

Schools at University for Climate and Energy (SAUCE)¹

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Background

About five years ago, a consortium of academics with backgrounds in climate and energy policy joined with practitioners in the 'Children's Universities' movement – a development to familiarise schoolchildren with higher education institutions – to create a programme to promote awareness of climate and energy issues and solutions across Europe. This paper describes the thinking behind this initiative – a project supported by Intelligent Energy Europe – the excitement it offered for the developers, practitioners and children, and the prospects for its further dissemination to Commonwealth countries within the European Union (Cyprus and Malta) and worldwide.

Research shows that the burden of climate change will fall chiefly on today's and tomorrow's children, and on poorer people in developing countries. We also know the relative frailty of programmes devoted to encouraging behaviour change: they turn out to be too little, too late and are often absent of the necessary political will. Further, scare tactics aimed at the public will be more likely to provoke avoidance of the issues than to engage the public in solutions. For these reasons, the Schools at University for Climate and Energy (SAUCE) consortium chose a range of approaches, including the arts, social and natural sciences, and engineering, to promote interest in the climate issue and to show the contribution that all disciplines can make to finding a solution to the problem.

The UK SAUCE programme

In the UK, the institutional framework for SAUCE is familiar to fellow Commonwealth education professionals, and the inner-city location of the programme in London allows it to reach many students from the Commonwealth diaspora. We were interested to see whether these children would identify with problems faced by their historic 'home' communities in the Commonwealth and therefore be more committed to addressing climate issues.

The programme's target age group (9 to 13-year-olds) straddled two stages of cognitive development, so that content fit for one class would not necessarily suit another, and this had to be taken into account in the design of the programme. SAUCE took a 'head, hearts and hands' approach to programme delivery, recognising the importance of creative, practical and emotional engagement to complement the cognitive. Children of this age group can understand environmental issues and are more open-minded than older ones. In terms of developmental psychology, children between seven and 11 years of age are at the stage of concrete operational thinking, able to apply logic to physical objects but not in the abstract; while after the age of 11 they move on to formal

operational thinking, where they begin to develop their own moral judgements and understand abstract and complex issues such as climate and energy. This means that programme content needs to be developed with this progression in mind.

In accordance with the principles of the 2005–14 United Nations Decade of Education for Sustainable Development, SAUCE has emphasised the need to link the natural sciences to social, cultural and political aspects of climate and energy, and making connections between these and everyday life and behaviour. SAUCE is also consistent with curriculum developments that address acquisition of key skills that include working with others, communication and problem-solving, as well as 'soft skills' such as empathy, and with developing learning opportunities in an 'out-of-school' environment.

The content of a typical day's programme, as described below, shows how relatively easy it is to create and deliver, but also warns of the logistical challenges of bringing a group of 150–200 schoolchildren into a university environment, with attendant issues of health and safety.

The programme aimed to be inclusive, and so included content from a range of disciplines:

- Art (designing logos and posters)
- Music (writing lyrics and having the winning lyrics performed)
- Dance (the Brazilian *capoeira*)
- Film (stories from children's arctic expeditions)
- Social science of behaviour change (engaging children in games and puzzles to help them understand energy-saving behaviours)
- Physics and chemistry (explaining the role of different elements in climate change – and in making ice-cream)
- Engineering (assembling model hydrogen-cell cars and endurance-testing them; making model wind turbines and testing them in a specially constructed wind tunnel; assembling model carbon-neutral houses)
- Urban horticulture (balcony gardening)

This list of activities was well within the capabilities of the practitioners engaged with SAUCE in the UK. A valuable community of practitioners – local experts in various disciplines who were brought together to engage in the challenge – emerged to deliver the programme. With programmes developed in the five other European partner countries (Austria, Denmark, Germany, Latvia and the Netherlands), each drawing on particular local



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Children learn about creating a carbon-neutral home

strengths, a SAUCE template has been developed.² Now, selected elements of the template programme can be used as appropriate, depending on the balance needing to be achieved between providing a basic understanding of climate change and solutions, and raising aspirations of children to stay in education to tertiary level. Also, where there is no ready access to a university campus, parts of the programme could be delivered at schools rather than in the university, while still maintaining the 'university' ethos of SAUCE.

Partnerships

The UK SAUCE programme built on networks of practitioners in climate and energy education and practice in the capital, and nationally. These were drawn from tertiary level institutions and NGOs, as well as art, theatre and music practitioners. The key tertiary links were with the University College London (UCL) programme of public science communications and with the world-renowned Centre for Alternative Technology (CAT) in Powys, Wales, host to WISE (the Wales Institute for Sustainable Education); music and theatre groups (Arcola Energy, a local troupe specialising in hydrogen cell deployment and community engagement in green issues); and other environmental education practitioners.



