

Primary Focus on Creativity & Challenge

Summer 2005





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Advancing education through ICT

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Introduction

ABOUT THE EDITOR:

Heather Govier is a freelance educational writer. Educated as a scientist, she began teaching in primary schools in 1973 and has worked as an LEA advisory teacher and a lecturer in ITT. Before the merger of Naace with MAPE, she had been Chair of MAPE, since 1998. She is currently Chair of the Naace Primary Working Group.

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It has been a great delight to serve as guest editor for the Naace Primary Focus on Creativity and Challenge. I have thoroughly enjoyed reading this eclectic set of articles, all of which exemplify creative teaching and so many of which have introduced me to new ideas and applications.

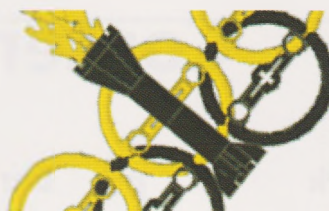
Although there have been a number of publications from the Naace Primary Working group since our inception in January 2004, this was the first one which was initiated after the merger of MAPE and Naace. Instead of the accustomed hunt round for contributors from amongst the MAPE activists, I was able to put out a call for contributions to the whole Naace community. The response was overwhelming. There are so many folks out there doing really exciting things with ICT in primary schools and so many of them willing to share their experiences.

I hope you enjoy reading the article as much as I did and that they inspire you to try out the ideas in your classrooms.

Heather Govier

Toys, Tasks and Teamwork

Adrian Horner



Northampton 2004
Robot Olympics

Toys We're educators aren't we?
Tasks That's more like it.
Teamwork Now I'm feeling a little more comfortable...

At the Learning Discovery Centre in Northampton we've been playing with Lego!

Not just us. Rather, groups ranging from Year 4 pupils from small village schools to Year 9 Gifted and Talented pupils from schools across the town of Northampton.

We believe in giving children room to explore, create and be innovative in their thinking and approach to tasks. Furthermore, we wanted to facilitate the exploration of computer control beyond QCA into an area where the pupils would use their knowledge and understanding of how to programme and work together creatively to solve tasks. So, wanting to develop our Roboteering capabilities, we purchased the Lego Mindstorms (Robolab) Kits. These kits:

- allow structures to be built in a multitude of ways stimulating creativity
- allow constructions to be assembled and disassembled relatively easily as pupils explore the task
- and allow for innovation as pupils test and try new theories.

Working with Lego wasn't enough. We sought to develop a set of tasks that would motivate, stretch and challenge pupils from a variety of age ranges and school backgrounds. Wanting a theme for our challenges we chose the Olympic games. So Robo-Olympics was born. Tasks would be set for the children that invoked the spirit and bore some resemblance to the games. Models would be constructed that would enable competition and team strategy.

Each day started at 10am and finished at 2:30pm. Each of our Robo Olympic events was held in an accommodating school hall, which we converted into the 'Robo LDC' for a day with mirrors, trickery and some nice masking tape. We worked with 45 (15 groups of 3) KS 2/ 3 pupils - chosen by their schools and deemed to be particularly talented in Science/ Technology.

Each group of 3 children had a laptop running Robolab. www.commotiongroup.com/

A further 2 children from each participating school brought a laptop and recorded the day using still and video cameras - interviewing the key players, getting the low down generally, and producing a news sheet, Power Point presentation or video by the close of the event. For examples of work produced check out:

www.learningdiscovery.co.uk/features/robolympics/four.pdf

www.learningdiscovery.co.uk/features/robolympics/robots.pdf and

www.learningdiscovery.co.uk/features/robolympics/report.ppt

In addition the photographs and articles were on our web site by 5pm that evening - allowing pupils to look in and re-live their triumphs!

What Happened?

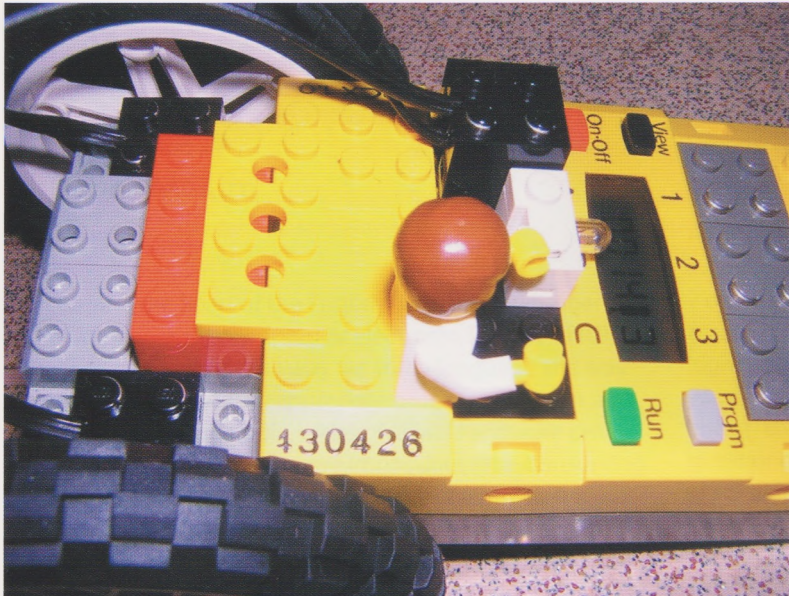
The day broke into four parts. Part one was scene setting, housekeeping and getting everyone up to speed with the Lego Mindstorms software we use. The nature of the software allows it to be introduced in a very short period of time. It encourages learning by experimentation, so once you understand the basic principles that the icons on screen represent, you can modify and control them pretty effortlessly. Whether or not that makes the robot do what you wanted then depends on you.

We started with introductory tasks to gain mastery of the basics of the Robolab software.

Task	Activity	Robolab Level	Equipment
1	Turning a light on for 2 seconds	Pilot 1	RCX Brick, bulb.
2	Running a motor on for 4 seconds	Pilot 1	RCX Brick, motor, connection wire
3	2 Motors on, car to run for 3m.	Pilot 2	RCX Brick, 2 motors, 2 connection wires, wheels.

Once familiar with the programming the pupils designed and constructed small cars/ buggies using the RCX brick as a base and then adding motors, wheels and various other pieces.

The constructions finished, we prepared for the main tasks of the day.



The three events chosen for our Robo Olympics were as follows:

Sprint Race

A series of heats was used to determine the fastest vehicle. Teams programmed their vehicles to travel in a straight line for 8 seconds and stop (No sensors were used). Racing lanes were designated using tape, and extra points awarded for the vehicle that stayed the straightest. After a series of heats to narrow the field, a final race was held to determine the overall winner.

There is plenty of good 'science' here:

- do you go for four wheels or three (or two)?
- big wheels on the motor or small ones?
- how can you make the wires not touch the wheel?

For this task, you need fast sturdy robots that travel in a straight line. If the robot wobbles or weaves, you'll be losing precious time because your robot will be travelling farther than anyone else's.

To be effective, the robot:

- needs to be balanced so it doesn't swerve or wobble as it runs
- should be light
- should be sturdy, but not armour reinforced!
- should have more weight over the wheels that are connected to the motors than over the other wheels.*
- needs large rear wheels and good rear wheel traction.*

*These two design features were not given to the teams - creative exploration and discovery being important aspects of the event.

This task uses speed and wheel size. The fastest car will go furthest in 8 seconds - so there's no need to have stopwatches.

Olympic Torch

The mission for this task was to make sure that the torch reached Greece in time for the competition. Travelling around the world, the buggy had to pass through the continents of Asia, Africa and America, (areas marked out by masking tape) so that it could deliver the torch to Athens. Teams had to design a platform to sit on the car so that the torch could be carried securely.

The torch was a 15cm length of cardboard carpet tube - bulky and a little unstable.

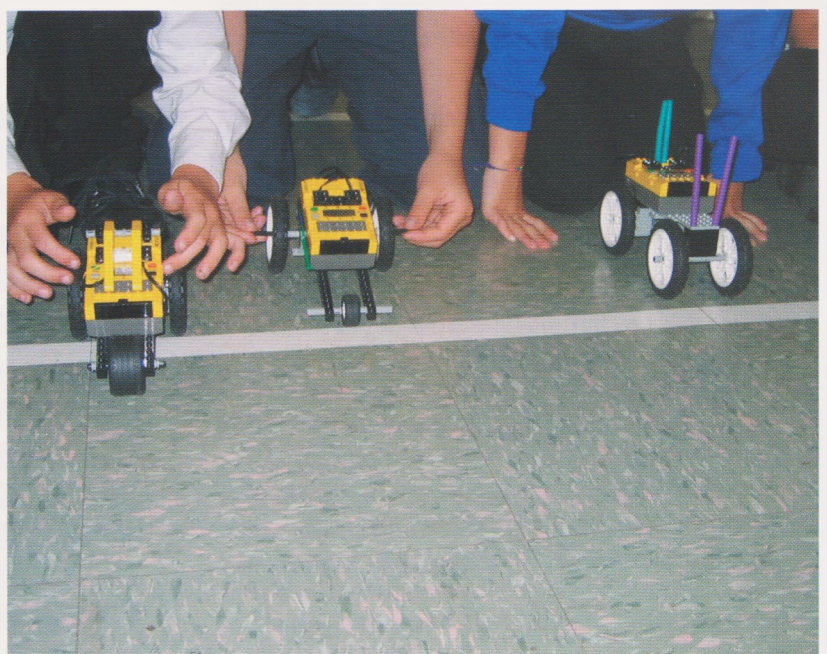
This one took more thought in programming - relating distance travelled to motor power and time, steering by using the two motors, experimenting and refining a design. My favourite was the team who got the program

just right then changed the wheels on their robot. The current record holder for this managed to make the robot successfully stop in three different zones out of four possible ones.

Since the continents were not in a straight line, the most successful teams built up their programme in step-by-step procedures, splitting the journey into four steps with a turn at the end of each one. The pupils were shown the continents and then worked by trial and error to build up successive steps that would enable their torch to visit each place. A further extension was added whereby the buggies had to stop in each continent for 5 seconds.

Freestyle Gymnastic (Dance) Competition

Teams programmed their robots to move to music around a fixed "rink" area (a 2-metre diameter circle). Robot gymnasts were judged on criteria such as overall routine, how well the movement of the robot coordinated with the music, how the robot design reflected the music and artistic merit. Dancers performed for a minimum of 30 seconds and a maximum of 90.



An effective robot for this task:

- must be strong as turning makes the structure twist in all sorts of directions causing wheels or wheel assemblies to fall off, and robots to fly apart
- must be low to the ground (so it doesn't topple over)
- can't go as fast
- needs a shorter wheelbase for easier tight turns
- works best with front glides or single swivel wheel --> less friction when turning
- needs weight evenly distributed so it doesn't pop wheelies.

Olympic Javelin

This was an ongoing challenge with pupils expected to create solutions to complete the task over the course of the day. The basic idea was that teams would design a robot arm that would throw a drinking straw forward the furthest distance.

