

Watch This Space 4 **Gallery Educator Case Study**

Sian Weston and London Printworks Trust Placement at Lilian Baylis Technology School

Teaching maths through textiles and ICT

Context, aims and objectives

London Printworks Trust has worked with a number of local schools in the past, but we particularly wanted to strengthen links with the Design Technology Department at Lilian Baylis in order to deliver cross curricula work using textiles as a basis for learning about other subjects, particularly mathematics.

We have worked specifically with Lilian Baylis School on a number of educational projects including one for the Crafts Council's '**Boys Who Sew**' exhibition which targeted Portuguese speaking pupils at the school; a large scale banner project for their new school premises with designer **Zakee Shariff**, working with students from Year 9 on a project called 'Road Trip'; we also supported students as part of their GCSE work in Design Technology.

Also, the success of this previous work and good relationship with the school was the rationale for continuing the relationship and testing a new area of development – cross curricula work - for both the school and London Printworks Trust.

We identified design group **Action Time Vision** - who work across visual art and programming to produce highly interactive computer systems that use play as a basis for learning – to lead a series of workshops initially as a pilot programme, but with an aim to use our findings as a model to extend across the London Borough of Lambeth, and potentially on a London-wide basis.

We also wanted to get a firmer understanding of how schools operate in order to build a body of knowledge and experience at London Printworks Trust. This was a crucial part of our organisational development over the next five years, as it would assist us to design new programmes of work that reflect changes to our Local Authority Service Level Agreement, which now forms part of Lambeth's Local Area Agreement, prioritising work with 3 to 19 year olds.

Initial contact at Lilian Baylis was made through Emily Barney, a textiles tutor in the Design Technology Department and also via Head Teacher Gary Phillips. Our initial request was greeted warmly, and we were given the go-ahead immediately. I met with Emily at London Printworks Trust to discuss when the residency could take place, and we agreed on three

consecutive days in November. I also set out our aims for the secondment and she passed those on to colleagues at the school.

We encountered a problem a few weeks later when Emily told me of a possible OFSTED visit in November 07 and the school began to have reservations about my residency, saying that if the dates clashed, the OFSTED visit would be prioritised. This was resolved by talking to Penny Jones and fellow Watch This Space course members who assured me that OFSTED would see my residency only as a positive element that would reflect well on the school.

Placement Aims

- To identify areas where London Printworks Trust could make cross-curricula links between different subject areas – for example between mathematics and textiles to look at digital or repeat print
- To develop and deliver a pilot cross-curricula course working with Action Time Vision and a group of students and staff members at Lilian Baylis.
- To develop a strong model for cross-curricula work that can be rolled out to other schools in Lambeth.
- To identify professional development opportunities for Lilian Baylis staff
- To strengthen delivery of textile elements of Design Technology GCSE in print and fashion.

Pre-planning

In advance of the placement we had another meeting with the school where I met deputy head teacher, Su Wardrop to identify which particular classes I would observe. The school was very flexible in its approach to my residency, and allowed me a free rein to determine what subjects I chose to examine. We decided to look in detail at mathematics, but also to observe classes in ICT, citizenship, science and textiles. A timetable was drawn up by Su covering the three days, a copy of which is attached in the appendix.

Day 1

Year Group	Subject	Tutor
Year 11	Mathematics	Ian Clarke
Year 7	Mathematics	Miss Brown-Quilty
Year 8	ICT	Michael Currie
Year 11	ICT	Mr Wilson

Day 2

Year 11	Product Design	Emily Barney (double lesson)
Year 7	Textiles	Emily Barney (double lesson)
Year 10	Mathematics	Mr Awuley
Year 7	Mathematics	Eileen Leatt

Day 3

Day 3 was marred by the fact that I was scheduled to observe mostly Year 11 classes, but the whole year group was on an out of school visit to the O2 arena in Greenwich. Instead of observing a double lesson of Year 11 Science I observed Year 7 Art with Emily Barney, and Year 7 Art with Fiona Williams. Year 10 Science went ahead as planned.

Mathematics

Students study in traditional year groups, but occasionally collaborate in small partnerships as they did in our pilot project. I worked with year groups 7 to 11, and students were stretched as the work became more advanced. However, all the mathematics tutors were very thorough and students were given a sense of confidence to always ask questions when they didn't understand something fully. Students were highly motivated in all the classes I visited, and were keen to get to the correct answer. Students were set short problems to solve individually, usually for approximately 5 minutes, before working them out as a class. Lilian Baylis are very committed to a high level of learning in mathematics, and its head of department, Eileen Leatt, personally leads a 'maths camp' for girls each year that helps students who are either having problems or are especially gifted in the area, both are intended to improve overall GCSE grades. Research indicated that girls in particular were less confident in the subject than boys, and their GCSE results mirrored this, however their grades have improved significantly after the maths camps initiative was deployed. Class sizes varied from 21 – 30 on the days I visited.

