Carnegie UK Trust

Enterprising Libraries: Neath Port Talbot Libraries

Shared Intelligence

Enterprising Libraries: Technoclubs in Neath Port Talbot Libraries

As part of the Carnegie UK Trust's work on the **Future of Libraries** in the UK and Ireland, the Trust wanted to explore the innovative ways in which public libraries can contribute economic wellbeing by supporting access to education, training and employment, and enabling people to fulfil their potential and enhance their quality of life.

This programme of work, 'Enterprising Libraries', involved the Trust giving £3,000 to Neath Port Talbot Libraries, a library that had already started to explore creative ways of encouraging enterprise and digital skills development. The Trust commissioned Shared Intelligence to conduct an independent evaluation of the activities run at Neath Port Talbot to ensure that lessons and experience from the projects were captured and could be shared with public library professionals and policymakers.

The Project

Technoclubs in Neath Port Talbot (NPT) Libraries is the name given to library-run computer-coding and robotics clubs[1] that are held in schools and libraries for primary and secondary-school aged children. The inspiration for Technoclubs came from the Technocamps project at Swansea University. However, the university sessions did not cater for the under 11s and so NPT Libraries have adapted the sessions to suit a younger audience.

The idea of running Technoclubs in NPT Libraries was conceived in late 2012 when NPT Libraries launched their first LEGO Mindstorm workshops for children. This initiative was part of a Welsh Government project supported by CyMAL (Museums, Libraries and Archives Wales). Following this workshop, in Spring 2013 the

Systems, ICT and Development Officer at NPT Libraries attended a Technocamps training day at Swansea University. She attended with a colleague who, unlike her, had little prior interest or knowledge in Technocamps. However, this colleague quickly 'caught the bug' for Technocamps.

From the inception of Technocamps, the Systems, ICT and Development Officer has been the overall lead and instigator of activities. She introduced Technoclubs into the library service, designed the structure of the sessions, and acquired the equipment needed – five laptops, five tablets and three robot kits. The senior officer from the local authority's Education Library and Resource Service (ELRS)[2] also played a crucial role brokering relationships with local school headteachers.

At the time of writing, two schools in Neath Port Talbot were hosting Technoclubs run by NPT Libraries, and several other schools were approaching libraries to run similar activities with them.

An underlying reason for the school's interest is that this year, in England and Wales, a new computer science curriculum is being introduced. This curriculum tries to recapture the quality and spirit of computer science which existed 30 years ago – one in which pupils are taught not only to use software, but given an insight into how to make it.

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[1] The robotics used are LEGO Mindstorm kits, and coding is taught using Scratch and Hopscotch

[2] The ELRS in Neath Port Talbot was created as part of the education service, but in addition to supporting school libraries and loaning museum items, they also produce film and broadcasts for schools and provide a wide range of technical support.

There is a particular resonance to endeavours to equip local children with STEM skills. Fifteen minutes away from one of the participating schools is TATA Industries' steel plant, the largest employer in the area and the newest blast furnace in Europe. Ten minutes further is Sony's UK Technology Centre which has produced over 3 million Raspberry Pi computers in just two years – prompting Sir Howard Stringer (former head of Sony) to argue Welsh firms could win back high-tech manufacturing from Asia. The whole area now hosts a string of leading edge manufacturing and technology firms providing highly-paid high-skilled jobs.

Yet the head teacher at one of the participating schools told us that he worries his pupils will miss out on these high-status high-skilled jobs unless he achieves a step-change in pupils' STEM[3] skills and attitude to STEM subjects. For him, Technoclubs are part of that change.

'In the current circumstances, we need to show we are providing a service which is relevant to our communities. There is massive skills gap in STEM, and schools can't afford the equipment or staff time or training.

Why spend money on equipment to take to schools? Hopscotch and Scratch actually cost nothing. You don't need new iPads. The only extra is the robotics . . . So we spend three lots of £300, go into schools, bring children back into libraries.'

Bethan Lee, Systems, ICT and Development Officer at Neath Port Talbot libraries

Aims

Through Technoclubs, NPT Libraries aimed to give children practical experience of applying computer science skills, encourage more children to take-up STEM subjects and raise their aspirations. Through doing so, a related aim was to increase the profile of public libraries in promoting STEM and computer science subjects, and to attract more children to join the library.

Originally, NPT Libraries planned to initiate Technoclubs in libraries and in schools in parallel.