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Colour of dyed water changes as CO₂ is added

Preparation

Preparation included a session bringing together all practitioners on the programme, to share content and consider practices for engaging children in this age group, and a session to introduce teachers to the content (which had to be integrated into the beginning of the day's programme for UK teachers in recognition of their timetabled commitments at school). Preparation also involved extensive negotiation with university staff engaged in campus maintenance and access, and risk management (health and safety). These staff members proved invariably to be not just receptive but enthusiastic in their support of the programme, providing a welcoming environment for children who might have been apprehensive about crossing the threshold of the university.

Preparation also included working with the university's senior hierarchy, persuading them of the long-term value of the programme for student recruitment and its importance in community relations (remember that these pupils are on the threshold of secondary school, and then of subject choices that will shape their subsequent opportunities and pathway choices at university). If a university's green credentials are based on an assessment of curriculum, research, community and campus, a SAUCE programme allows academics to demonstrate the quality of their teaching (and helps train them to address younger audiences), the relevance of their research, their engagement with the community, and the sustainability of their campus design and management.

A day of SAUCE

The typical SAUCE programme delivered in London started with a brief introduction to presenters and the purpose of the day, and a plenary lecture for all children attending, lasting about 45 minutes. This was very much in the style of a formally delivered lecture in the auditorium to give a sense of 'university', but included elements of direct engagement by the children. The children were then put into groups for three sessions. Finally, they were brought back together for a brief review session, or to say goodbye, if teachers were happy to conduct the review in class the next day.

Initially, two alternative lectures were included as opening sessions. The first, offered by CAT, presented a description of the greenhouse effect and the key causes of climate change, and then engaged the children in a game, or exercise, to explore how changes in diet, lifestyle and home (white goods, energy use, insulation) could reduce domestic carbon emissions.

The second lecture, by Andrea Sella of UCL and his students, concentrated more on the science of climate change, helping pupils understand the relationship between the solids, liquids and gases important in understanding the impact of climate change – using colourful and exciting demonstrations and experiments showing the relationship between growing atmospheric carbon concentrations and changes in the physical environment, such as ocean acidification and sea-level rises. This session's popularity was enhanced by its conclusion, using liquid nitrogen to provide ice cream for all. Above all, it re-created a quasi-laboratory environment and was particularly valuable for schools without science labs.

After the lecture, students were divided into groups to attend a set of workshops geared to experiential learning and kinetic engagement. Initially, each student would attend three workshops.

This was later reduced to two longer ones in response to feedback, to allow more time for the children to work on their activities. A balance was always sought between workshops that involved more 'hands-on' learning, and those that were more about entertainment and storytelling.

The hands-on activities proved most popular. One workshop involved *capoeira* dancing. While perhaps not obviously a 'climate change' activity at first sight, this Brazilian art form has several advantages. The musical instrument used, the *berimbau*, is made from natural and recycled materials, and the story of the dance illustrates issues of equity in the impacts of climate change on indigenous peoples and their rainforest habitat. Trying the dance moves helped children remember the whole session.

In the first programme, a professional popular music group partnered with us to provide children with an opportunity to design and paint a logo for the 'international handshake', or to write lyrics to be included in a song about climate change written by the group.

Another strong session was provided by ActionAid, making the link between reduced energy consumption in the UK and sustainable development in Africa.

Some of the most successful workshops combined hands-on work in model construction with explanations of the link between climate change, renewable energy sources and energy saving. These sessions also involved competitions between small teams of three or four pupils and this competitive element generated a lot of excitement. Our partnership with Arcola Energy provided two of these workshops. The first involved assembling a simple model hydrogen cell car powered by liquid hydrogen with the aim of maximising the distance travelled per 5 ml of hydrogen gas. Through this, pupils began to appreciate the relationship between gearing and fuel economy as well as issues of energy storage and conversion. This workshop was selected for inclusion in the Abu Dhabi Science Festival, where it was delivered to 3,000 local pupils.

In the second workshop from the Arcola partnership, children worked in small teams to make a wind turbine from recycled materials and test its efficiency in a specially constructed wind tunnel. Some interesting differences were observed between the aesthetics and efficiency of boys' and girls' turbine designs.

The summer timing of delivery meant that pupils usually took their lunch in the university courtyard, which allowed them to see some small demonstration projects at work, such as 'vertical gardening' and the use of solar panels for delivery of electricity in the model houses they had made.

Two workshops focused on making food and learning about the origins and climate footprints of different ingredients; one involved making chocolate with cocoa from Ghana, the other exploring the footprint of components of the toy-filled chocolate Kinder Egg (aluminium foil from Caribbean bauxite, African cocoa and a plastic toy from China). Maps of the world were used to help show the origin of materials from the Caribbean and African Commonwealth, and to introduce the Commonwealth itself.