Textiles

The textiles department is chronically under-resourced and has a very small budget for materials. The classes I visited were very lively affairs, and the tutor used available materials in a very inventive manner. Students worked individually on practical work, which varied from puppet making with Year 7 students, to printed deckchair fabrics for Year 11 students. There was no theoretical work in any of the classes, although I understand that the tutor has taken students out of class to visit places like the V&A on occasions. I have made some suggestions and comments about how to improve delivery of some elements of the textile curriculum in the final section of this evaluation. Class sizes varied from 26 – 28 on the days I visited.

Science

I observed only one science class, which was a Year 10 Applied Science class. I had expected this class to be much more theoretical and was surprised that it was more hands-on practical than I anticipated. Students were researching 'Chemical Tests for Negative Ions' using Bunsen burners, copper sulphate, potassium chloride, sodium carbonate, iron sulphate and Salt A, a toxic substance. The classroom was very well equipped. Learning was from worksheets and the tutor didn't use the whiteboard in the class I observed. Students worked in pairs. The tutor was well supported by a science technician, who had set the experiments up in advance. The students I spoke to didn't really seem to understand the significance of the work undertaken however, with my limited level of understanding I wasn't able to ask more detailed questions. There were 22 students on the day I visited.

ICT

The ICT department is very well resourced and all students have access to laptops and the internet. During one class I visited, the students learned about advanced applications of Microsoft Excel and took situations from real life to use as the basis of the work. For example football results and the quantity of food needed to feed animals in the zoo. The other focussed on making a storyboard, soundtrack and special features for an animation. Both classes were very well run, the students engaged with the materials well and were thoughtful in their approach to work. Students worked individually, and were set particular

tasks to complete within short time limits. Both tutors constantly told the students how well they were doing, and there was a level of pride in the students' accomplishments. Class sizes varied from 26 – 29 on the days I visited.

Citizenship / Foundation Studies

I observed just one class in citizenship/foundation studies, which was with Year 7. Students worked in groups of 5-6, and group leaders were allocated. The focus of the class was a presentation 'Why visit Japan?' a topic they had been working on for some time. Students had to come up with a 2 minute presentation that persuaded the 'audience' of three good reasons to visit the country. There were 30 students on my visit.

School Resources

Lilian Baylis is largely a very well resourced school and the Head Teacher has made provision for every student to have unlimited access to the internet and to a PC. Each classroom is well equipped with electronic interactive white boards, computers, laptops (including a laptop trolley that can be moved to any part of the school) There is, however, no 'e-strategy' that addresses future development and sustainability.

The Pilot Project

1 hour: 40 mins

Year 8, Group size: 30

We set our sights on working with the mathematics department, so that we could deliver a short programme using textiles as a basis for teaching quite complex mathematical problems including geometry, symmetry and volume with links to repeat print in textiles.

Pilot Project Course Aim

To make a connection between mathematical skills and creativity, in this instance through creating repeat textile print patterns.

Introduction

Repeat print in textiles is the most complex area within the discipline, and is taught only at a very high level on degree courses or other similar professional courses. We wanted to teach students at Lilian Baylis to design a simple repeat print using mathematics as a basis for their design, relating it back to geometry, in particular to tessellations.

Students are attracted to Playstations, I-pods, MP3 players etc, but often have very little understanding about how they are made and developed, how some of the software could be utilised in other applications, and that mathematical skills lie at the heart of all these designs. These students could be the potential software designers of the future.

Some pre-planning was done by Lilian Baylis mathematics tutor Ian Clarke, who worked with the group to create their initial designs using just a circle and a triangle, and these designs were used in the pilot workshop. The class of 30 was split into groups of five, and had to agree the final design as a group.

The first part of the pilot workshop was spent looking at simple colour theory – colour opposites and primary colours. Each group selected their starting colour and then had to identify the colour opposite to use in their first layout. We showed students different images

including Mark Wallinger's *Oxymoron* – a piece of work commissioned by London Printworks Trust that showed how the use of complementary colours has been used to very powerful effect.