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[3] Science, technology, engineering, and maths

The hope was that they would be mutually reinforcing, with some children discovering Technoclubs through libraries and others joining through schools. Over time, it was hoped club numbers in both settings would grow.

Delivering the project alongside Education Library and Resource Service (ELRS) has had an effect on how the aims of the project have been conceived and delivered upon. While for NPT Libraries staff it has been important to get more children and young people into libraries, for ELRS staff, it has been more important to develop activity within schools, drawing on the resources available in the library service.

What happened and what role did support from the Trust play?

One of the first steps was for all those involved in running Technoclubs to receive training from the Swansea University Technocamps team. This enabled Technoclub sessions to be supported by staff other than the Systems, ICT and Development Officer. Staff who underwent training included: the library service's schools support officer, a qualified teacher and a youth leader (who had no digital experience prior to the training).

Some sessions were supported by a member of library staff and a staff member from the Education Library and Resource Service also helped deliver some sessions.

A further member of the library team is currently being trained. This individual is a library assistant with only a few years' experience and no background in digital or working with children, and it is expected that she will need more support than the others before she can confidently lead a Technoclub. At a participating primary school, the after-school Technoclub is also supported by one of the school's teaching assistants with the intention that she, too, can lead sessions at some point in the future.

Funding from the Trust helped the library service acquire equipment, a crucial element of the programme. The main expense was three [LEGO Mindstorm robotics kits](). The library service used laptops and tablet computers they already owned.

Designing a local version of the Technoclub model

Given the highly-structured nature of The Swansea University Technocamps programme and the fact it was aimed at children aged 11+, NPT Libraries staff decided to make their sessions less structured, and to offer it to under 11s. Staff rehearsed potential Technocamp sessions with LEGO robot kits *'until we had the confidence to run sessions, and until we had activities which we could run for an hour'.* Once confident in this area, staff started teaching themselves Scratch and Hopscotch (programming languages which were part of the Swansea University programme).

Library staff were aided by the schools support officer in creating a structure and focus on learning objectives. The support officer used her prior teaching experience to approach the sessions as she would a school lesson plan.

In spring, 2013, NPT Libraries took their Technoclub idea from the drawing board to a live programme of after-school clubs at Gnoll Primary school and Sandfields Library. They did so despite the difficult backdrop of having to make [significant reductions to their service](#) – including reducing the number of library branches. This wider upheaval affected Technoclubs in several ways:

- The prospect of major organisational change made it harder to find staff willing to help with Technoclubs.
- There were sensitivities around working with library branches whose future was uncertain.
- The Systems, ICT and Development Officer was given additional responsibilities around training volunteers when proposals were made to hand over several branches to community groups.

Launching Technoclubs

Nevertheless, after receiving funding from the Carnegie UK Trust, the Systems, ICT and Development Officer began trial taster sessions with children in larger libraries during the summer holidays of 2013.

Following from this, NPT libraries planned to launch Technoclubs at Sandfields Library in Port Talbot, after school on a weekday. Their target age-group was 11-16-year-olds from NPT Libraries' existing membership. This was expected to attract children from the two local comprehensives, St Joseph's RC Comprehensive (a mile from Sandfields Library), and Sandfields Comprehensive (which is slightly closer).

For the in-school Technoclub, the target was Gnoll Primary in Neath and the plan was for a Technoclub to take place after school in one of the classrooms. Getting the club running at Gnoll Primary began with a meeting at the start of the 2013-14 autumn term between NPT libraries' Systems, ICT and Development Officer and the IT lead at the school. In November, two taster sessions were held during normal lesson time for Years 5 and 6 (nine and 10-year-olds) and which 55 children attended. A de-brief with the school concluded an after-school club would be viable, and the school sent letters to parents asking if they wanted their children to join Technoclub.

Technoclub at Gnoll Primary began in January, 2014, with six children taking part. The teachers describe the children taking part as tending to be those needing extra attention with behaviour and general performance*.* Technoclub at Gnoll has now been running weekly with the same children.

Challenges with the older age-group

In contrast with Technoclub at Gnoll Primary, the in-library Technoclub at Sandfields Library aimed at 11-16 year-olds proved more challenging to get going for several reasons. Although the original aim had been to recruit club participants from the existing library user base, library staff realised this would not generate enough numbers and decided they would also need to work with the two nearby comprehensives to achieve sufficient numbers.