The trick here was to get height and angle so that the straw travelled furthest. Using a motor and a short time span the arm had to spin forward and let go of the straw. The short program – was the easy bit. The tricky bit was designing the arm/ throwing motion.

We really enjoy putting on events like this - they are fun and they let us try out first hand ideas we've been kicking around within our team. Our long-term aim at the Learning Discovery Centre is to influence the thinking of teachers about how ICT can transform learning - and working with their group of youngsters is a powerful way of doing that. By the end of the fourth Robo-Olympic day we'd seen some 200 pupils and 20+ teachers. For many people Control is seen as 'hard ICT' - the bit you do because you have to, rather than because it has value. We think it is the most incredible tool for building thinking skills, refining scientific thinking, team building, and **fun!**

Robo Olympic Challenge event: Equipment

- 15 Robolab Team Challenge sets
- 15 Laptops with Robolab installed.
- Notepaper
- Laptops to be brought by participating schools
- Digital and Video Cameras
- Extension cables- 4 x 4 gang plugs
- Masking Tape
- Drinking straws

Adrian Horner is e-learning consultant for the Learning Discovery Centre in Northampton. This was set up in 2003 to act as a catalyst to transform learning across the county. Find out more at www.learningdiscovery.co.uk

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Having Fun with Words

Trevor Millum

Language is the heart of the English curriculum, whether it is written or spoken, printed or electronic. The use of ICT enhances and extends the way we study language, the way we use it and the way we appreciate others' use of it. In all these undertakings, simple, widely available software can help us to do things which were impossible, time-consuming or inefficient without ICT.

ICT does not make teaching and learning English colder, less human or humane. Indeed, two key constituents of creativity much praised by Philip Pullman, mystery and chance, make frequent appearances in the activities described here. Further, in providing choices and in assisting pupils' autonomy, ICT can help us move away from a didactic delivery-mode approach. Nevertheless, we still need to be on our guard against a tick-box mentality which some in education would like to promote; closed (rather than open-ended) tasks are so much easier to mark and link so well to levels and league tables!

This first activity is something I call **Word Dig**, an analogy taken from archaeology and aims to promote a thoughtful investigation of language by creating curiosity and uncertainty.

Here is an extract from a piece of prose. A black highlight has been applied so that the words are invisible. A double click will select a word, a chance word, the font colour of which can then be changed to white. In this way a number of words can be revealed. What inferences can be made about the nature of the text? If you deduce that it is narrative fiction, can you suggest what genre? Can you go further and make some predictions about the content?

of chimneys
rope
running noose and teeth
round
less distance height
knife hand drop
instant loop
beneath on
arms The
lost balance
neck
tight as a bowstring, and swift as the
arrow it speeds.
hand

Further revelations can be made to support or contradict predictions. If you want to turn it into a game or competition, deduct points for every word revealed. There are commercial programs available which will provide similar activities – but how much more satisfying to make your own – free.

Approaching the text at a different level, there is some interesting word and sentence level work that can be done – or to put it in old fashioned terms, we can help children to understand how writers can use language. For example, 'tight as a bowstring, and swift as the arrow it speeds'. If you reveal the whole phrase it has less power, less creative energy to involve the curiosity of the pupil as investigator, as questioner. Revealed in small sections, it invites suggestion, prediction, contradiction. There is mystery; there is often chance – and surprise.

For those who did not see the article 'The Mouse and the Muse' in the Naace 'Primary Focus on New Literacies' (Spring 2004) I would like, briefly, to mention the use of **Collapsed Texts** (or fridge magnets as they are known in some quarters). Even very able writers often struggle to begin a piece of imaginative writing. The provision of a word bank which limits the possibilities seems, paradoxically, to liberate writers in some way. Here is a set of words:

a a a an ancient and and and and and as at
away away ballad beast beast before black
bluebirds born caged children chime clocks
come cut day desperate distant dolphins
down dream east echoing every eyes faded
far faraway feast first flight foals for friends
from from fun future geese glade gold great
grey had had hadn't head heard hearken
horn hotels hour human hunted I I in
in in in invisible isle it it jade kind land
learned legged light lived made man woman
moonflower mountains night noble of of
of off off once one or our pact pale played
power purest rhyme rise river said sang saw
say see seer shadow shimmering shining
sight silver slay so speak spoke stole tan the
the the the the the their them then there
they they though time to to tourists two
two-legged unicorn unicorns up up upon use
was were west what when where white wild
with within

They are the equivalent of the words on your fridge. Use as many of them as you like in any way that you like. You may not add words but it is helpful (and so generous) to allow pupils to add or remove a final 's' or 'ed'. Each writer will come up with a different result.

desperate children caged in gold
shimmering mountains dream of shining rivers
wild unicorns played with distant dolphins

These phrases might be shared, combined or re-worked. Some leeway might, at this stage, then be given to use the writing as a springboard for further work without the restraints of restricted vocabulary. Try it and see. The bank of words will, to begin with, seem mysterious; it's revealing what feelings, images, chances, surprises, it can produce.

Your bank of words can be obtained by taking any text and ordering the words alphabetically. Poems such as Kit Wright's 'Magic Box' are ideal. A technique for doing this is given in the box.

Putting text in alphabetical order using Word

(grateful acknowledgment to Chris Warren)

1. Edit > Replace

Type a space in the top box

Type a ^p in the lower box (/p on Apple computers)

Click 'Replace All', 'No' and then 'Close'.

This should put your text into a long single column.

2. Table > Sort > OK

This should sort your list into alphabetical order.

3. Edit > Replace

Type ^p in top box

Type a space (or two or three) in the lower box

Click 'Replace All', 'No' and then 'Close'.

This should put your text into a paragraph.

A variation on the Word Dig activity is **Flash in the Pan**: something you can create using PowerPoint. The screen will display a given text one word at a time, flashing up the word and then hiding it. The really is a mystery to pupils and they will be surprisingly attentive. Having shown the text once or twice, see what they can remember. You may be surprised how much is recalled. See how far you can reconstruct the text and then either show it one more time or reveal it complete – and fixed. One of the interesting aspects is the status that this technique gives to punctuation marks. The instructions are given in the box. Bear in mind that pupils may like to see their own work displayed in this unusual fashion, too!

Flash in the Pan:

Having typed or pasted your text into a PowerPoint screen, go to

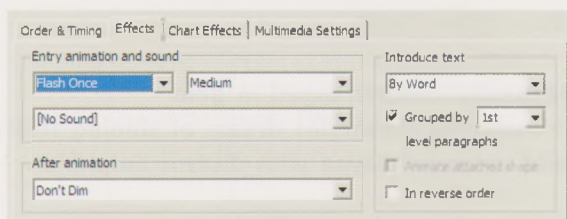
Slideshow > Custom animations.

Click on the text to select it.

Under Effects: Entry animation and sound, select 'Flash Once' and then 'Medium' or 'Slow'.

Under Effects: Introduce text, select 'By Word'.

(Choose 'By letter' for the spelling reinforcement activity.)



A similar technique can be used to reinforce spelling patterns. This can be something which is useful for some quite able pupils who, nevertheless, still make basic errors in written work. Words can be made to display one letter at a time, perhaps accompanied by one of those maddening sound effects. The effect on learning is likely to be greater if pupils try constructing the PowerPoint displays themselves, of course, but there isn't always time for this.

Finally, what turns 'The pupils sat at the tables' into 'After a wet playtime, the pupils, a mixed bunch of ne'er-do-wells, sat unwillingly at the paper-strewn tables, which had been there since the old school was built?' Obviously, the addition of adjectives, adverbs, phrases and sub-clauses; however, discussion of complex sentences can be a very boring activity. The dynamic nature of your word processor, in conjunction with a projector (and IWB if you have one) can turn such investigation into an experiment with words.

Start with a simple main clause. 'The cat sat on the mat' will do. Pupils can suggest others. Take suggestions about the nature of the cat and select one or two of them. Insert them into your sentence:

'The hostile cat, which had red angry eyes, sat on the mat.'

You might like to consider what the cat had been doing, where it had come from or why it was there. 'Having been chased by a Great Dane, the hostile cat, which had red angry eyes, sat on the mat.'

What kind of mat? 'Having been chased by a Great Dane, the hostile cat, which had red angry eyes, sat on the greasy mat.' Or, 'Having been chased by a Great Dane, the hostile cat, which had red angry eyes, sat on the mat, which bore the marks of huge teeth.'

This is beginning to get out of hand. You can stop whenever you like, of course – but sometimes pupils will appreciate the surreal or, as they see it, the silly: 'Having been chased by a Great Dane, the hostile (though curiously attractive) cat, which had red angry eyes, sat in an elegant posture on the mat, which bore the marks of huge (though not necessarily sharp) teeth.'

We haven't even begun to use semi-colons, which, as readers of some Victorian prose will know, could extend a sentence into a page-long paragraph. If you wish to use highlighting to mark words and phrases to pick out or name terms, you can. The activity becomes more interesting and dynamic when the Undo function is used so that, bit by bit, phrase by phrase, the sentence can be reduced to its original clause. 'Redo' will expand it once again. Where your short original clause might eventually lead is a mystery – and depends on the chance interventions of pupils with all their multifarious possibilities.

Experiment. Let pupils experiment. Having fun with words is a natural precursor to loving language and all that can follow.

Trevor Millum is a writer of children's poems and short stories, an experienced trainer of teachers in ICT and English at all key stages and Director of Development and Communications for NATE (National Association for the Teaching of English).

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A Sense of Murder: Making Datalogging Interesting

Steve Bunce

Introduction

Interpreting sensor data can be a difficult area for the pupils to understand. How can we make datalogging interesting? Our idea was to solve a murder at the Data Inn. The pupils looked at the data for each of the rooms: light, sound and temperature; they then tried to deduce whether the suspects' alibis matched with the data.

The learning activities were reinforced with practical sessions using the dataloggers, in order for the pupils to make a connection between the real-life data collection and what it means.

Each lesson was based around the three-part model of starter, main and plenary sessions, with clear objectives outlining the learning points. A major feature was the pupils' discussions and explanations of their ideas and so there were many assessment opportunities. As each lesson was linked to practical activities and demonstrations of datalogging, the pupils were fully engaged in carrying out the experiments and were able to explain what was happening.

The outcomes were that the pupils really enjoyed the problem-solving, they developed a firm foundation in interpreting data and the quality of the conversations and use of language surprised everyone. Whodunnit? - You'll have to find out!

The Introductory Lesson

We started the topic by looking at the opening scenes of the software, 'A Sense of Murder' (available from Commotion, www.commotiongroup.co.uk 01732 773399). This introduced the background to the murder of Lux Lumens, the Industrial Tycoon and the pupils met the four suspects, Hugh Middity, Val Ume, Anna Logg and Darren Heit. This opened a dialogue between the pupils about 'How and where do you think the murder took place? Can people look guilty just by their appearance? Who do you think had the greatest motive?'

The first lesson held the key to creating the excitement and interest in the topic. The class looked at the newspaper article explaining the murder case; they had been chosen as the detectives to solve the murder.

