Painsley Catholic College

– Stem Leaders Qualification

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The SLQ is a qualification designed by the Centre for Science Education, Sheffield Hallam University, building on in-depth research into the development of youngsters' Personal Capabilities. www.personalcapabilities.co.uk/slq

STEM Leaders Qualification

slq

The school

Painsley Catholic College is a high performing (HPSS) Specialist Science, Maths and Computing College, originally designated in 2004. It is an 11-18 voluntary aided Catholic comprehensive school, with approximately 1200 pupils on roll. It is in a semi-rural location, in the Staffordshire Moorlands, close to the city of Stoke-on-Trent. Academic ability on entry is broadly in line with the national average and the VA 2011 places the college in the top 3% of schools nationally; 4% of students are SEN statement / school action and 86% of all students make the expected progress in English and 79% in Maths KS2-4 with both these values placing the school top in the county.

The project

Painsley became a lead hub school for the SLQ in the county after achieving STEM Pathfinder School status from the SSAT (Schools Network) in 2008-9. This involved us committing to work with other schools and to enrich their, and our, curriculum provision in STEM. An inspirational presentation from girls at Sutton Coldfield Grammar School at the 2009 SSAT Science Conference highlighted the SLQ pilot and convinced us that this was the perfect qualification to enrich curriculum provision and help us to focus on Personal Capabilities.

The SLQ is unique, in that it is based on skills that allow students to progress and develop throughout the course, highly flexible both in terms of the mode of delivery and content, supportive of innovative practice, students Personal Capabilities and employability (Bianchi 2002). A pilot activity with students prior to implementing the full course was very well received.

We recruited a hub of 3 other schools across the county and started to co-operatively plan the SLQ. CPD and student showcases were planned on a rota basis, with each school taking a turn in hosting and therefore sharing ownership of the project.

The first draft of the course was developed by Painsley, following Edexcel and Sheffield Hallam University training, and then shared with the hub for modification and further development. Each school adapted the course to suit their own needs. All the schools in the cluster began running the scheme as an extra-curricula club, meeting once per week. This timetable proved to be too onerous and the time available did not allow for depth in a task. To solve this, major event sessions were planned e.g. working with an expert, planning a STEMtastic event for Year 5, visiting an engineering company for a challenge day etc. These major events provided the depth needed. In the end the two approaches blended into fortnightly STEM sessions (2 hours after school) and major events.

In Year 11, this reduced further to a need-to-meet basis prior to and after a major event, such as completion of the final personal development questionnaire to track progress in Personal Capabilities from Year 8 to Year 11, with fantastic results achieved by all. A key task was to bring on board more staff to deliver the SLQ and also internally verify units.This also spread workload and expertise.

Above Year 10 Delivering CPD on engaging STEM activities, using skills gained from the practising leadership with others unit.

Joint moderation was planned for the cluster's first year to make sure all schools were along the right lines and this was supported by the Centre for Science Education and Edexcel. In subsequent years moderation has been between schools which also meant there was an opportunity to share experiences.

All resources follow the 'Teamwork' optional unit, but each school could do its own project within the unit. This made moderation easier. All resources have been shared as developed by each school. These have been shared with colleagues at SSAT National Conference and also at the ASE conference in Liverpool in 2012. Samples can be obtained by email (see contacts).

STEM Activity at Painsley Catholic College

The SLQ has had a big impact on the students completing the course, the staff involved, other students and across the school. It has certainly raised the profile of STEM education in school. All staff are aware of STEM and the leaders wear blazer flashes with pride. This has had a knock on effect into other areas and we now have over 70 sports leaders in addition to art leaders and maths leaders.

STEM Ambassadors

We have 6 student STEM Ambassadors and have launched an ICT Ambassador scheme. ICT Ambassadors are trained by ICT technicians to support ICT in the classroom including helping to troubleshoot hardware issues. The skills used relate to the unit 1 of the SLQ, developing personal leadership skills and also, for the ICT Ambassadors, the learning from more experienced colleagues unit. They have been trained in hardware maintenance and are now class ambassadors to support learning in the classroom and provide ICT support to staff when required.

