Technocamps: A Decade of Supporting Computer Science Education in Wales

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In the early 1980s, the BBC Micro was introduced to schools throughout Britain, and before long they were in 80% of UK classrooms. By encouraging young learners to experiment with computers, a generation of creative (and computational) talent was spawned. Applications in the UK to study computer science at university hit a peak, and computer science graduates changed the world as they helped computers come to dominate every aspect of our lives.

Fast forward 30 years and the situation could not be any more different. The computer is no longer a novelty. Children now spend more time at home in front of a computer screen than a TV screen, but like the TV, their interest is restricted to using the computer, not in experimenting with it. Computer studies in school (now called "Information and Communication Technology" (ICT)) has evolved into IT studies with an emphasis on digital literacy and office skills -- significantly more mundane than the social networking and gaming for which the pupils use their home computers. 65% of IT teachers in the UK do not have a relevant qualification but have slipped into the role of IT teacher simply by being digitally literate. Applications to study computer science at university slumped -- especially amongst females -- and many of those who start a university computer science course drop out during the first year as they are unaware of what computer science is and what studying it entails.

A decade ago, the Department of Computer Science at Swansea University started looking into ways to address this issue. In 2003 we at Swansea started Technocamps, a schools outreach programme which brings groups of school children to the University for day-long workshops based on selected computational themes to inform them what computing is about, with follow-up extracurricular clubs ("Technoclubs") in the schools. Of course we are not alone in exploring solutions to a perceived problem in education. In particular, in 2008 the UK-wide organization Computing At School (CAS) was formed, and its current membership of over 3000 teachers and computing professionals are working hard to promote the teaching of computing at school.

Technocamps was very successful as a local initiative, with many students studying computer science at Swansea claiming to be influenced by Technocamps activities. In 2010, based on empirical data regarding its effect on school children's attitudes towards computing -- as well as their teachers -- Swansea University was awarded £6 million funding by the Welsh Government under the EU's European Social Fund (ESF) Convergence Programme to run Technocamps as a pan-Wales project; since then, Technocamps has been operating with regional hubs at the Universities of Aberystwyth, Bangor, and Glamorgan. Though focusing on the children, Technocamps also provides "Technoteach" events aimed at up-skilling IT teachers in Welsh schools. Since 2010, Technocamps has provided computing-related activities and resources for thousands of young people across Wales, as well as interacting with hundreds of teachers at a majority of the nation's schools.

Wales is a devolved nation within the United Kingdom, with its own elected national government fully responsible for its education system. The Welsh Government's Minister for Education and Skills has publicly stated the importance of computer science education and is a key supporter of Technocamps, understanding the wider educational and socio-economic impact that his government can make with reform in Wales. With only 5% of the population of England but with distinct socio-cultural challenges, Wales represents an ideal microcosm for experimenting to effect educational change.

In this paper we will outline the history (and prehistory) of Technocamps including the changes to computing education in schools which made Technocamps necessary and timely; explain the evolved nature of education in the UK focusing on Wales with its specific challenges and opportunities; and present data both in support of intervention as well as the positive effect this intervention is having. The authors both sit on an official Welsh Government Steering Group (with the first author acting as co-chair) which is to deliver a report to the Minister in July with recommendations for computer science curriculum reform; this paper will also present the background and thinking of this Group.