

# **Involving everyone: Using the “Literacy from Scratch” project to develop the Computing and presentation skills of FE students with learning difficulties and disabilities (LLDD students), aged 18 to 24 years, and of their Learning Assistants**

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## **Abstract**

“Literacy from Scratch” is an international classroom project designed to develop computer coding skills (now a part of the new “Computing” curriculum in England) alongside literacy development, using the MIT visual coding language, Scratch. This project has now been extended upwards from ages 5 to 14, to include trainee teachers at Brunel University London, as well as LLDD students, aged 18 to 24 years, at an FE College in Lambeth, south London. The paper explores the potential for this latter, largely under-represented, group of students to improve their communication skills, while learning elementary coding. In the most recent phase of the project (Spring 2017), we have also included a small-scale study comparing PowerPoint and Scratch as tools for supporting the presentation of these students’ ideas, and their literacy development. Classroom support staff, (called Learning Assistants, or LAs, in England) were also encouraged to develop their teaching and learning skills throughout this project.

**Keywords** Coding, LLDD students, Learning Assistants, Scratch, PowerPoint

## **Background to the “Literacy from Scratch” curriculum project**

This curriculum project, which is a response to the UK government’s 2012 Computing initiative, started life in London, at secondary school level at Key Stage 3, with students aged 12 to 13, moving downwards in age to Key Stage 2, and ultimately to Key Stage 1 as required by the National Curriculum for Computing, with pupils aged 5 years (Williams, L. 2013). Following its on-line publication, the project was quickly adopted by Dr. Miroslava Černočová, Assistant Dean of Education, Charles University in Prague, Czech Republic (Williams, L. and Černočová, M. 2013), and by the University-attached Primary School, ZS Korunovacni, Head Teacher, Tomas Komrska. The project is also now running in schools in Italy, through the work of Dr. G. Barbara Demo, University of Torino, and her local schools (Demo, G. Barbara. and Williams, L. 2014). Pupil learning outcomes at every stage of the learning process have been inspiring.

See: <http://www.literacyfromscratch.org.uk/pupils/>

The project has also been very successfully developed with Post Graduate Qualified Teacher Status (QTS) students at Brunel University London, in the Department of Education, Charles University in Prague, and at De Montfort University, England with MA students (Williams, L., Černočová, M. Demo, G.B., and Younie, S. 2014). For an example of an on-line completed QTS teacher-training project file, see: <http://www.literacyfromscratch.org.uk/teaching/bookworm.htm>

## **Lambeth College involvement and background**

Lambeth College is a career-focused college in south west London, which meets the needs of learners with learning disabilities and difficulties (LLDD students). The LLDD Department has over 200 students with abilities ranging from Milestone 7/8 to Entry Level 3. This reflects an ability level normally associated with mainstream pupils aged about six or seven years of age, though the Lambeth students have far greater life experience, of course. Some of the students progress each year to mainstream provision within the College, and a few also leave College to go into paid or volunteer employment each year.

### **Past projects**

Previous Lambeth College ICT projects, in collaboration with and devised by Lawrence Williams, working with Lloyd Mead, include ‘Using Interactive Whiteboards’ as a tool to motivate and engage student learners with learning difficulties and disabilities. See: ‘Creating and using interactive white board games’ [http://www.mirandanet.org.uk/resources/iwb\\_games.htm](http://www.mirandanet.org.uk/resources/iwb_games.htm) For further collaborative projects, see: <http://www.mirandanet.org.uk/resources/> These successful cross-agency projects have all been focused on the social and engagement aspects of the Lambeth College students’ practical life skills.

### **Working with LLDD students**

The current development phase of “Literacy from Scratch” aims to explore to what extent this successful teaching and learning project in Computing can be developed to support students in the 18 to 24 age range, especially those with learning difficulties and disabilities, a group currently under-represented in the literature, and under-supported in life. Accordingly, Lambeth College, in south London, England, was approached to see if some of the students there might become engaged in supporting small-scale research in this new area. The challenge was taken up by Lloyd Mead, a Lambeth College tutor, who works with learners with learning difficulties and disabilities (LLDD students).

With a vast majority of the current cohort of students having a relatively good level of skills, this made the project a viable option. The students would normally have completed an assessed presentation, about themselves and their personal interests, towards the end of their College course in Practical Life Skills, using the PowerPoint program, to enable them to develop their ICT skills, together with their literacy skills. Taking on the additional challenge of using the Scratch visual coding program would, we hoped, add to the students’ computational thinking skills and, more specifically for this particular group of students, to their sequencing and interpersonal skills, together with a greater opportunity for individuation in their final presentations. We also hoped to be able to compare their responses to working both with PowerPoint and with Scratch.