Cape Farewell Education promotes a cultural response to climate change by taking celebrities from the arts and school students on Arctic expeditions to expose them to the impact of climate change on the Arctic and on sea levels. Their website integrates these



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Capoeira: Learning cool new moves



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The children's winning lyric is performed

activities with the school curriculum. For SAUCE, they showed a film of their expeditions, and then engaged children in a mime exercise to illustrate a key climate change theme.

In the final SAUCE programme, in the context of widening interest in urban horticulture in providing nutrition and reducing food miles, Highbury Builders' Collective presented their micro food farm. This uses a wormery to process domestic vegetable waste to produce fertiliser for a vertical garden suitable for a domestic balcony, as well as to provide a continuous supply of organic salad vegetables.

In the final session, a workshop on visioning the future was included, the guiding premise of which is that children can and should participate actively in the shaping of their environment.

Discussion

The location of the UK programme in central London was a major benefit, both in terms of available partners from the non-formal environmental education sectors and the number of Commonwealth diaspora pupils from the multicultural environment of the borough of Islington and neighbouring boroughs. Critical early help also came from the local authority's officer responsible for the sustainable schools programme, as well as a city-wide sustainability for schools initiative, the London Sustainable Schools Forum (LSSF),

This rich context allowed a number of approaches to be tried over the three years and five 'runs' of the programme. A variety of lessons were learned.

There is a delicate balance to be drawn, for example, between leaving enough time for pupils to get from one session to another, especially via a 'comfort break', and maintaining order. Health and safety considerations may require the provision of water, and the most convenient source (plastic bottles) may contradict the overall message of the day! The benefit of working with practitioners experienced with the relevant age group (in this case, 9 to 13-year-olds) is substantial.

The SAUCE programme provided funding for programme development, including meetings between project partners from the lead institution – Freie Universität Berlin, the Berlin Energy Agency (an independent organisation with experience in running 'Children's Universities') – as well as universities from Austria (Technical University of Vienna), Denmark (Roskilde and Aarhus), Latvia (Riga), the Netherlands (Twente) and the UK (London Metropolitan). The project team as a whole included energy and climate specialists from the natural and social sciences, as well as pedagogical specialists with experience in organising 'Children's Universities'. Developing and running the programme requires social and entrepreneurial skills on the part of the organisers, and it is helpful to have access to experts in science and energy communication for a younger audience.

SAUCE met a number of goals:

- Getting children interested in university education
- Showing children the potential of using different disciplines, some of them unfamiliar, to make a difference in facing the challenges they will inherit
- Designing a programme that engages teachers but also frees them from a day of preparing lessons



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Logos designed by the children



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Children make accessories ('flowers') from plastic waste

- Providing a fun 'out-of-school' environment for children to approach serious issues

The feedback was overwhelmingly positive ('an awesome day'), and schools who had visited the programme were keen to return in following years.

Some of the partnerships will endure, including the one that involves Arcola Theatre in developing plays with local playwrights and children on renewable energy and climate.

One key lesson for Commonwealth partners is that the programme may be run as a whole, or in some of its component parts. Running it in a university setting has enormous benefits (see above), particularly access to some useful science laboratory infrastructure, but it could also be run in schools. It should be seen as a modular programme, with benefits to be derived from running any component. It can also work well to develop mutually supportive links between a university and its local community, a key element for developing sustainable universities.

Conclusion

While universities in developed countries and those regional universities with international reputations may find it easier to develop a fully fledged SAUCE programme, any school and any university can help deliver skills, attitudes and behaviours to support climate and energy initiatives by engaging their staff from all disciplines in a SAUCE-type programme.

In the context of development of the Post-2015 Agenda, integrating sustainable development goals with the successor to the Millennium Development Goals (MDGs), the education sector could usefully look to ways of integrating education for sustainable development with the programme of universal primary education.

The SAUCE programme illustrates some ways this might come about. With sustainable development of small island developing states (SIDS) coming to its third international meeting in Samoa in 2014, and the Commonwealth Heads of Government Meeting to be held in Mauritius in 2015, the time may be opportune for the development of a climate and energy-awareness programme for schools in SIDS, bringing together key institutions (the Commonwealth of Learning and the Association of Commonwealth Universities) with SIDS' education ministers to explore joint initiatives that integrate distance learning and local providers.

Endnotes

- 1 SAUCE is an Intelligent Energy Europe programme working across seven universities in six countries. Its aim is to bring primary school children into their local university to explore solutions to climate and renewable energy challenges.
- 2 See Handbook, Resources and Report on the www.schools-at-university.eu website.

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