Peer to Peer STEM learning

The project has seen primary school students taught by the STEM Leaders and the students in Year 11 have received the Princess Diana Award for their work to support the teaching and learning of science in our twinned school in Ghana as part of the teamwork unit.

Support for the PSHEE Curriculum

The role of the STEM leaders and Ambassadors was highly praised by our PSHEE Ofsted inspection in November 2011, being put forward as a case study for PSHEE best practice nationally. It has also allowed us to promote awareness of SMSC (Social, Moral, Spiritual and Cultural) issues with students. We play them the video of our twinned Ghanian school in Tafo, Ghana to prompt discussion about the different circumstances in the two schools. SMSC appears in every strand of the new OFSTED and so the SLQ provides valuable evidence for it as it lends itself to group work. Many of the short activities we have done to develop skills have had humanitarian elements to them, for example the solar module. This had activities that looked at humanitarian engineering and health – designing water straws and solar ovens.

Visitors from the STEM world

The STEM leaders also arranged for Dr Leahy from National Geographic Channel's series "Bite Me!" to visit the school and talk to students about his work as an experiential parasitologist. He was extremely funny and talked about parasites in Africa to link with our Ghanaian projects. In the evening we held an event for families, supported by the PTA, called *"An audience with Dr Leahy...."*. Over 100 families came to this event. The students organised everything, using the skills developed throughout the course. They also arranged a 'Cafe Scientifique' event for Year 8 pupils in our languages block, which was led by a robotics expert from Staffordshire University.

Visits into the STEM world

SLQ students will also visit the University of Manchester to look at the design and build of high performance electric vehicles as part of a new project for the learning from more experienced colleagues unit. They will put this into practice back at school when they deliver a STEMtastic session using Hydrogen-fuelled model cars with the new Year 7 intake at STEM club.

The outcome

All students have passed with flying colours. The course has raised the profile of STEM and turned it from geek to chic! Students are proud to be STEM Leaders.

Personally, it has enriched my teaching as I apply many of the ideas and teaching strategies to my lessons to become more of a facilitator in the classroom. The range of enrichment we now provide in STEM is enormous and all students have access to STEM activities, including a whole school STEM Citizenship day.

For the STEM work done, I was awarded the Lloyds Register Educational Trust Teacher of the Year UK in 2011 and was also interviewed about girls and engineering opportunities by Radio 4 presenter Jenny Murray for Woman's Hour. Students have also been interviewed about how this has course has raised their aspirations, interest and success in STEM subjects for the Times educational Supplement (TES Minority report 2011) and presented their work and the impacts of the SLQ at the SSAT national conferences and science conferences in 2010 and 2011. They have also delivered CPD to teachers for the Science Learning Centre for the West Midlands and the STEM Clubs network. I am so proud of what they have achieved as it has grown from a small idea to have an international impact!

Parents think very highly of the SLQ, commenting that:

> "The opportunities are beyond the normal curriculum, yet have enriched their child's school experience and broadened their horizons."

Students have made many comments over the last 4 years, but here are some of the most pertinent that will remain with me:

> Before I did STEM, I thought I was always right and I didn't listen to others' views. I know that I am not always right and I need the richness that others' bring to a team. STEM has made me think again and reflect and I am a better person for it. I can work with others now and am more tenacious.
>
> *Year 11*

> I met a prince, programmed a robot, engineered a hydro-electric power station, trained teachers and had a great time doing it!
>
> *Year 11*

> I can't think of words to say to let you know how much STEM has meant to me... I have made new friends, experienced new things, and developed my leadership skills and personal skills which will be invaluable to me for the rest of my life as this has put me on the right steps to success. I was so shy before and now I can talk to a room full of headteachers! I never dreamt I could do that!
>
> *Year 11*

Left Meeting Prince Boateng to hand over science kits from the Teamwork unit

> I always felt different and had found it hard to make friends. STEM has allowed me to become more confident in myself and I can now get on with all sorts of people and know that I have made a difference to the lives of others.
>
> *Year 10*

Result / evidence of success

Our partner schools in the hub have successfully passed students and continue to develop exciting opportunities for learners. We support each other and continue to co-develop resources and ideas. Our EdExcel moderator complimented our logbooks and we have recently developed an innovative online assessment tracker tool to support greater independence in task completion. The biggest success for me, apart from passing the qualification, is the personal impact on learners over time. Other subjects measure progress against attainment targets but this qualification allows you to see the richness of pupils' qualities and develops the whole child in a way a more academic qualification cannot. It gives them lifelong skills that employers need and that our future workforce must have. It equips them for the challenges of the jobs that have not even been thought of yet as technology advances. As a teacher it is a liberating qualification to deliver.

