City Learning Centres

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How many times have you met a Russian cosmonaut at school and journeyed with him on his flight into space; blasting off from Baikonur Cosmodrome, orbiting the earth and then re-entering the atmosphere for touch down? Or, did you ever climb aboard an erythrocyte as it made its way through the arteries and veins of the human body? These meetings and journeys in science classrooms are a reality for children, particularly if they are able to access a City Learning Centre (CLC).

The Government announced its Excellence in Cities (EiC) policy two years into its first term. This radical step provides revenue for schools in disadvantaged major cities, thus improving performance and engagement. Emphasis has switched from the quality of teaching to the quality of student learning, with the learner becoming paramount, and the City Learning Centre as one of the EiC deliverables. Groups of schools in disadvantaged and often underperforming communities work together to build co-owned, high technology learning centres. The understanding is that the funding has to be used by staff and students to enhance learning and teaching across the whole curriculum, providing Information and Communications Technology (ICT) to the wider community and improving access to the latest technology, to test bed innovation and new ways of working in an environment, which is quite unlike a school. The development of the CLC varies between localities. Some have built new extensions to a central school hub to house the state of the art technologies. Others refurbished old buildings or built a completely separate resource under the guidance of a management board, distinctive from the governance of school in which it was placed.

CLCs give youngsters "hands-on" experience with resources normally beyond the scope of the school budget and provide learning that exceeds the confines of the school day or year by sharing good practice and innovation. The first CLC opened in 2000 and today there are 105 centres operating in 57 local authorities. So how far have they come and what impact are they having on science education in the UK?

Science learning is challenging for many young people, requiring a wide range of abilities in a young scientist: logic, enquiry, analysis, persistence and exploration. Under 10% of schools are designated as specialist science colleges, 70% of students reach national standard at KS3, GCSE chemistry, physics and biology have recently been named as difficult GSCEs and uptake at A level has declined and so there is much work to be done.

Innovation in learning is being delivered through a variety of projects at CLCs and is now embedded in schools' curricular programmes. Many centres experiment with cutting edge technology using a range of devices and software from robotics, control and data logging, leading to digital media, computer aided design and manufacture, interactive Q&A sessions using mobile-phone-like texting, virtual reality and bluescreen technology. Innovation is providing opportunities to develop and test new approaches which have a positive impact on understanding in science and improving student attitude to learning and enjoyment as pupils are "hooked-in".

The CLCs have piloted video-conferencing, extending links and providing access to specialists and creating discussion with their peers, that would previously not have been possible. Blackpool CLC is working with America whilst Nottingham links with Lithuania. Some Centres include video-conference links as part of the curriculum. Students at Frankley CLC, Birmingham, study Forensic Science with a Forensic Archaeologist from London and the local police, using the CLC resources to undertake forensic tests. Other students have piloted the new video-conferencing e-Mission with the National Space Centre in which astronauts become stranded on Europa, an ice moon of Jupiter. Pupils monitor their life support and health, look into ice tremors and plan recovery routes. CLCs bring many expert professionals into the school system,

Young TV editors engrossed in making their Science Programme at Huyton CLC

who although not trained teachers, give students the opportunity to work with expert adults. Primary students spent an action-packed day at Parklands CLC, Liverpool as part of a science secondary transition project investigating city criminology in the context of the Murder at Honey Lane High. They worked with the City Historian, police, journalists and teachers to take forward their evidence from DNA finger printing.

Many CLCs have invested in digital media technologies, offering a range of hardware and software that match or surpass industry standards, allowing schools to explore new approaches to assignments that increase levels of challenge, interest and enjoyment. Stockton CLC took students to Robin Hood Bay where they snorkeled with digital cameras and videos to record marine life. The tidal cycle was time-lapse recorded to demonstrate ecological and astronomical phenomena. At Longbenton CLC students use bluescreen technology to drop inside a cell to explore its structure and function. 3D stereo projection allows them to enter a human heart with scientists from Teesside University, and to follow the journey of an erythrocyte around the circulatory system. Like other centres, this one links to the National Space Centre for e-Missions. Volcanic eruption is the problem requiring solution for students working as scientists and environmentalists processing and handling data accurately. Year 5 used digital animation to investigate animal adaptation and habitat and Year 13 students benefited from the lecture series offered as masterclasses by staff from Jesus College, Cambridge.