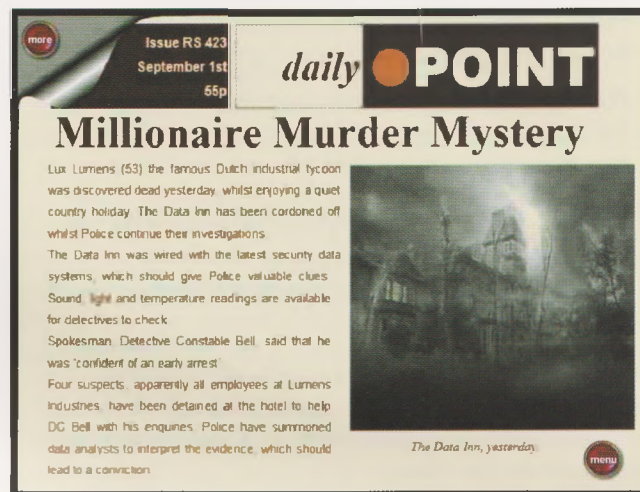


Fig 1 There's been a murder

Now that the children were hooked, an 'Odd-one-out' activity was used to get them thinking. The activity started simply with three suspects from the murder.

Teacher: "Who is the odd-one-out?" (choices: Anna, Darren and Hugh)

Pupils: "Anna, because she's the only girl." "Hugh, because he's wearing glasses." "Darren, because he looks worried." "Anna, because she looks angry."



Fig 2 Who is the odd one out? Which is the odd one out?

Next the choices changed from people to objects.

Teacher: "Which is the odd-one-out?" (choices: television, radio and mobile phone)

Pupil 1: "Radio, because it doesn't have a screen."

Pupil 2: "Mobile phone, because you can talk to it."

Pupil 3: "Radio, because it's not interactive."

Teacher: "What do you mean by interactive?"

Pupil 4: "You can press the red button on the TV and get more information and you can press buttons on the phone and get more information, the radio just makes sounds."

Pupil 5: "You can change stations to get more information."

Pupil 6: "But that's just lucky if you get what you want, on the TV you can get to play games and on the phone."

In the final round of the activity the choices were 'Light', 'Sound' and 'Temperature'. This proved to be much harder for the class as the choices were not objects i.e. if the options were a light bulb, radio and fan heater, they would be able to find the odd-one-out more easily. After discussion with each other in pairs, the pupils returned their ideas.

Pupil 1: "We think sound is the odd-one-out, because a light bulb gives out light and gets hot."

Pupil 2: "You can get sound from lights, these strip lights in the classroom make a buzzing noise, so sound isn't the odd-one-out."

Pupil 3: "The Sun gives out light and heat, but doesn't make any sound."

Pupil 4: "It might do, but we're too far away to hear it."

The lesson moved on to a new activity of describing pictures and graphs. The aim was for the pupils to realise the importance of using precise language to explain and communicate their ideas.

The pupils worked in pairs, sitting back-to-back. One pupil described the six pictures and the other attempted to draw them. They were allowed five minutes, but they were not allowed to look at each other's pictures until the time was up. Then they compared the pictures and discussed the words they had used to instruct and question during the drawing. The pupils then wrote these words on the interactive whiteboard. A rich variety of words were collected, 'straight, percentage, diagonal' and they also used angles, points on the compass and the hours on the clock to describe the directions to draw the lines.

The class all thought that they had drawn the pictures accurately. After praising them, it was pointed out to them that even though they had captured the shapes well, they needed to evaluate the positioning on the page and the scale of the drawings. After the pupils gave themselves brief self-evaluations, they swapped over and it was the instructor's turn to draw and vice versa. This time the pupils were much more precise in their language to guide each other and in the positioning and scale of the drawings.

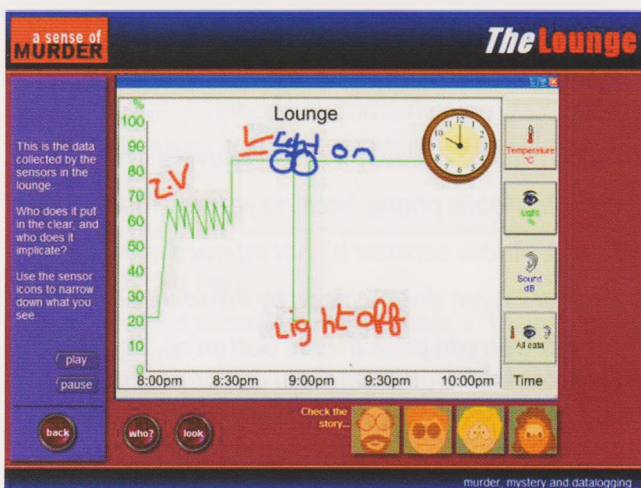


Fig 3 Annotating the light data graph

In the final part of the lesson each pupil was given a different sheet which had a graph on the top half and a blank set of axes on the lower half. The pupils had to find a person with the corresponding graph, so that they could draw the trace on their lower graph. For example, the top graph could contain light data and the lower blank graph could be labelled in decibels. Therefore, this pupil would need to find another one who had the sound graph data. This pupil could then find another pupil who needed to draw the light

data on their graph. The class really enjoyed the activity, finding the appropriate match and then going through the challenge of describing the graphs.

The lesson concluded by reviewing the main teaching points and highlighting the richness of the language the class had used. The software was revisited to read the murder newspaper article and to think of questions they would like to ask the suspects.

The Light Lesson

The next lesson focussed on the light sensor and where light sensors might be used, for example, night lights in a baby's room or security lights, which switch on overnight. The starter activity began by looking at real data. The datalogger was connected to the projector and the pupils watched the data trace appear. The graph line jumped around the screen as the datalogger was pointed at the classroom lights, at the daylight coming through the window, at the shade under a desk and when covered with a hand. Then all the lights were switched off and the blinds closed. The pupils were involved in predicting where they thought the trace would move to as each light was switched on and as each blind was opened. They observed what they called 'a step up' each time more light was detected by the datalogger. The class then looked at the overnight data and they attempted to explain what had happened.

The next activity was a 'Living graph' of data which followed the same format of the data in the 'A Sense of Murder' software. The pupils decided which data they would look at, light, sound or temperature; they chose to look at light first. They read the annotation labels which they need to arrange on the graph, for example, 'Door opened', 'Light on', 'Doorbell rings', 'Letter through letterbox', 'Dog barks'. The pupils were allowed thinking time and they discussed with each other their initial ideas. The first pupil came and dragged a label into position on the graph and explained why it went there.

Pupil 1: "I put the 'Light on' there on the graph, because you can see it goes up like a step, just like before when you switched on the light in the classroom."

The next pupil came and placed the next label on.

Pupil 2: "I put 'Doorbell rings' there, because the bell rings first and then they switched the light on and opened the door."

Teacher: "Your story makes sense, but can we tell from the graph? Remember, which data are we looking at?"

Pupil 2: "Light"

Teacher: "So, is there any evidence on this light graph which tells us that the doorbell rang?"

Pupil 2: "Not on this graph, we could look at the sound graph."

The activity developed allowing the pupils to place the labels on the different graphs. When this was carried out with a Year 8 class, they were better at focusing on the data than the Year 5 classes. The younger pupils inferred more from the statements than the data, i.e. they sequenced them into a

story without looking at the data. So, the activity was turned around. One pupil placed the labels randomly on the graph and the class decided if they could give reasons, based on the information in the graph. They came to the conclusion that if you have the three graphs you can place the labels with supporting evidence, but just looking at one graph means you sometimes need to make up a story.

The pupils took turns to use the dataloggers to look at the light levels around the school and the TV resource, which was part of the software. The pupils pointed the datalogger at the middle of the TV animation on the computer screen and changed the channels on the TV. Once the data was downloaded on to the computer, into the LogIT software, the pupils explained the graph and added annotation labels. This reinforced their learning and provided an assessment for the teacher, showing they had understood the activity.

The 'A Sense of Murder' software was started and the class discussed what they understood by an alibi. On the computers, the pupils were allowed time to listen to the alibis and look at the light data for the rooms. Finally, for the plenary, the class annotated the light data for the Lounge graph.

Teacher: "Hugh said he was watching the TV, do you think he is lying?"

Pupil 1: "I think he's telling the truth."

Teacher: "Why? Is there a part on the graph which matches his alibi?"

Pupil 1: "He says he was watching TV and the light graph jumps up and down like the TV was flickering."

Teacher: "Put your hands up if you agree... hands down. OK, hands up if you have a different idea."

Pupil 2: "I think it was when someone switched on a florescent light, because they flicker on and off, before going on properly."

The Sound Lesson

The datalogger was recording as the pupils entered the room. The pupils started to notice the trace on the interactive whiteboard reacting vigorously as they settled down into their seats. The trace disappeared below fifty decibels and as the teacher spoke the trace jumped up on the screen; then it was the pupils' turn. Conducted by the teacher, the class practiced whispering, murmuring, becoming slightly louder into chattering and then a short shout. The graph on the screen reflected the changes in the sound levels, so the pupils came out to annotate the graph with the appropriate words. An emphasis was placed on using accurate language.

Teacher: "Can you tell me the story of the sound graph?"

Pupil 1: "It is silent then sound gets higher."

Teacher: "What are the units on the sound graph?"

Pupil 2: "Decibels"

Teacher: "Does that measure how loud or soft a sound is or does it measure how high or low-pitched a sound is?" "Hands up for louder and soft... now, hands up for high and low."

In order to check the pupils did not hold a misconception about the loudness of a sound and its pitch, the class were instructed to make a high-pitched sound and then a low-pitched sound at around 90 decibels. Then they made high and low-pitched sounds at around 60 decibels.

Teacher: "When the line on the graph goes down from 90 to 60 decibels, is the pitch of the sound changing?"

Pupil 3: "We can't tell, because the graph just tells us how loud the sounds are."

The class thought of places where you might need a sound sensor. They suggested a monitoring system for a classroom to judge when a class is being too noisy.

The pupils started the 'A Sense of Murder' software and continued to solve the crime. The pupils with the datalogger used the 'Radio' part of the software. By holding the sensor next to the computer's speakers, the pupils recorded the sound levels for the different radio stations on the virtual radio. They then annotated the graph to identify when the radio station was playing rock music (loud), dance music (repetitive beat) or a comedy programme (from quiet to loud when the audience laughs).



Fig 4 Monitoring sound levels



Fig 5 The animated radio

The activities were closely related to the alibis of the suspects. Therefore, the pupils were able to match the patterns from the sound graphs of the datalogger to the graphs in the different rooms in the software.

The Temperature Lesson

The lesson began with the class looking at the temperature trace from the datalogger which had been collecting overnight. The pupils described the story of the graph as the temperature dropped and rose again when the school heating was switched on. They were then asked to predict what would happen if the temperature sensor was placed into a flask of hot water, which was boiled an hour before.

Pupil 1: "The line on the graph would go up."