### **Developments**

The “Literacy from Scratch” Computing project is aimed also at helping Lambeth College to prepare their students to start developing a new set of elementary Computing skills for succeeding in the world of work. They would also, we hoped, develop their more general computational thinking skills, through planning and problem-solving. The students strive to be able to present themselves well publicly, and to communicate clearly and effectively, for example at a job interview, but also for making personal choices, and for clearly giving their own opinions. These are important markers for Lambeth College. The next step was to see if these same students could present themselves in a similar way, but using Scratch, as well as

the more familiar PowerPoint. This development would simultaneously support their learning in:

- Literacy (selecting and presenting written information about themselves)
- ICT (saving and editing electronic files, including photographic images of themselves, their hobbies, and their other interests)
- Computing (adding a new set of coding skills, including elementary programming, algorithms, decomposition, and abstraction)
- Interpersonal and communication skills, for their College assessments
- Comparing PowerPoint and Scratch as tools to support literacy

All of these skills would help them in their personal development, and make them potentially more employable as well as more confident.

Following an autumn classroom term review of their ICT skills, including logging on to the College intranet and Moodle, and saving and retrieving work files, the plan was to spend approximately two hours a week during the Spring Term using the Scratch coding program, and to develop these basic skills, along with encouraging the College's own support staff in the skills required for using Scratch, in order to enable the Lambeth students to succeed. Each student would choose an area of personal interest (such as music, dance, football or cooking) and make a presentation project about themselves and their personal interests, as before, but using the Scratch program, instead of only using PowerPoint. This would clearly be dependent on the students' abilities in developing these new Computing skills, but had the further objective that all the students would be presenting their work to each other, and for some of the students to present their work publicly to a wider College audience.

### **Project Development**

Following the preliminary revision of their basic ICT skills in the Autumn Term, the Lambeth students began work on their Scratch projects in January 2016. In order to assess their progress, a series of monthly Excel files was created, charting the various skills that they were developing. What we hoped to see was steady progress from working With Help towards working Unaided on the various aspects of the project. The term With Help, in this respect, means without giving verbal instructions, or pointing to screen icons or explaining the commands.) The spreadsheets show that all students made very good progress.

### **What the students did to achieve this**

After a predictably slow start, in the completely new subject area of Computing, the students soon became fully engaged in their work. They set about developing projects on a range of individually chosen topics. These included music, football, cooking, and graffiti. As work progressed, it was pleasing to see the increasing levels both of enthusiasm and of concentration.

### **What the helpers did**

We were ably supported in this phase by classroom assistant, Athena Robinson, who explored the use of Scratch with her young daughter at home, and was subsequently able to give increasingly valuable advice to the Lambeth student group in the computer room. She also bravely developed her own individual Scratch project, which gave her useful insight into the problems faced by the College students:

She writes:

*During the past weeks, the Scratch project has pushed our students to think, and to present their pictures and videos in the way that they want others to see what they have been doing.*

*It has pushed them to think about how they would start out on their project, and how they would put it in an effective order. They were able to add sound files, including their own voices, to explain what their project was about. They have learned to record these different sounds, and to put them where they felt they were needed. They were also able to import pictures from different websites. Some of them have used photographs which they took within the community surrounding the College. One of our students, who is a Spanish speaker, recorded his Scratch project partly in Spanish, and he's delighted to hear it both in Spanish and in English.*

*I myself have created a Scratch project using pictures from my home island in the Cayman Islands, I was able to import my pictures from saved areas, and to include speech where needed. I also got my daughter to start her own Scratch project using her tablet at home. By doing this, I was able to understand how well the Lambeth students were actually doing, and how they felt while creating their own projects. All of their projects show how they are all very different people, and they also show their ability to develop their skills in coding from day one. Although the students are on different ability levels in all areas, they were all able to create their projects just the way they wanted.*

We also had with us Ahmad Brooke, a mainstream student currently doing a computer maintenance course at the College. He was interested in exploring teacher training as a possible career, and so he joined the group, work-shadowing as a learning assistant (or LA). At the end of each lesson, Lloyd provided Ahmad with detailed feedback about his role and contribution to the project, thus enabling him better to support the students in achieving their targets. This work also supported his own personal development, while providing practical help to the group.

Ahmad remarks:

*Through spending time with the students, I have found that the Scratch programming tool has helped them to improve their communication, keyboard, and cognitive skills. What is also amazing is how easily this tool was picked up by the students, and was used creatively to explore what the students can do with this program, including internet searching, and the use of the Moodle.*

### **Sound files**

As the project developed, most of the students saw the benefits of adding voice-over sound files to improve their presentations, and this was done in class with the help of a more modern laptop computer, with microphone and speaker. One student, Francisco, decided that he would do his voice-overs in both English and Spanish.

### **Targets for the students**

For some of the students, targets including sharing their ideas with others, and communicating these ideas effectively, as well as developing interpersonal skills, and finally presenting their finished project work publicly. This project achieved these aims by helping them to develop their confidence and pride in their achievements, such that they wanted to share their success with others.