Several schools make use of the Virtual Learning Environment to research the Solar System with Open University scientists. Children are linked up "live" to interrogate experts. Children were linked to a conference in Texas and spoke directly to Dr Tim McCoy, at the Smithsonian Institute, Washington. Anyone can now visit the CLC website to hear the webcast of this interaction (www.vle.stocktonclc.co.uk). Who can fail to be inspired when hearing the eager, searching questions of the young scientists? – How do space craft go into orbit around other planets? – What colour is Saturn`s core? – followed by the laconic, knowledgeable transatlantic response. Alternatively, the podcast of the event can be downloaded. The work will soon be uploaded on the OUs RSF site from which the resource will be available for any teacher or pupil to use worldwide.

Digital media have also enhanced ecological studies such as those undertaken by 8 year olds in Sunderland where data loggers, digital microscopes and cameras enable children to test variables such as temperature and light that impact on crustacean habitats.

Many CLCs provide curriculum developers in substantial training programmes designed for teachers. Towneley CLC, Lancashire organises Heads of Science collaboration with classes on improving performance for course work examination. Students are also involved in Science Roadshows using robotics, media and science game technologies. Visits to the Sheffield CLC by groups of Chinese teachers resulted in the launch of the eChina project, and with film and examples of British curriculum materials being sent to the Beijing Institute of Technology, for inclusion in their teacher training programme.

High quality Computer Aided Design and manufacturers' facilities exceed the experience and budget of most schools, yet some CLCs' standards match those of industry. Design software linked to computer controlled laser cutters, milling machines, lathes, sewing machines and the latest 3-D printers provide opportunities in schools to raise A level Technology grades. Frankley CLC works with local business to solve industrial problems and student awareness of commercial interests improves their understanding of economic developments. Many primary schools are unable to deliver the control technology element of KS2 due to limited resources or expertise, unless they use CLCs that are properly equipped and have staff to provide a high quality experience and train teachers along with their students.

Many CLCs work closely with talented students offering valuable e-learning opportunities through masterclasses and Summer/Easter schools with access to specialised equipment. In Hammersmith, pupils designed an informative HIV/Aids website. In Hackney, primary children researched and organised scientific investigations into forces to create an online video quiz which is now used by other pupils and teachers. In Wirral, primary work has led to an Astronomy Club and improved links to the National Schools Observatory. Sports Scientists at South Camden view and analyse video clips of their own performance, capture skills, compare contact, break down activities and improve learning. They work alongside younger, secondary scientists on a "Cars in Motion" project in which teams evaluate a Grand Prix circuit, devise a race strategy, calculate safe speeds appropriate to the changing track, use practice laps and make improvements to performances. Able younger children investigate healthy eating and create a TV report using their own research, scripts, recordings, transitions, editing and presentational skills. Centres cater for learners of all needs and abilities, none more so that in North Hull where autistic children access the science curriculum independently through the use of technology.

Community members access courses including "silver surfers clubs" for the retired. Centres nationally average over 100 adult learners per week, many of which successfully complete accreditation on courses. Blackpool CLC has over 1000 adult members and around 110 use its TV studio each month for a variety of projects. Infants have learnt alongside adult family members at Sheffield CLC to increase involvement in family learning.

The newly opened National Science Learning Centres will provide further links for the CLCs such as those developing at Redcar & Cleveland. They will provide the highest quality professional development for science teachers and technicians, to drive standards and enjoyment of scientific learning in our schools even higher.