Similar to the plan at Gnoll, the idea was to begin with taster sessions. However, scheduling tasters in secondary schools proved much more difficult

than at a primary due to timetable pressures. A further challenge was that the in-school tasters – when they were finally held – did not persuade many children to attend the Technoclub at Sandfields library a mile away. When children did start coming to the library-based sessions, staff found the 11+ Technoclub had a 'totally different feel' to the activities at Gnoll Primary and was harder to run and attract pupils to. In response to these challenges, library staff tried making further adjustments to the activities, making the sessions less structured, and playing music to create more of a youth club feel.

A further challenge was that the staff at one of the schools began asking NPT Libraries to hold additional tasters at their school. For the NPT libraries team, it was felt this would move the club into the school instead helping to increase the footfall of children in libraries.

Do Technoclubs support enterprise and help people gain new skills, knowledge and experience?

New skills and knowledge?
The evidence indicates Technoclubs support new skills and knowledge for three groups; library staff, school staff, and the children who take part.

Before NPT Libraries began delivering Technoclubs, none of the library staff involved in Technoclubs were experts in Scratch or Hopscotch, or programming LEGO Mindstorm robots. Even the member of the library staff who instigated the whole idea had to teach herself how to use these programmes.

For staff in schools, Technoclubs provide an opportunity to learn new skills that the new Computer Science curriculum requires schools to have. The long-term aim of the head teacher at Gnoll Primary school is for his own staff to run Technoclubs. However, given that the Technocamp team at Swansea University are not focusing on primary schools and under-11s, he sees his only practical route to providing his staff with these skills is through NPT Libraries.

For the children, Technoclubs have clearly introduced them to new skills and knowledge – as well as helping with their overall behaviour and classroom engagement. Some children already

knew about some of the technology. For some, this meant robots, whilst others were already avid players of Minecraft which has some similarities to Scratch. But all of them have gone on to try things they did not already know about and some have gone from simply being interested in gaming as a hobby, to being interested in gaming as a career.

For some, Technocamps has blended the acquisition of knowledge with competitive drive. One of the two girls in Technoclub said of programming a Mindstorm robot to navigate a maze: '*It was fun trying to work out what length and how many rotations would work 'cos we wanted to beat the other team.*'

Supporting creative problem-solving among school-children
The interviews carried out by Shared Intelligence and the NPT Libraries with the staff and pupils at Gnoll Primary indicate that coming to Technoclub has encouraged inquiry and problem-solving skills.

Gnoll Primary pupils described how Technoclub challenged them to think creatively and try new things – precisely the culture the head teacher wants to instil. One boy told us he initially only wanted to use LEGO Mindstorm robots because he loves anything to do with robots. But on the day we visited, he was working on a Scratch project for the first time because he felt he had mastered Mindstorm and '*I like something which is a bit of a challenge*'. Another pupil described how Technoclub had encouraged him to try something difficult which, with practice, became easier.

NPT Libraries staff also told us when they first introduced LEGO robots the children just wanted to start playing without planning, *'. . . but now they see the value of taking their time, and planning, and studying instructions. They also see how you need to experiment. For example we made a maze and when it didn't work they tried again.'*

We also heard from one teacher how Technoclubs help children's literacy and numeracy by making learning practical: *'. . . [the children talk about] "0.5 degrees" with the robots and that's great because if they're not understanding it in class, they're still using the vocabulary . . . and then in class, they'll remember: "We did fractions and degrees in club – I get it now".'*

Again, the head teacher at Gnoll primary told us quite bluntly: *'For me, this is about core skills, maths, English, computational thinking. Other head teachers might not see it that way and will probably only wake up to the value of robotics and simple programming when the curriculum forces them.'*

How are Technoclubs building reputation, stimulating debate, and supporting innovation?

Building reputation

Staff leading the Technoclubs are building the reputation of NPT Libraries with those they work most closely with, but for much of the past year, virtually all press and social media attention on NPT Libraries has been focused on the budget cuts (and subsequent discussions with community groups to keep branches open). In this context, it has been extremely challenging for NPT libraries to generate general public or local media attention on Technoclubs.

Despite this, however, NPT Libraries have won the confidence of those they have been working with directly, such as the head teacher at Gnoll, who said: *'I could not do this without Bethan and NPT libraries . . .'* He also told us: *'We just don't have the skills in the school.'* Another teacher went on, however, to say: *'We couldn't run it if [the library staff] hadn't come in to do it and [the library staff] have all got the skills on the programmes that I haven't got and we're working really closely together and learning off each other.'*

Since embarking upon Technoclubs, there have been requests from two other local primary schools wanting help to start a Technoclub. This suggests that NPT Libraries' reputation among schools is growing. But this is most likely to be through word of mouth, as schools do not naturally think to look to libraries for help with computer science.

