We also share lessons learned to assist educators emulating this format of engagement, and provide ideas and inspiration of outreach activities for student chapters to carry out.

Keywords: Optics education, Physics outreach, Science, culture and religion, Public engagement with research, Widening participation, Student chapters, STEM.

SUMMARY (for the conference program and any other publicity/media)

We describe two case studies of collaboration with education learning centers at Salisbury and Winchester Cathedrals in the United Kingdom to develop educational activities to complement areas of the national curriculum to link the themes of science with the culture associated with cathedrals. The paper presents different formats of engagement, in the form of workshops and shows, suited for school pupils aged 6-14 years on the themes of telecommunications, particle physics, the human eye and the electromagnetic spectrum. Evaluation methods measuring activity impact are discussed, and lessons learned provided to inspire educators to emulate this educational outreach in non-traditional settings.

Topics

1. 1st choice: Curriculum development in Optics and Photonics Education
2. 2nd choice: Assessment and evaluation of education
3. 3rd choice: New Pedagogical Methods, Tools and Models in Optical Education

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