Mark Wallinger's *Oxymoron* – where the Union Jack has been subverted using its colour opposites to form the colours of the Irish Tricolour

Each person in the group was allocated a specific duty – drawing shapes, cutting and sticking. They used the designs from the previous class as a template, and then had to work out how to scale up the designs for the dot and cross paper, learning how to apply the principals of ratio in a practical way.



Students used compasses and rulers to design their layouts then cut out shapes in colour paper



Students used pattern-makers large scale 'dot and cross' paper to replicate the graph paper used in the mathematics class, and constructed patterns using colour paper.

Ulla Winkler from Action Time Vision worked with students on a group by group basis, showing them on her laptop how their designs could work in different colourways and in different configurations.

Students were then encouraged to experiment with Ulla to create different versions of their own designs using Adobe Illustrator, so that they could start to think how writing and developing simple programming could impact on not only their studies in mathematics, but also creatively.

The class time was very short, so students had to work quickly to achieve results. Most students were excited about the work, and were pleased with their overall results. The next step of the student programme is to use their designs to make silk screens and print them at the specialist textile print workshops at London Printworks Trust, although this will require additional fundraising.

Written evaluation completed just after the pilot course showed that a large percentage of the group were excited about working with an artist; working as a group; enjoyed doing something fun in a mathematics class, and most students wanted to do more work with London Printworks Trust.

When asked what work they would like to develop with London Printworks Trust and Action Time Vision, most answered textile print work; simple programming, and enterprise work (making textile prints to sell).

Some of the student's comments included the following:

'I can't wait for the printing!'

'It was fun, I had a great time!'

'It was great fun, and I want to use more complicated shapes'

Eileen Leatt, the Head of Mathematics, came and observed the pilot project, and sent me this fantastic quote the same day..

'Hello Sian, this is just a quick message to say how much I have enjoyed watching and observing our Year 8 students working on their project with you and Ulla today. It is never easy getting children involved in a cross-curricular project, especially when mathematics is involved, but today I saw some fantastic geometric designs, some of which were quite complex, and I heard the most amazing conversations going on between the students, which involved quite accurate descriptions and correct geometric terminology. Added to this of course, is their incredible enthusiasm to get their tasks completed before the end of the afternoon.'

The link between Art and Mathematics is well known and recorded. It's a part of the curriculum we tend NOT to spend too much time on, as we have a more rigid syllabus

to cover. All too often, it is the mathematician who identifies the mathematical aspects of an artistic design and tries hard to enthuse others, many of whom are often not at all interested in Mathematics as a subject.

How refreshing to see the subject approached from the "other side". Children were taught a basic skill, (using a ruler and compass), and from that basic idea, sprang so many suggestions, experiments, and finally some fantastic work. I really do believe that this approach to learning mathematics encourages students to think seriously about taking the subject further after GCSE. These students will be your successful and innovative designers of the future.

Once again, thank you so much for working with us, and I look forward to working with you again in the near future.'

Future Plans

In future courses London Printworks Trust and Action Time Vision would like to show how mathematics can be used as a basis for understanding high level IT work, software design and programming, as well as repeat print textiles.

Staff CPD

The staff members that I approached during and after the residency and pilot project at Lilian Baylis were keen to come to London Printworks Trust for some training in textile print. This included the Head of Mathematics, Eileen Leatt, and Ian Clarke the mathematics tutor. Emily Barney, the textiles tutor, also wanted to come and do some additional work with us, and identified other technical and teaching staff in the Design Technology department who would benefit from taking part in some professional development workshops.

The success of the pilot project has encouraged London Printworks Trust to begin to plan additional cross-curricula courses using evidence as the basis for a model that could be tested in other areas of the school.

Also, we want to develop and deliver projects specifically working with the maths department, to build on the success of this project. Ian Clarke and Eileen Leatt are very keen to trial some ambitious cross-curricula work with their students, using their special day-long 'project days' throughout the school year. We will fundraise with the school for this to be delivered, ensuring a really high quality project.

Changes to Original Plans

In addition to the missing Year 11 on my final day I was also due to present a short Powerpoint at an early morning staff briefing, going over the aims of the residency and some visuals from London Printworks Trust and Action Time Vision, however this was cancelled at the last minute. This impacted on my visit as some staff members whose classes I visited had no real idea who I was, why I was there, the significance of working with London Printworks Trust, or even how we might be able to collaborate in the future in ways *not* described by us.

I had also asked to be allowed to introduce myself at every class – even where students recognised me from other classes. For the most part this happened, however in one or two

cases I was not given the opportunity at the beginning of the class, so had to spend workshop time going round individually telling students who I was and why I was there. Many assumed I was part of the OFSTED inspection team.