Teacher: "What would happen if I didn't place the sensor in the water, but placed it above the water?"

Pupil 2: "It would go up, but not as much as if you'd put it in the water."

Teacher: "OK, then, come and draw on the whiteboard the line you think the temperature trace will follow."

The pupils drew their lines and the datalogger was placed above the hot water. The class watched and evaluated whether their predictions were correct. Then they predicted the graph shape for placing the sensor in front of a fan heater and out of the window.

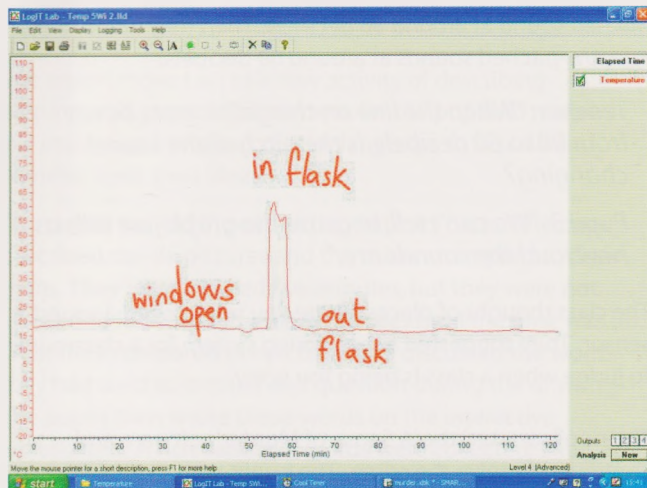


Fig 6 Annotating the temperature graph

The next activity involved the pupils using the virtual kettle (part of the software). The animated kettle boiled onscreen and the simulated temperature data was plotted on the graph. The animation was paused and the pupils were again asked to discuss and predict the shape of the graph as the kettle reached boiling point.

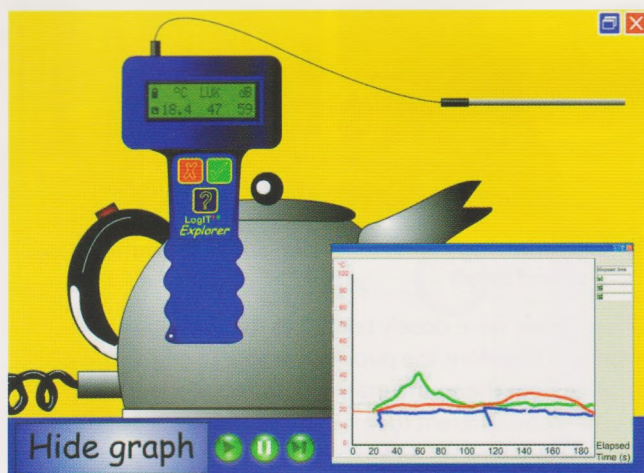


Fig 7 The Virtual Kettle

The class continued to solve the murder case, matching the temperature data to the suspects' alibis.

Teacher: "When the character says 'it's freezing' is there any evidence in the graph?"

Pupil 1: "It's freezing... it's a turn of phrase, it's not really that cold"

Teacher: "What temperature do you think the room would be if it was freezing?"

Pupil 2: "Zero Celsius"

The final lesson, investigating sampling rates

The pupils now had all they needed to solve to the crime. They had analysed the data and matched it to the suspects' alibis. So before the conclusion of the topic, the concept of sampling rates was considered.

From the software, 'The Jewel Thief' activity was projected onto the whiteboard. The scenario was a museum containing a special jewel, which was watched over by security cameras. The cameras could only store a limited number of frames, so the pupils discussed between themselves about how often they wanted to take a picture. If they captured too often, they could run out of pictures, if the intervals were too large, they could miss the thief entering. The quality of their ideas and explanations were excellent,

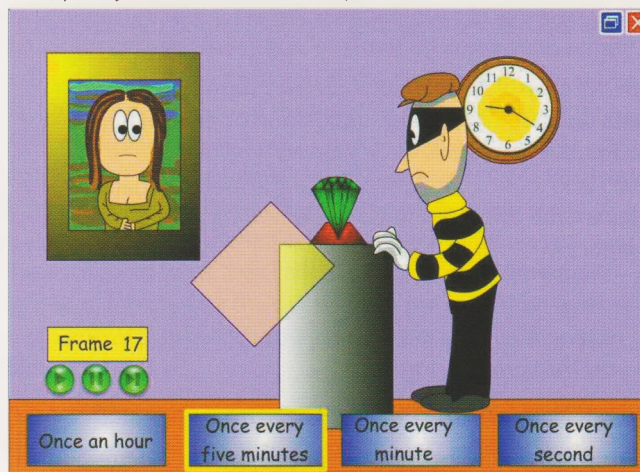


Fig 8 The Jewel Thief

The class then considered monitoring different scenarios and decided upon which sensors would be most appropriate and suitable sampling rates. This enabled them to construct experiments for each other, which they would investigate in future lessons.

Finally, the whole class deliberated on the alibis and the data to solve the crime. Again, the precise language they used and the interpretation skills they displayed showed that they had developed their abilities over the lessons and most notably enjoyed themselves. Eventually, they discovered that the murderer was... arrrggh! Thud!

Grateful thanks go to Richard Coates Middle School, Northumberland and in particular to Les Brown, David Elliott and Red Willcox for their cooperation and help.

The 'A Sense of Murder software' (complete with lesson plans, resources and user guide) is available from Commotion,

www.commotiongroup.co.uk 01732 773399.

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Using Macromedia Flash in the classroom to bring poetry to life

Lynda Haney

Web design skills and Macromedia tools are becoming increasingly important in helping teachers and pupils meet National Curriculum Key Stage objectives. Using Flash in the primary school lays a foundation of key ICT skills, which can continue to be developed at Key Stages 3 and 4. Educators are becoming more aware of the importance of introducing these tools at an early stage so that by the time a pupil leaves school, his or her knowledge of web design can be a CV asset.



Fig 1 The Highwayman

Rainhill City Learning Centre has worked on several projects with St Helens High Schools using Flash animation with a great degree of success. The project was initiated at the CLC by former director Tim Farr working with Y7, Y8 and Y9 pupils of all abilities but this year we decided to bring a Year 6 class to the CLC to work on the animation of a poem.

Flash may not generally be thought of as being a tool for primary school pupils to use but, with help, pupils of all ages and abilities can be motivated and can achieve results.

City Learning Centres provide an inspiring environment and are a key element of the Excellence in Cities programme. The aim of a City Learning Centre is to enhance learning and teaching across the whole curriculum for pupils and teachers. To achieve this, the CLC's objectives include improving access to, and use of, the latest educational technology so as to increase attainment levels through the use of that technology.

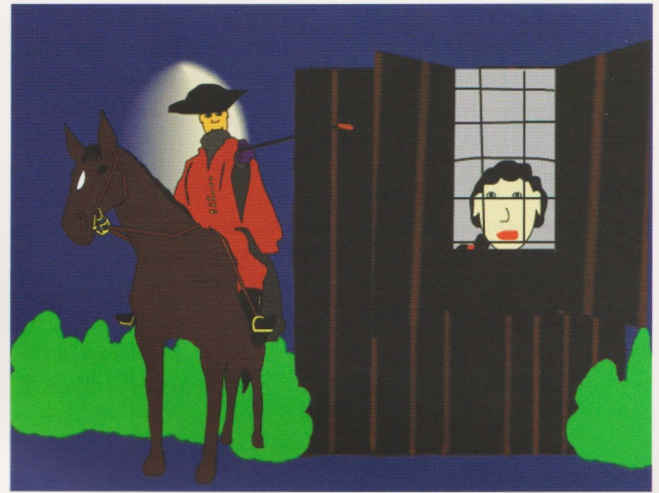


Fig 2 He tapped with his whip on the shutters

Macromedia products such as Flash and Dreamweaver have become industry standard and, at the CLC, we firmly believe that students need to be exposed to all industry standard tools from as early an age as possible.

The beauty of the particular project that we have worked on is that, although technology-based, it is cross curricular, combining four National Curriculum subjects – Drama, English, Art and ICT.

In this project the pupils:

- Explored a character-based poem (English)
- Storyboarded each verse into separate scenes (Drama)
- Designed background and characters (Art)
- Put the animation together using Flash (ICT).

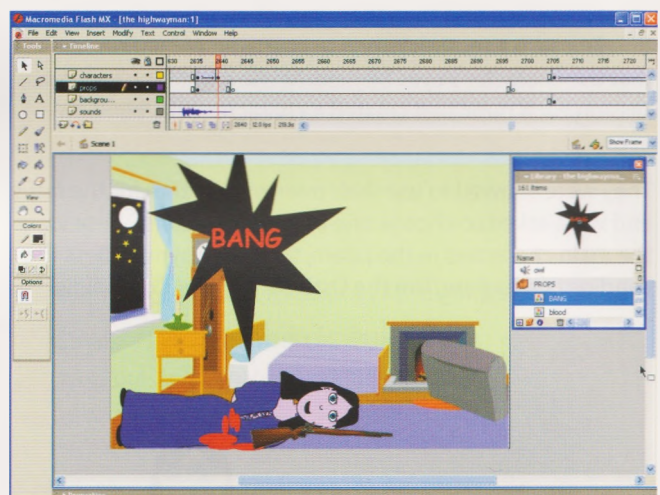


Fig 3 Creating the Project in Flash

The Flash work involved:

- Creating a background and importing it into Macromedia Flash
- Taking part in a session working on graphics in Flash
- Using characters and objects already contained in the Flash Library
- Adding narrative to the poem
- Animating the characters inline with the pre-prepared storyboard.

The Year 6 class that took part was from Sherdley Primary School in St Helens. Thirty pupils with their teacher Cathy Hughes and classroom assistant Carol Fairhurst spent time at school learning the poem and preparing their storyboards. The class visited the City Learning Centre on three occasions to work with Flash.

The first session took place in the classroom when the pupils were introduced to the idea of how a poem could be animated. The Highwayman, a poem that the pupils had been working on, was chosen and the first task was to discuss the scenes and the characters. The pupils were encouraged to work together as this was to become a whole class project

The pupils worked with great enthusiasm creating their storyboard and the ideas flowed. Every idea was captured on paper as they drew the scenes, using words to represent characters and sounds.

The following week the pupils visited the City Learning Centre to create their backgrounds using the painting software package Revelation Art. Most of the pupils used the background templates that are provided by the software but they added other bits themselves to make the scene their own.

Back at school again the pupils worked on the narration of the poem with each pupil having a particular verse or part of a verse to narrate. The narration was recorded and then back at the CLC each verse was put into the Flash timeline ready for the pupils next session.

A second visit to the CLC was arranged and this time the pupils had their first opportunity to use Flash. They were introduced to the basic drawing tools to draw their character's face and then they were shown how to use the timeline with a motion tween to create an animation so that the character's eyes blinked. At the end of the two-hour session each pupil had created a character with 'blinking' eyes.