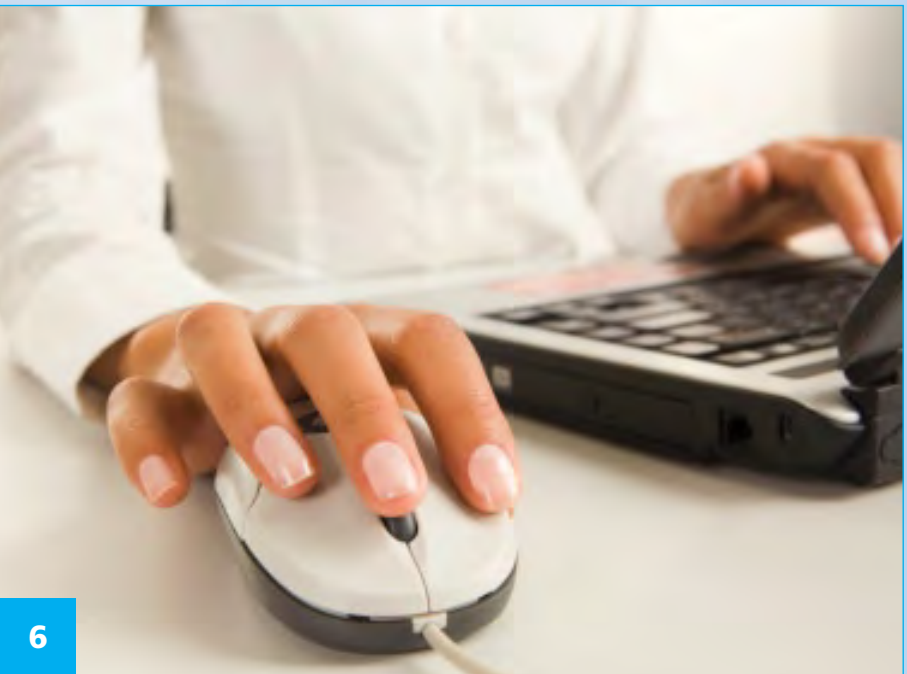
What did and didn't work?

The STEM hub worked well in sharing ideas and moderating our work part way through our first cohort. One school did not want to take the full qualification due to changes at a senior management level and wanted to use the links to develop a STEM club. This is still the situation so has not worked as well as hoped in terms of gaining the SLQ as a cluster. Funding issues continue to be a concern as school budgets tighten and pressure to perform in qualifications that count in the eBacc mounts.

Using logbooks and allowing independent completion works well as the course has no curriculum allocation and is taken as an extra-curricular option.

Other staff are now involved in planning and delivering which makes it more sustainable and if one staff member were to leave then not all the expertise and contacts are lost. The first cohort was a pilot and students from a mixed ability background were chosen by their head of year. Only one dropped out over the four years giving a very good success rate! Subsequent cohorts have been by letter of application and then interview by the student STEM Ambassadors.