Review

In the future I would organise a short briefing in advance of any secondment so that *all* staff could learn something about London Printworks Trust as an organisation and what we can offer before the residency started.

Teachers' professional lives are very full and they have many demands on their time, however an organisation like London Printworks Trust can not only help to alleviate those time pressures, but offer a quality resource that will enrich the learning experience for students and staff alike. As we are a resource-based organisation, and have a staff team with a lot of skills and experience, Lilian Baylis, and eventually other schools, can utilise those skills as well as our industry standard equipment and resources to help students produce really exciting work for their GCSE portfolios. Students can also begin to make links to other practices and areas of the curriculum which can help with their overall approach to learning.

In the past when we have worked with groups as part of their GCSE work there is strong evidence that by taking part in practical day-long workshops, their attention span has increased, their overall engagement has improved - increasing their appetite for working creatively.

We have made contact with some highly committed teachers at Lilian Baylis, including Emily Barney in textiles as well as Ian Clarke and Eileen Leatt in the mathematics department; Michael Currie in ICT, and deputy head teacher Su Wardrop.

Working with the school in the future

We have made preliminary plans to work with the same group of Year 8 students who worked on the pilot project in December 07 to come and complete their work by printing some lengths of fabric at London Printworks Trust, although no dates have been confirmed.

We also plan to undertake some continuing professional development with staff from Lilian Baylis, and will be approaching the school for funds to enable this piece of work to be completed. This is an essential part of the programme as it will ensure that work is able to continue independently of London Printworks Trust, and that staff have the knowledge, expertise and confidence to think more ambitiously when planning practical work with students.

All London Printworks Trust's work is about engaging excluded groups with a creative process in a way that is appropriate, meaningful and tailored to each group's needs. What we have attempted to address in the Watch This Space 4 programme is a different way of approaching creativity which is more inclusive of other subject areas, helping us to widen the pool of potential people we can target for other creative projects.

Final Comments

The Watch This Space 4 programme arrived at a very timely moment for London Printworks Trust as we were undergoing a period of change with our Local Authority funding. Their

priorities had changed from a general one of widening participation to targeting a very specific age group of 3 to 19 years. London Printworks Trust has a strong track record of working with local young people and has delivered some work with schools with positive results. However, work with schools has tended to be ad-hoc on a project by project basis. We are now looking to develop longer lasting, mutually beneficial strategic partnerships with local schools. The Watch This Space residency has enabled us to start such a partnership with Lilian Baylis School.

I have learned a great deal about how schools operate and how we can best support teaching, technical staff and students in a very practical way. Also, I have learnt how we can help them to deliver high quality projects that work within the constraints of the national curriculum. Our previous work with schools has been at times frustrating largely because of the limited contact time we have students. By using the simple model developed by London Printworks Trust and Action Time Vision we have shown that even in a very tight timetable we can achieve remarkable results.

In addition, London Printworks Trust attempted to address the on-going technical and support staff problems in the textiles department by suggesting that interview procedures were strengthened by giving candidates a practical test as part of the interview in order to assess their practical capabilities. We have also passed on the names and contact details of some of our own interns and volunteers to Emily Barney as potential freelance support staff. The first intern from London Printworks Trust, Gemma Wilkinson, worked on a departmental 'project day' in January 2008, and was also present when the OFSTED team came and observe on 16, 17 and 18th January 2008.

London Printworks Trust would also like to help improve the delivery of the theoretical work to the textiles department by engaging the students with some of the fantastic collections that are on their doorstep – including the Constance Howard Collection at Goldsmiths; the Museum of Domestic Architecture at Middlesex University, and the Geffrye Museum in Bethnal Green. We'd also like to work with them on a much overlooked part of the national curriculum – 'The World of the Professional Designer' where we can help them to build a visiting designers' programme, so that students can engage on a face-to-face basis and really learn about the design process and what it takes to run a design business.

The textile tutor works hard to raise sufficient funding to allow students to come and use the facilities at London Printworks Trust, and this has resulted in significant improvements in overall GCSE grades for Year 11 students. In the future, London Printworks Trust plan to fundraise alongside the school to improve and extend this opportunity.

London Printworks Trust is interested in supporting citizenship classes by working with students on areas that they could really engage with, including issues like child labour, ecologically produced and fairly traded fabrics in the fashion and textile markets, fake and counterfeit clothing and accessories and its links to organised crime. We could also look at Katherine Hamnett's 'White Gold' programme in the international organic cotton trade.