They were allowed to use their own imagination for the faces and were asked to choose one of four characters. These were the main characters in the poem, the Highwayman, Bess the Landlord's daughter, Tim the Ostler and a Red Coat soldier.



Tim the Ostler



Bess



Fig 4 A Pupil creates a character's face.

Before the pupils' final visit to the CLC the character's heads were added to a library of character bodies drawn for the pupils by Peter Atkinson of Creative Classrooms and Neil Gilhooley, Rainhill CLCs web designer.

During this last visit to the CLC the pupils were shown how to import library items and then use the library items to add backgrounds, characters and sounds on key frames in the Flash timeline. They had to grasp the importance of using layers and how to add items at the correct point on the correct layer.

The initial idea was for each of the pupils to create a short movie with a few backgrounds and a couple of characters. All were able to achieve this. I was surprised, however, how quickly some of the pupils grasped the basics of the program and were able to work their way through the whole poem adding all the backgrounds and characters without any further help.

Finally the pupils were shown how to create a simple motion tween to move their characters on the stage.

The finished movie was put together using different parts of the pupils' work.

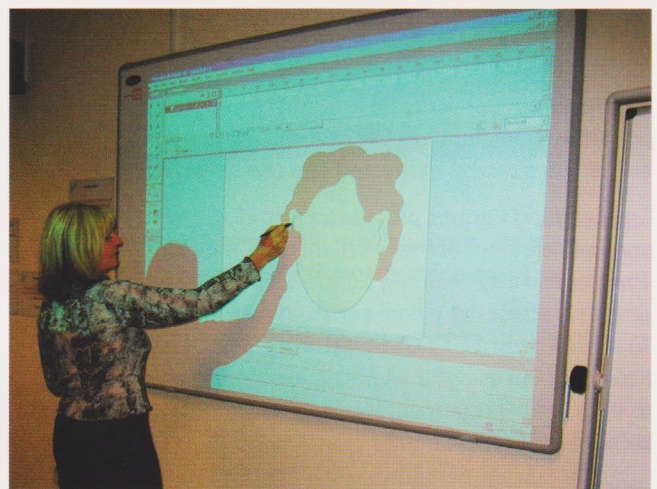


Fig 5 Mrs Hughes has a go

At Rainhill CLC we aim to develop and enhance teacher ICT skills and to provide additionality to the continual professional development opportunities that already exist in our area. CPD has a key role to play in raising standards by improving the learning and teaching that takes place already in our schools. When classes visit the CLC it provides a valuable CPD opportunity for the class teacher as they work alongside their pupils.

Cathy Hughes, Y6 class teacher, made the following comments:

"Using Flash to put together a class animation of 'The Highwayman' has been a thoroughly enjoyable experience for all involved. The children worked enthusiastically learning the poem and planning the backgrounds and pictures to go with the verses. It was such a pleasure to listen to them as they practised reciting their verses with their partners and the rest of the class."

Overall this was an exciting cross-curricular learning experience, irrespective of the differing abilities within a normal class of thirty Year 6 children. All the children involved achieved an outcome above expectations in the short time they had to learn the program."

The following comments were made by the pupils after the work was completed:



Fig 6 *The Redcoats came marching up to the old inn door*

"I loved doing Flash Animation because it was so interesting to see the pictures move. Usually I don't like working on computers but I really enjoyed doing this program it was lots of fun"

"I really enjoyed working at the CLC. I learned how to draw faces that even had eyes that blinked and we learned how to make movies out of scenes in the poem."

"My favourite part was listening to everyone's recordings and adding the backgrounds to it. I didn't think that I would be able to do the work but I did and I want to learn more about it."

"Animating the poem using Flash was very exciting, it made the poem come to life. Because I put

together the parts of the poem with pictures it really helped me to understand what the poem was about. This should be called 'Fun Learning'."

It was an amazing experience working with these pupils. Their enthusiasm was fantastic and they had a lot of excellent ideas as they worked to put the whole thing together.

All the pupils took part in the narration, their self-confidence growing with each trial run, and every child completed a character and their own piece of the final movie.

Using Flash in this way is innovative which fulfils the remit of the CLC. Flash projects encourage a team approach to learning, which can enable every pupil to have the opportunity to reach his or her true potential. It certainly gave the pupils the motivation to learn, they worked throughout as a team developing skills together.

For any teachers wishing to look further at using Flash there is plenty of evidence on the Internet of the excellent work being done in classrooms around the country. There is a lot of good stuff on the web and lots of excellent downloadable teacher resources and ideas for primary lessons.

With special thanks to Tim Farr for the inspiration.

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Harnessing Creativity of Gifted and Talented pupils at Waltham Forest City Learning Centre

Gareth Honeyford

Context

Waltham Forest City Learning Centre, like all CLCs, is part of the Excellence in Cities (EiC) Programme and has a remit to support other strands of EiC including gifted and talented education. To this end we have hosted summer schools, Saturday classes and after school clubs for pupils of primary and secondary ages as well as running school based projects and providing training for teachers, classroom assistants and learning mentors. This article includes details of three of these projects, two that formed part of a gifted and talented Saturday school and one that ran with two schools over a number of weeks.

CLCs also have a brief to encourage the innovative use of ICT across the curriculum. This can allow opportunities for both creative teaching and teaching creativity. In the National Advisory Committee on Creative and Cultural Education (NACCCE) report 'All our Futures: Creativity, Culture and Education' these are defined as follows:

'By teaching creatively, we mean teachers using imaginative approaches to make learning more interesting, exciting and effective.' (p.102) *'By teaching for creativity, we mean forms of teaching that are intended to develop young people's own creative thinking or behaviour.'* (p.103)

Many of our projects have utilised the increasingly popular art of video editing using Apple iMovie but the intention in this piece is to focus on some less well-known pieces of software that can allow the development of innovative and exciting creative projects with little or no outlay. One of the projects outlined here incorporates both approaches whilst the other uses a conventional pedagogical approach to 'teach for creativity.' It is an age-old saying that 'necessity is the mother of invention' and that is certainly how these projects began. Towards the end of the financial year the CLC was burgled and had most of its video cameras, laptops and associated equipment taken. With no funds to replace and awaiting insurance company assessors, something needed to be found for some forthcoming gifted and talented projects. The following activities were born out of that situation.

Software Used

Photoshop Elements <http://www.adobe.com>

One of the few portable items of hardware left after the break in was a pair of Sony Mavica digital cameras. This was fortuitous as we had recently purchased a site licence for Adobe Photoshop Elements, which, with educational discounts etc. worked out at about £15 per licence. Some schools and home users may have a copy of Elements or its predecessor Photoshop LE as it comes bundled with some cameras and scanners.

Adobe's Photoshop is probably the best-known commercial photo editing package and incredibly popular. Photoshop Elements is slightly less well known but a much more economically viable alternative for those on a limited budget. Elements has a much more wizard driven interface than full Photoshop but still allows the similar end results. Some features have less flexibility and adjustability than with the full package but the pay off for this is simplicity in use. I suspect that Elements may lack some commercial outputting options but in the school setting this is unlikely to be a problem.

Sodaplay [sodaplay.com](http://www.sodaplay.com)

Sodaplay was introduced to me by a friend and colleague and was unlike anything I had seen or used before. It's creators have this to say about it:

"sodaplay was devised by a London based company called soda creative ltd. we made it as part of our ongoing ideas generation, research and development process, but mainly we made it just for fun. soda sends a heartfelt thank you to the thousands of people who so enrich sodaplay with their marvellous sodaconstructor creations, just some of which appear in the sodazoo. your creativity is a constant source of joy to us."

To explain further though, sodaplay is a modelling package that allows users to build on screen constructions from 'masses, muscles and springs.' It is incredibly simple in concept but the completed constructions can be very complex. Construction is completed online and finished models can be submitted to an on-line zoo! Best of all, it is free.

Anim8or <http://www.anim8or.com>

The creator of Anim8or describes it as

"a 3D modelling and character animation program that I have written over the past couple of years, not as a commercial endeavour, but because I love 3D graphics, animation, and programming. While it is far from a complete professional level application like 3DStudio MAX or Lightwave, I believe that it has enough capability to be of use to others."

(R. Steven Glanville)

In my experience Anim8or is an impressive piece of software that proved to be very successful in the project outlined later. Despite its power it is incredibly small (fitting onto a single floppy disk) and is available to download absolutely free.

Hardware Used

All the sessions were run on an RM Connect 2.4 network (Windows 98) on P3 866MHz machines with 128 Meg Ram and 20Gb HDD.

Case Study 1 - CLC Saturday School 31st July 2004

Context

This was part of a Saturday School for Gifted and Talented pupils involving 22 Year 6 children from 13 schools. The pupils were selected by the school from amongst their G and T cohort, comprising the 10% most able in each school.

The Photoshop Session

The aim of this session was to give pupils an overview of the tools and techniques that the software allows. With all the pupils gathered round an interactive whiteboard I began the session with a quick introduction including examples of high-end edited pictures. These were sourced from www.worth1000.com/ but care is needed, as some of the images here are not suitable for use with pupils. This aspect of the session was very important, as most pupils had not done any photo editing before. It also led neatly into the next part of the session.

There is a general perception amongst pupils (and indeed most adults) that photographs record real events and are snapshots of events, facts. Pupils were amazed at how images could be altered with a computer but still look totally realistic and this caused a real perception shift. We discussed how newspapers could alter photographs and whether this was 'ethical.' One or two pupils were aware of the faked torture photos from Iraq and they gave their opinions on this.

Having explored the possibilities that exist with photo editing it was time to introduce pupils to the tools. Taking a picture of one of the pupils against a contrasting coloured background (the bright blue wall in the room in which we were working) using a Sony Mavica floppy disk digital camera I loaded the image into Elements. Whilst I was explaining this, my colleague photographed other pupils against the wall.

Next I introduced the concept of filters that alter how an image looks and applied several to my standard image. The pupils appreciated the interesting effects and rapid results and were keen to have a go themselves. Therefore after explaining how to log on, access files and save their work, the next half an hour was spent with pupils loading and altering photographs of themselves using filters.

After the pupils had spent some



Fig 1
*Altering
an image
with filters*

time playing with the filters I gathered them around the front to demonstrate the next stage of the editing process. Using the magnetic lasso tool I selected the outline of a person (quite easy against a contrasting background) and showed how that image could be copied. I then pasted the image onto the original creating the illusion of twins and repeated to create triplets. This also gave me an opportunity to explain about how layers operate. This led into an ideal opportunity to resize some of the images and to discuss scale.



Fig 2 *Lassoing
and Layering*



Sodaplay Session

The aim of this session was to give pupils an overview of the features of Sodaplay so that they could begin to explore the creative process through its use. With the group gathered around the whiteboard I began the session.

I explained to pupils that the software we were going to be using was called Sodaplay and that it allowed us to build and animate models. I also explained that although it looked very simple, many complex structures could be built of many simple components working together. None of the pupils had previously used Sodaplay so my first action was to introduce them to the Soda Zoo. This allowed me to show pupils various models of different levels of complexity. This also allowed me to show that some models moved freely around in space (free masses) and others were fixed at some point or points (fixed masses).