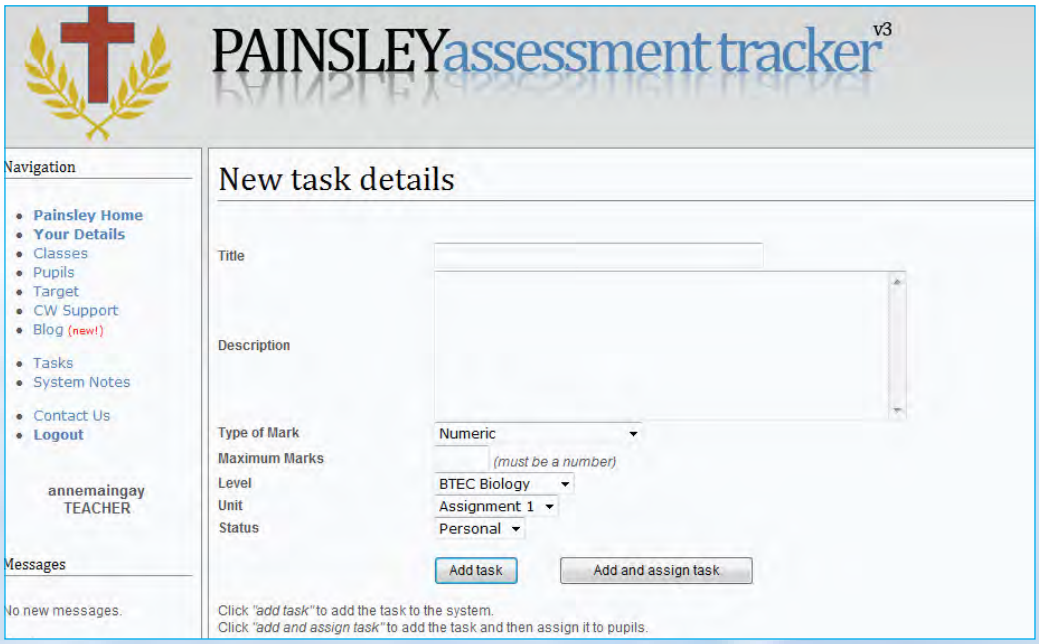
The success of a cohort appears to be very much down to the drive and enthusiasm of the lead teacher. Since the SLQ is an extra-curricular option, students would soon vote with their feet if they were not enjoying it. This means greater planning is needed compared to just running a club.



Tasks are fluid and adaptable according to what experience we can arrange for learners e.g. Smallpiece Trust engineering days, guest speakers, resources and costs etc. This variability requires a complex system to monitor the criteria achieved. This will now be done using an innovative online assessment tracker already developed in school for our OCR nationals in ICT and vocational science courses. This will simplify monitoring and encourage students to take more responsibility for their own tracking against the criteria.

The future

The next steps are to share the new online tracker we have developed with hub schools. The tracker allows students to log-on via the website and see where they are with respect to achieving the criteria for each unit. This is password protected so that a student only sees their data. It also gives assessment information and task information and links to logbooks. This promotes independence and is suited to the nature of the SLQ as an extra-curricular option. Tasks are uploaded and assigned to students quickly and easily. It has meant that assessment can occur remotely, for example when visiting ABB engineering, online assessment can occur whilst on the visit and witness statements can be completed online instantly too. The system has been used successfully in school for ICT, PE, Technology and Science and the SLQ was the next step. Please see contact for further information.



Key insights

We are also monitoring the impacts on uptake, as only certain numbers of qualifications vocationally will count in league tables. The qualification has to build its niche in such a high performing school, not as a performance indicator subject, but as a subject that meets the every child achieves and PSHEE agendas in school. It is also a driver for increasing engagement with industry. A greater involvement of other departments is also planned and resources purchased to do this such as smart materials in technology for a smart materials project to 'learn from more experienced colleagues'.

The future

It is planned that students could have options for the completion of units e.g. smart materials and fabrics for problem solving or learning from more experienced colleagues or robots to do the same units, to meet the interest of learners. There is also scope to link it to the extended project done by students in school, looking at humanitarian engineering. We are closely monitoring the Level 3 pilot and will explore this option too, but the launch came at wrong time in terms of curriculum development and planning which occurs in October for the following September. We are also keen for more schools to join our cluster and spread the value of the SLQ.

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To find out more about the STEM Leaders Qualification contact the Centre for Science Education, Sheffield Hallam University on 0114 2254870.

www.shu.ac.uk/research/cse

Bianchi L (2002) Teachers' experiences of the teaching of Personal Capabilities in the Science Curriculum' PhD Thesis, Sheffield Hallam University.

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