Supporting innovation

While many library services signpost the type of knowledge Technoclubs bring, and provide resources or space for other organisations to run technology or coding clubs, the difference is that NPT Libraries have taught themselves the skills to deliver these activities directly. This seems a far more proactive and engaged approach, and one which would enable public libraries to add more value and have more impact in their communities. They have also discovered a real need among local primary schools for basic programming skills and for extra-curricular technology-based activities – a need schools are struggling to meet.

NPT Libraries' Technoclubs also highlight the fact that among library and information professionals there are individuals with the background and aptitude to teach themselves technologies like Scratch, Hopscotch and robotics kits and then deliver sessions using these. It is likely similar individuals exist across the sector, but what NPT Libraries have done is enabled those staff to put that potential into practice.

Does Gateshead have lessons for other public libraries?

Replicability

Even though the number of children taking part in Neath Port Talbot so far is small, potential is being demonstrated in terms of libraries adding value for schools around STEM skills and enabling schools to deliver the computer science curriculum.

What NPT Libraries have done is neither complicated nor costly. Staff taught themselves Scratch and Hopscotch in a short period of time as well as how to operate LEGO Mindstorm robots (these are after all, technologies designed originally for children from eight years up). They

have also managed it during a time of significant uncertainty and upheaval within NPT Libraries.

In terms of cost, the three LEGO Mindstorm kits were purchased for around £300 each. The library service already had the five laptops and five tablet computers which they take to each Technoclub. With this set of equipment, NPT Libraries can run clubs for around 14 children at a time.

For these reasons, we see Technoclubs as highly replicable in other library services.

In terms of the necessary conditions, two factors stand out. The first is the strong relationships which already existed between NPT Libraries and local schools via the Education Library and Resource Service.

The second factor is having staff with the motivation and skills to initiate and lead this type of service development, and the competencies to carry it through. From what we learned about the Systems, ICT and Development Officer, it is clear that her skills in partnership building and her overall affinity with technology were more important than her knowledge of specific software.

NPT Libraries staff are now planning to develop the model in two directions. They planned to hold 11+ Technoclub tasters in all libraries to see which locations draw the most interest. They are also considering lowering the age range of the in-library Technoclubs to include under-11s (ie the age group engaging well at Gnoll Primary).

Our observation, however, is that focusing on primary-age children may be more successful than secondary age – especially as other local primary schools have now approached NPT Libraries about setting up Technoclubs. In contrast, Technoclubs for the older age group also seem to bring more challenges. Focusing on under 11s also differentiates NPT Libraries' Technoclubs from the mainstream Technocamps being promoted across Wales for 11+ only.

The big question for other library services may be the balance between providing something which benefits children in-school, as opposed to something which increases the number of children coming into library buildings.
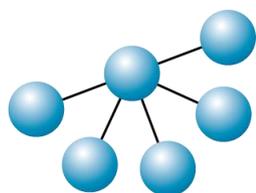
NPT Libraries' original logic model

Shared Intelligence supported NPT Libraries to develop a logic model – a graphical representation of the logical relationships between the resources, activities, outcomes and impact of a programme. The aim was to enable NPT Libraries to consider and reflect upon how they planned to reach their desired goal.

Inputs: Staff attendance at training sessions led by Technocamps team at Swansea University; and promotional activity led by library staff

Processes: Relationships built between libraries and schools, LEA, Swansea University and local businesses; library staff develop skills needed to delivering the Technoclub model; and launch of two Technoclubs, one held in-school for 9-11s, and one held in a library

Outcomes: Number of library staff able to run Technoclubs increases; schools become champions for Technoclubs; STEM skills improve; interest in STEM curriculum increases; and perceptions about libraries are changed

Impacts: Raised aspirations of children; greater take-up of STEM subjects; and increased profile for libraries' role in promoting STEM and computer science

Testing how the model is working:

- Number of sessions held and number of children participating
- Evidence of changes in skills of participants based on interviews with teachers
- Before and after perceptions of children who took part
- Perceptions of library staff who took part
- Media mentions of the activities
- Number of enquiries to the library service from elsewhere

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