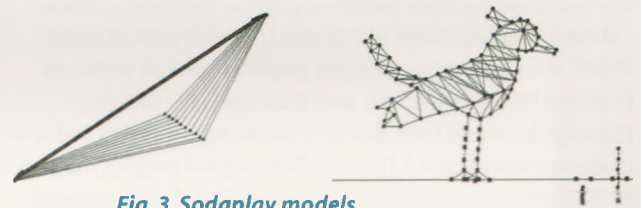


Fig 3 *Sodaplay models*

Having shown pupils some different models it is useful to show how some of the parameters of the models environment can be altered and the effects these have on the models. After choosing a suitable model I first switched gravity off and then reversed it (oh the power!) Next I turned it back on and adjusted its force up and down, increased friction (f) and finally adjusted spring stiffness (k). Between each of these steps I stopped and asked pupils to predict what they thought would happen.

Having demonstrated this I quickly introduced pupils to how models are constructed. This involved showing them how to add masses (free and fixed), springs and muscles. The pupils were now given the opportunity to load some models and adjust the environment. They also had the opportunity to begin to experiment with construction, either by trying to build from scratch or by adding to another model.

After about twenty minutes I gathered the pupils together and asked if any had been successful in building their own structure from scratch. One or two had but many were finding their structures collapsed. This allowed us to look

back at some of the models and to 'discover' that triangles were a feature of strong models. I explained to the pupils how to save their constructions and they returned to the computers to build.

At the end of the session they were reminded to save their work and gathered at the front so that they could load and talk about their model while showing the others on the whiteboard.

The pupils were given a choice of topic for the afternoon session. They could choose one of the following:

- Use Photoshop Elements to create an image for the headline "Incredible shrinking virus hits Waltham Forest"
- Use Sodaplay to create a creature (as interesting looking as possible) that can move across the screen until it hits a barrier and then move back in the other direction or that dances on the spot.

Both tasks proved highly motivating.

Case Study 2 - The Fathom Project Summer Term 2004

Context

This project took place over several weeks with pupils taught at school, at the City Learning Centre and at the National Maritime Museum in Greenwich. It involved 30 Year 5 pupils from 2 schools, plus 5 pupils from Greenwich by Video Conference. Participants were selected by their teachers as pupils who had creative skills and would be well equipped to train classmates in using the software later in the year.

History

Originally funded by Domex and run in conjunction with the National Maritime Museum (Online Education Officer - Sheerin Mahabir) and Middlesex University (Dr Magnus Moar), the project encouraged pupils to look at artefacts from the NMM collections and then use a 3D drawing package to create their own mythical creatures to inhabit an undersea world called Fathom. The original project made use of 3D Studio Max and ran over a period of about one year. As pupils in Waltham Forest had not had the opportunity to take part in this project when it originally ran, it was decided to run a truncated version of the project for these pupils making use of the CLC as well as the resources of NMM and Middlesex University.

Outline of project

The teaching for this project involved several different people and different venues. This was partly due to staff and venue availability, partly to reduce the amount of travelling pupils needed to do and partly to enrich the learning experience for pupils.

There is no space in this article to explain step by step how the software works, however the Anim8or site has a full manual and tutorials to download.

Session 1 - ½ Day

Pupils looked at historic charts from the NMM archives and saw how the cartographers had illustrated their maps with pictures of creatures that they believed lived in the mysterious depths of the seas. This was the starting point

for pupils who were then encouraged to design their own creatures on squared paper. The pupils were then shown the work of other pupils who had previously taken part in the project and had a brief introduction to the Anim8or software.

Session 2 - ½ Day

The pupils were shown the Anim8or software again and had an introduction to some of the tools available to them. They were given a basic lesson about working in 3D, x, y and z views and the drawing tools. They were then set the challenge of creating a model 'tree' and given some time to explore this. Towards the end of the session the pupils looked at each other's results and with the support of the teacher began to think about how they would create their creatures.

In the final part of the session the pupils had the opportunity to link with some pupils in Greenwich that had taken part in the original project. During the videoconference the pupils showed their peers their tree creations and asked if they had any tips or had experienced any problems using the software.

Session 3 - 1 Day

This was a workshop style day. The pupils had a quick recap on building their creatures and then the bulk of the morning was spent on construction with both school and CLC staff supporting the pupils. This session also showed that several pupils had downloaded the software at home and effectively become 'peer experts'. After lunch the pupils were taught about textures and they photographed various textures and applied these to their models. They showed a great deal of imagination in the textures they used for different aspects of their models utilising everything from tree bark to one of the pupil's plaits.



Fig 4
Anim8or tree

In the final part of the session the pupils again had the opportunity to videoconference with the pupils in Greenwich.

Session 4 - ½ Day

The pupils continued with their builds and refined them.

Session 5 - ½ Day

During this session those pupils that required a little extra time to finish their creatures did so. The pupils also had the opportunity to create birth certificates for their creatures.

Session 6 - 1 Day at NMM

This session was the culmination of the pupils' hard work. The pupils travelled to the NMM and had an opportunity to look round some of the exhibits including the fantastic 'Tintin Exhibition'. They then had opportunity to look at the creatures that other pupils in other schools had created and to show their work. After this they met with the pupils that they had been video conferencing with and discussed their creatures and the project.

Session 7 - Twilight at CLC

Only a small number of parents were able to attend the

session at the NMM so it was decided to run a similar event at the CLC so that parents could attend. This gave pupils the opportunity to show their parents the creatures they had been working on. It also gave the pupils the opportunity to become teachers as they showed their parents how to create a simple model (the tree) using the Anim8or software.

Some of the pupils' creatures are shown here.

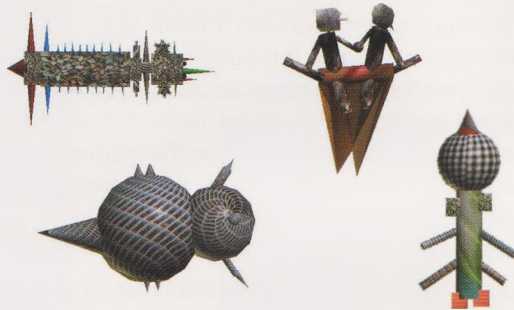


Fig 5
Some of the pupils' creatures

Conclusions

The pupils' work across all three of these projects never failed to surprise all those working with them. The pupils managed complex software with confidence and were constantly pushing at the barriers of their knowledge (and sometimes the capabilities of the software) in order to realise their ideas. In the words of Albert Einstein, "Imagination is more important than knowledge". In the case of these projects this was invariably the case but the imagination drove pupils to acquire further knowledge and skills.

The software genuinely appeared to enhance their creativity rather than impeding them in any way particularly amongst pupils whom the teachers said were sometimes held back by their art skills.

Making use of software that was new to all the pupils made the initial sessions much easier to teach as less differentiation was required than if some pupils had previously used the software. The use of software that is free or very low cost has the advantage for pupils that have a home computer in that they can start work at the CLC and if they are inspired to, continue at home for little or no outlay. This is also an advantage for schools in that they are also able to continue work started at the CLC and extend projects to other schools.

Whilst these projects were initially aimed at gifted and talented pupils, there is nothing about them that precludes their use with other pupils. In fact the projects address so many different aspects and were so popular with all the pupils involved it seems a shame to limit their use to one group. From an inclusion point of view the provision of learning opportunities such as these is very important. Charles Clarke in "Excellence and enjoyment: A strategy for primary schools DFES 2003" asserts that "Children Learn better when they are excited and engaged" and that "There will be different sparks that make learning vivid and real for different children." (Foreword) In "All our futures" this motivating effect is also noted, "Clearly there are many factors affecting pupil motivation and interest in education. But one of the most effective solutions is to develop active forms of learning which engage the creative energies of young people." (p.24) This is highlighted in Prof. Michael

Barber's statement in the same publication that "Creativity is not only an outcome of a good education, but a means of achieving a good education." (p.75)

In summary, the projects outlined here were motivating to the pupils and staff involved and produced impressive, creative results. All those involved learnt new skills that they could take away and use elsewhere and may have inspired them for the future. They would be well suited to use in many settings with pupils of a variety of abilities and may inspire success in other areas of the curriculum.

URLs

www.wfclc.org.uk
www.nmm.ac.uk
www.ncaction.org.uk/creativity/index.htm
www.dfes.gov.uk

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Acknowledgements

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Enrichment at NRICH

Jenni Back

The NRICH website is a well established resource for teaching and learning mathematics offering stimulating problems, investigations and games for all ages and abilities from 5 to 19, and an online maths thesaurus and discussion service. Its aims are:

- To enrich mathematical experiences by giving students the opportunity to explore and engage with mathematical ideas.
- To offer challenging activities which provide students with opportunities to develop their mathematics.
- To foster a community where students can be involved and supported in their own learning, and where effort and achievement is celebrated.
- To provide flexible access to a large, developing resource base.
- To research and develop the use of existing and new technologies to enhance the learning and teaching experience.
- To contribute to national and international debates relating to mathematics teaching and learning.

These are closely linked to the purposes of Naace and more specifically with this publication and its focus on creativity and challenge in primary education.

The NRICH Project started in 1996 and is based in the University of Cambridge Faculty of Education. NRICH is part of the Millennium Mathematics Project, which was set up in 1999 and is based in the Centre for Mathematical Sciences at the University.

The NRICH project (the largest of the programmes within the MMP) is led by Jennifer Piggott, a Lecturer within the Faculty of Education at the University of Cambridge. The NRICH Project encompasses the main NRICH website

www.nrich.maths.org which publishes free mathematical problems, games and articles for pupils and teachers. The online resources also include discussion forums and a mathematics thesaurus. The project team is involved in associated face-to-face outreach activity running pupil workshops, extra-curricular masterclasses throughout the UK and primary mathematics lectures at the Royal Institution, London. They also provide continuing professional development courses for teachers and pursue a related research programme.

So much for the background. What about the resources on the website? The site is republished every month with new content that is linked to a particular mathematical theme. The problems are carefully chosen and prepared by the editorial team and supporting articles, games and other resources are produced to complement the problems. In December, April and August we have a smaller publication which includes one or two more open investigations. NRICH encourages students to find and share different experiences of problems that have open starting points, open middles and open ends. NRICH expects students to

think mathematically and to explain their ideas clearly. To do this we publish students' solutions retrospectively, both from individuals and groups. NRICH aims to build children's confidence and mathematical abilities, making learning creative and enjoyable. All the material published in the past is archived and accessible using the search facilities on the site.

The site encourages the notion of sharing and communicating mathematics both through the publication of solutions and through the discussion boards where pupils, teachers and interested adults can ask mathematical questions and discuss mathematical issues that are of interest to them. In addition the mathematical thesaurus, which is being continuously developed, offers the opportunity to explore mathematical concepts independently.