### **ICT Elements**

- Logging on to the College intranet, and opening a new PowerPoint file
- Saving work in the right place
- Making a title page for the project

- Adding new pages
- Adding text data about themselves
- Inserting images of their interests from the internet and the College intranet
- Adding hyperlinks to a relevant web site

### **Scratch Elements**

- Opening a new Scratch file
- Saving work in the right place
- Working on coding
- Making a title page
- Moving between Scratch “pages” (using Backgrounds)
- Adding images (Sprites), from Scratch, the intranet, and the internet
- Animating these images
- Adding photos of themselves, using the Scratch camera
- Adding music (drumming and singing) and other sound files (cat sounds), using the Record facility in Scratch as well as embedded music files.

As the project progressed, and the students came to the natural end of their Scratch work, several went on to apply their skills to an entirely new, and entirely unaided project, the purpose of which was to see to what extent the skills they had learned could be successfully reapplied.

### **Conclusion**

The project was a great success. Each Lambeth College student met the aims of the project by producing a finished and polished piece of Scratch work that supported them when giving their final, public, spoken presentations. In this respect, the learning outcomes were slightly different from the development of writing skills demonstrated in the earlier Literacy from Scratch projects. At Lambeth College, the focus was rather more on the students’ more confident oral presentations than on writing skills. Elementary written skills were indeed developed, but confidence in speaking and presenting was by far the most successful aspect of the project. Several students also went on to develop interesting new projects of their own choice, without any help at all, showing effective transference of their new coding skills. They also showed awareness of some of the differences in using Scratch and PowerPoint, as tools to support their presentation skills.

Students’ comments:

- “PowerPoint is better for adding hyperlinks to web sites.”
  - “It is easier to add new pages using PowerPoint.”
  - “I thought PowerPoint was easier to use at first, ‘cos I had used it before, but I soon got used to adding pictures and sounds in Scratch.”
  - “Scratch is better for animation. It is fun.”
  - “Scratch is much easier to use for adding photos of myself. I sometimes found it hard to find my pictures on the college server. In Scratch, you just click.”
  - “Scratch is easier to use for adding music and other sounds.”
- We were also able to engage the LAs in the project in a number of ways:
- By giving a short initial training session on Scratch, with guidance on how to support the students in class
  - Classroom observation, including paired resolution of the students’ queries
  - Encouragement to develop ideas at home

- Adding in specific LA skills, such as drumming in the case of our LA and musician, William.

In this way, the LAs were able steadily to develop their own coding skills, while also contributing their other individual skills to the project.

### A Coding “Coda”

Parallel to the Lambeth College work ran a story-writing project, devised by a former colleague (who has asked to remain anonymous), which Beth Mead and I were challenged to develop, over several months. Each story was designed to illustrate a computer science concept in everyday life. Many primary school teachers use analogy to introduce the concept of algorithms to their young students as a cake or biscuit recipe. So the idea of seeing computing concepts in the world around us is not entirely new. It is, however, if illustrated through stories. Thus, with some guidance, Beth (aged only nine years at the start of the project) added a range of original animal and human characters to the suggested storylines, including her own dog, Maisy, all in delightful cartoon form (See Fig 1). She gave the characters different personalities, including character faults (Shakespeare’s idea, not ours!) and created the dialogue for them to speak. She wrote the stories in simple language, using short sentences, and with very few sentences to each page, as shown in one of the conference presentation slides. These stories were “field tested” on her younger siblings. Other stories illustrated concepts such as algorithms, decomposition, If, Then, Else, and Boolean logic. Six stories in all were complete, with one also being translated by Beth into Czech! The Czech was then checked, by friends in Prague. Beth learned a great deal from working on her project, and later developed some coding games using Scratch 2.00, to illustrate important events in these stories. These were then embedded into the final stories.



**Figure 1.** Beth’s delightful characters from the Algorithms book

### Coding Coda

At the end of the Lambeth College project, Lloyd Mead took Beth’s six finished stories, and some of the Scratch 2.00 games that she had created, into the college, where they

were used to strengthen the students' understanding of the coding concepts on which they had previously been working. These lessons therefore formed a series of extended plenary sessions (or a coda) to the Scratch project. In this way, these formerly separate teaching and learning projects were successfully merged into one.

### **Plans for developing future resources for LLDD students**

We plan to develop a further range of age-appropriate support materials and coding games for the Lambeth College students, using Scratch 2.00 and Interactive White Boards. These will be based on some earlier collaborative projects, created in PowerPoint, which are published on the MirandaNet web site, under Resources:

<http://www.mirandanet.org.uk/resources/>

The specific material for developing Interactive White Board games can be found at:

[http://www.mirandanet.org.uk/resources/iwb\\_games.htm](http://www.mirandanet.org.uk/resources/iwb_games.htm)

In this way, we hope to strengthen further the range of teaching and learning resources available to this particular group of LLDD students, and their Learning Assistants.

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<http://www.routledge.com/books/details/9781138022850/>

For the supporting web site for the Literacy from Scratch project, see:

[www.literacyfromscratch.org.uk](http://www.literacyfromscratch.org.uk)