Now for some help on accessing the resources. The website can be found at www.nrich.maths.org.uk. The home page outlines the theme for the month and offers access to problems appropriate for students from the whole age and ability range.



Fig 1 NRICH website:home page

The problems are presented in four different tiers. Each tier is designed to cover two Key Stages: 1 and 2, 2 and 3, 3 and 4, 4 and above. This is to try to encourage users to tackle a range of problems not necessarily restricted to their own Key Stage. Each month we publish three problems designed to be accessible to pupils who have covered the mathematics usually encountered by the end of each Key Stage. This means that there are three problems for those with experience of mathematics at Key Stage 1 (Stage 1), three for those with experience of maths up to the end of Key Stage 2 (Stage 2) and so on up to, and including Key Stage 5. At each level there are three problems: one challenging (★), one more challenging (★★) and one very challenging (★★★). The stars refer to the coding system on the site. We have also gone back over the archive of past problems and applied this coding to them, alongside identifying the aspects of mathematics that best identify the problem. This means that there should be something for everyone and we hope that you will be able to find it through one of the search mechanisms that are available. The language in which the problems are posed is designed to be accessible to children within that level. We try to avoid "ageist" contexts to a large extent, as many of the problems may well be appropriate for older children, or younger children, for a number of reasons. The levels are designed as indicators rather than prescriptions.

An example from the website will help to illustrate this.

The theme for the November 2004 website was fractions, decimals, percentages and ratio, and the problem Fair Feast was offered at Key Stage 1 with a two star (★★) rating, which means it is quite challenging. It can be found by looking in the past issues down the left hand side and going to Nov 2004 Stage 1&2 Tier 1



Fig 2 A problem - Fair Feast

Here the familiar context of sharing provides an opportunity in which to explore fractions in a variety of ways. The problem involves finding fractional quantities of whole numbers as well as dividing a unit into equal pieces. I have used this problem practically with a group of 8 and 9 year old children with a real picnic to share and was able to involve them in some interesting discussion that extended the sharing of the pizza to a group of 6 children. They talked about halving the quarters to get eighths and cutting one quarter into six equal pieces to get twenty-fourths. We eventually came to the conclusion that one sixth of the pizza was equivalent to one eighth plus one twenty-fourth. Quite a conclusion! The children were then encouraged to submit their solution to us for inclusion on the website. They did this by clicking on the 'Submit a solution' button above the title of the problem. The other options here are to get a 'Hint', which should give them a suggestion that will help them if they are stuck, or to look at 'Notes' which gives some background to the problem suitable for teachers or mentors.

A teacher planning a lesson on the topic of fractions could use the search facilities on the website to help find a selection of challenging problems on the same theme. The best way to do this if you have a particular topic in mind is to use the Maths Finder down the left hand side of the web page. This takes the user to a list of broad curriculum topics which includes "Fractions, Decimals, Percentages, Ratio and Proportion" and 'tagged' with this label are 204 resources in the data base. Clicking on the topic leads the user to a list of subtopics which gives a further 53 problems connected with fractions. These are all identified by their content and difficulty levels.

Another facility that the website offers is the opportunity to download the problems in the form of a printable page which preserves the illustrations. Teachers are welcome to use the worksheets as long as acknowledgement is made of their source. The NRICH website is charitably funded in order to maintain free access to its resources so we appreciate the acknowledgement of the ideas we produce.

Chocolate Bars illustrates another type of resource we offer which are interactivities that illustrate mathematical ideas. In this interactivity the user is able to choose the number of people coming to their party and joining in a game that involves sharing chocolate bars fairly. This is a game you can play on your own or with friends. You must imagine you are having a party!



Fig 3 An interactivity - Chocolate Bars

You have put 1 chocolate bar on one chair, 2 bars on another chair and 3 chocolate bars on a third chair. Each person takes it in turns to stand behind the chair where they will get the most chocolate if it is shared out straight away.

Which chair will this be?

Can you work out what fraction of a bar of chocolate each person will get?

This game is based on an old favourite which we were reminded of in an article by Peter Critchley in TES Mathematics Curriculum Special, Spring 2002. It can be found by typing 'Chocolate Bars' into the search bar at the top right hand side of the website.

These interactivities are particularly useful now that so many primary schools have interactive whiteboards with live internet access. They can really help to challenge children to think mathematically and provide a creative starting point for investigations.

The NRICH website offers teachers a huge bank of resources to use with children to inspire their mathematical creativity and challenge their thinking. It has enough problems on it for any child to tackle a fresh problem every day that they go to school. Why not start them off on that road of challenges today?

Jenni Back joined the NRICH team as coordinator of the Primary Project in 2001. She develops material for the website as well as overseeing the Royal Institution's Primary Mathematics Masterclass network and Primary Mathematics lectures. She has worked as a teacher of mathematics in schools around the world as well as in England. She has recently completed her PhD, which studied how teachers and their pupils talk about mathematics. She is interested in enriching the mathematics that children have the opportunity to experience both in and out of school and is a regular contributor to 'Primary Mathematics'.

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Don't forget the angry eyes!

Oscar Stringer

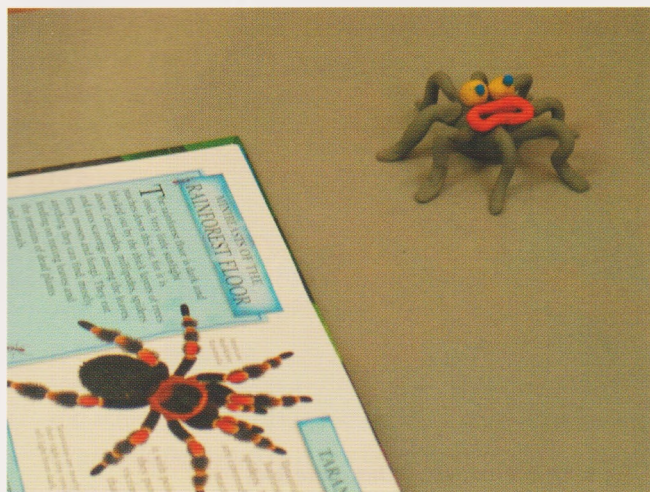


Fig 1 Don't forget your angry eyes

With so much choice of easy to use software available for both Mac and PC, it's hard to ignore the potential of animation in the classroom today. In this article I will aim to convince you that animation (in particular model animation) in school is possible, fun, easier than it looks, rewarding and will make you lots of new friends.

I have been running animation workshops and courses in schools and colleges for ten years and in that time there have been some major advances with ICT that have had a direct and positive effect on animation and digital video in education at all levels.

These benefits for education are:

- The ability to be able to watch and evaluate your animation clips immediately. Before digital, animators would have learnt their craft using film, shot onto a super 8 camera or similar. After you had shot your work you would need to get the film developed (at a cost and a week's wait) then bring it home and set up the projector to view your work and only then would you watch your animation and evaluate your creative decisions. With digital, you can watch and evaluate immediately and in my experience it is a great hook for children of all ages and speeds up the learning process.
- With programs like iStopmotion you have the ability to cut, copy and paste individual frames, making it easy to remove the frame with the stray hand in it or copy frames to repeat a simple piece of action like a wave.
- If you go wrong you can start again or easily cut out unwanted frames.
- Digital video editing programs like iMovie enhance the animation further with sound effects, music, titles and special effects. You can easily import your animation into a video editing package and add the extras that give it that extra something.

- Work can be copied on to good old video tape, DVD, CD the web and now your mobile phone. Before digital that would not have been possible in a school or college.
- Exterior location or site specific animation is also possible; see picture below;



Fig 2 Working outdoors

Why is model animation becoming so popular in the classroom?

Teachers wanting to discover the potential of digital video will find model animation a good starting point. With model animation, you can explore the software options and the different shots used in film making. This is a great way to use ICT creatively. It appeals to children of all ages, from 5 to 75, empowering them to bring models and objects to life easily and effectively.

Schools are busy, noisy, with never enough room. Animation however will allow you to create films on Mars or in Jurassic Milton Keynes - with creative art work and models you can set your film anywhere. There is also a lot more control over your surrounding environment - it doesn't matter if there's a riot going on in the next classroom as the animation filming process doesn't pick up the sound, you add that later during post production (editing).

It is possible to focus on a few scenes a session and there are a greater number of roles to be distributed to keep everyone on task. Films and TV programs are made up of many different shots, which have different roles within the structure of the film - long shots, mid shots and close ups to name a few. Using model animation allows children to discover, for example, how important it is to use close ups to get in close to the action or long shots to establish the scene and characters. If any film is shot with too many long shots, it quickly stops being interesting, so children discover the need to get in close.

A myth that surrounds animation that may prevent people from having a go is the idea that it takes years to make a film. Now this is true at studios like Aardman, home of Wallace and Gromit and Pixar home to Monsters Inc etc. They produce anywhere between three seconds a day to four seconds a week. If this were the case for animation in educational settings then clearly nothing would be happening in the classroom. However advances in digital video mean that in

a school day, working with up to four to five groups of five each, each group will be able to get footage lasting between 20 and 45 seconds depending on how well children work together. The longer film isn't necessarily the best; often shorter is sweeter as more care and thought has gone into it. Making films that are advert length is a great way to start, if the films or projects become too ambitious the chances are everyone involved will run out of steam and enthusiasm. So, keep your ideas simple.

Model animation doesn't demand the same disciplined accuracy and precision of other forms of animation. Being a hands-on and creative experience it encourages children to trust their creative instincts. For example, many children and adults on my courses ask me how they should make their model walk. The answer is that there is no right way to make a dinosaur or alien or pig walk. With animation, you should encourage a representation of walking. I have seen many examples of children of all ages surprising themselves with their work when making their characters walk into the scene. This is also a great leveller - I have had experiences in the classroom with teachers who have been amazed with the way some of their pupils have engaged with the animation process where in other areas of classroom learning they struggle.

Model animation has this levelling effect for several reasons:

It is an art form most people can relate to, there are few people in the country who haven't seen Wallace and Gromit or Pingu and haven't enjoyed the nature of the stories and the characters involved and wondered how it is achieved?

Children are experiencing an art form that may have seemed beyond their reach or capability - instead of spreadsheets and databases it's science fiction and alien invasions.

Children are working towards a goal that is highly desired and doing something that they enjoy. Model animation is an effective motivator for speaking and listening skills. It has encouraged children who haven't found poetry engaging, but are soon motivated when writing a poem to compliment their animation.

I have heard professional animators say that animators are, 'actors in their finger tips'. There is a lot of truth in this and children who are quiet and more reserved suddenly find an outlet for the creative side. Recently I worked with young patients with serious mental health issues at a hospital. They started the day quiet and withdrawn, but by lunch-time they were having a great time and were engaged with one other, laughing and sharing ideas as they brought their films to reality. Their carer told me that she hadn't ever seen a few of them talk let alone laugh - what a difference this work had made! What I'm trying to say is that animation is good for you and uses many skills that are fun and appeal to everyone.

Now at this point I am hoping I have convinced you of the huge potential of animation in education.

So how do you start?

Simply. Keep all your ideas embarrassingly simple to begin with. Animate the contents of a pencil case. It is a good way to develop confidence with the software package you choose. On my website

www.southstreetstudios.co.uk there are examples of simple projects which were achieved in the classroom with children and teachers.

Software (There isn't a huge choice but I think that this may change soon.)

For Windows users:

- Digital Blue, good software but the camera is a web cam so quality of the picture isn't great.
- 2simple software have released a new package called 2animate, it's very good but at present is limited to 48 frames, which is 4 seconds worth of animation. You use it with a web cam.
- SM Animator is a free download (SM stands for Stop Motion) from www.animateclay.com/capture.htm.

For the Macintosh:

- iStopmotion which is an amazing program as you can plug in your DV camera or iSight camera and it's only £35.00 from www.istopmotion.com
- There is a new program from Kudlian called 'I can animate' www.kudlian.net/products/icananimate

The great thing about the Mac programs is you can import your animation films directly into iMovie (the free video editing package that comes with every Mac) where you add sound fx's, music, titles etc. The Apple Mac is the chosen platform for many professionals in education and the creative industries. It comes with software to edit your films and make CDs and DVDs and is a perfect ICT solution for animation, digital video and music.

Tips for starters

When you launch any of the animation software packages, you have a choice of frame rates. Set the FPS (Frames Per Second) to 12 or 15 FPS. This helps the young animators. If the frame rate is set to 24 FPS then they will have to make really tiny movements to get smoothish movement, as when played back the action will be fast. When animating keep the movements small - it's hard to say how small, but the smaller the movement the better. There is a DVD available of Aardman's Creature Comforts. Watch the DVD with the class on the white board and use the frame advance feature on the DVD player controls to see the animations made by the professionals a frame at a time. That way you can show your class how small the movements of the elephant's trunk need to be.

With all forms of animation you can make the impossible happen, elephants playing football with a T- rex happily. However, if the ideas become too ambitious when starting out it's going to get tricky. So, keep the ideas simple. You will discover lots through play and experimenting but I would start by making a ball roll across a table top and then gently squish it to make it morph into different shapes.



Fig 3 Keep the designs simple

When making models from plasticine, limit the features on the head to two or three and make sure that these are large. This makes it much easier to animate the model and bring it to life. Many of the camera options are web cams, which do not have very high definition, so you need to create models with big bold designs that stand out and are easy to see.

The models must be able to stand up. This is a tricky area as the modeling materials are quite heavy and weak so creative approaches are needed to ensure that the model stands up. Try big feet, four legs rather than two, short fat legs, small models (pen or pencil height is big enough), and use a tail as an extra support. All of this needs to be established at the start otherwise the models keep falling over and children get frustrated.

Keep the stories simple and get the characters reacting to the action. When models react to a simple action, for example, a ball rolling on and stopping at their feet, this brings the characters to life and adds interest.

Use photographs, books and children's art work as scenery. Keep the colours simple and try to get the scenery to compliment the models so that they stand out from the background.

In photography, darkness is as important as light. In music, silence is crucial in the right place. In dance, stillness is one of the set moves! While you are on a journey of animating your models and bringing them to life, you'll need to remember that stillness is very important. If all the action of your models runs together without stillness it becomes very difficult to watch, much like a sentence without a full stop or comma. So, divide your animation up into small units of action and punctuate each unit with a pause of six frames (half a second). This gets easier each time you have a go and often I let the children work it out for themselves by allowing all the action to run together and then asking them what's needed.

"Animation is sixty percent sound." There are hundreds of quotes by film makers underlining the importance of

sound in film. As your animation will be silent when filming, you have the option to add sound later in digital editing packages like iMovie or the package that comes with the digital blue camera. The more sound you add to your film the better, the richer it will be and the world you're creating will come to life even more. Sound effects are easily available on CD's in music shops or on line as free downloads for educational use. (It's a good idea to ask the web site owner if you can use them in school - many are free but it's good to ask.) Music made in programs like GarageBand or EJay is perfect for first animation shorts.

For teachers in all areas of education, an inset day on model animation is fun, uplifting, creative and guaranteed to generate laughter and smiles. Films made by teachers on courses can be viewed on my website, along with feedback comments from the delegates.



Fig 4 Laughter at an INSET day

These are just a few pointers to help get you started and develop some basic understanding of the craft of animation. A good place to cut your teeth is an after-school-club. The results at first might seem a bit fast and crazy but if you remember to add the pauses to the action and keep the ideas simple, you and the children will have a lot of fun.

Good luck!

Oscar Stringer, is an independent film maker. He trains teachers to work with digital video and works with young people in schools, art centres and for film festivals. He recently directed a group of young people making a film with the First Light Project and the Animation Station, merging 3D animation with live action. When not working in education he makes short films and is currently working on a documentary. Recent work has been screened at festivals and on TV.

Oscar Stringer has released a training CD for Teachers, full of examples of work, tutorials and resources to get teachers started with animation in education.

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Creativity and Challenge in MFL with Interactive Whiteboards

Andy Hutt

By 2010, all Primary Schools in England should be able to offer pupils the chance to learn at least one modern foreign language. The DfES has been proactive in its preparation for this. One of the outcomes is *Sonica Spanish*. Developed by 3T and commissioned by the DfES, *Sonica Spanish* is a set of software tools and learning materials designed specifically for the teaching of Spanish at KS2. The software can be used by individual pupils working at PCs, but early use in pilot schools indicates that its main use will be through whole class and small group teaching using data projectors and interactive whiteboards.

The experiences of early users of *Sonica Spanish* suggests three main areas in which interactive whiteboards can support creativity in language teaching:

- Support for different learning styles
- Flexibility and teacher confidence
- Pupil confidence and attitudes to learning.

Support for different learning styles

Although there are those that would disagree with Gardner's theories of multiple intelligences, most teachers recognise the need to create learning experiences that have appeal across the senses. The experiences of the pilot schools suggest that *Sonica Spanish* provides this multi-sensory appeal.

Visually, the graphics are strong, colourful and appealing – designed specifically for projection. Often, the graphics are used for more than just visual appeal – they are used to support learning objectives. In this example, pupils learn greetings at different times of the day. The background graphics change to match the time of day to provide a visual cue and to support visual memory.

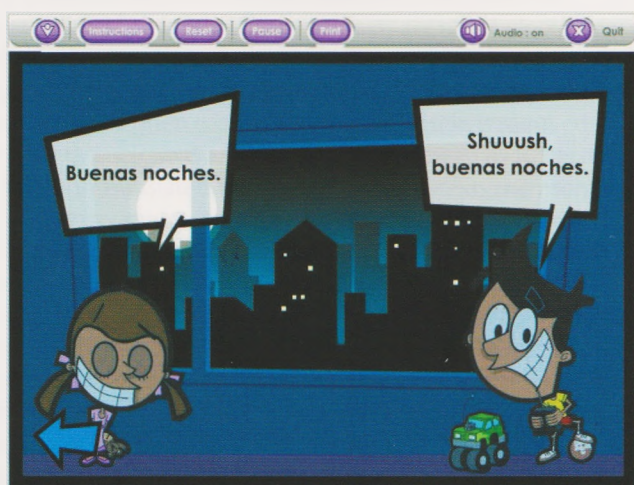


Fig 1 Buenas noches

Aurally and orally, *Sonica Spanish* provides support for pupils through a rich variety of sound, speech and music; the ability to record their voices; and a spoken Spanish dictionary. In the whole-class setting and with interactive whiteboards, *Sonica Spanish* also has a particularly potent tool: karaoke.



Fig 2 Karaoke

The karaoke function can be easily controlled by the teacher, for example to mute the sung lyrics.

One teacher reported how children would 'kill' for one particular activity – the dance mat. Combining the kinaesthetic element of games playing with learning objectives has proved both highly motivating and successful. *Sonica Spanish* comes with a dance mat.



Fig 3 Dance mat

Flexibility and teacher confidence

A creative classroom requires teachers to have confidence, professional skills and a range of tools and materials. Traditionally, teachers have been adept at manipulating published resources to meet the needs of their classroom but much software is rigid in its structure. Pilot school responses have commented favourably on the flexibility offered by *Sonica Spanish*. Although the program is structured to support the QCA scheme of work, teachers have control over the presentation of activities. Importantly, this planning and selection need not take place at the interactive whiteboard but can be completed away from the whiteboard computer and then synchronised with the classroom or network resources.



Fig 4 Teacher planning tools

Sonica Spanish has inbuilt support materials and mechanisms to enable it to be used by teachers with little or no Spanish, as well as those who are more fluent. Flexibility was also evident in pilot schools where Sonica Spanish was used in a variety of ways: with whole-classes and small groups; in lessons and in clubs; daily and two or three days a week; and tailored for different pupil groupings.

Sonica Spanish is supplied with Easiteach Player, enabling it to be used as a whole-class teaching tool on any make of interactive whiteboard.

Pupil confidence and attitudes to learning

A creative classroom is one that supports its pupils' innate love of learning and discovery. The emphasis in Sonica Spanish is on active participation and exploration of the language. Pilot schools spoke of how pupils had become more open to the concept of learning a new language and had in many instances taken their Spanish use outside of the classroom. Pupils have also been highly motivated by many of the constructive learning games in Sonica Spanish.

One criticism of some interactive whiteboard teaching materials is that there is not enough follow up away from the whiteboard for individuals to practise and reflect on their learning. *Sonica Spanish* therefore contains a Journal tool. Designed to encourage individual pupils to repeat and reinforce the learning exercises, the Journal will provide pupil assessment and summary information.



Fig 5 Journal tool

One interesting side effect, in those pilot schools where the teacher was not a Spanish 'expert', was that pupils enjoyed learning at the same time as the teacher – benefiting from this joint participation in learning.

Conclusion

At the time of writing, use of Sonica Spanish has been confined to a number of pilot schools that comment that teachers do require a degree of ICT confidence, and time, to get to know the materials. Overwhelmingly, the reaction has been positive but Sonica Spanish is not a program designed to encourage creative, original or imaginative output. Instead, it enables any interactive whiteboard technology to support the development of the creative classroom. It encourages exploration and risk-taking; develops confidence in learning; supports different learning styles; and opens up possibilities for language learning for both teachers and pupils.

Sonica Spanish is available from RM. Further information is available at www.rm.com/SonicaSpanish

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Creativity and interactive texts

Gordon Askew

ICT is changing and extending the way in which we read and write. This goes far beyond the fact that reading and writing on-screen gives us new flexibilities and immediacies, although these facilities themselves are of considerable significance. Through ICT we can also access and create importantly different kinds of text, ones that are hyperlinked, multi-modal and non-linear, requiring dynamic engagement from the reader – that is to say *interactive texts*.

Particularly exciting from a teaching perspective is that such interactive texts are beginning to look as though they offer very effective and engaging material for developing and extending children's reading and writing. More exciting still, they seem to open up remarkable new vistas of creativity – both in terms of thinking and of making.

We need, therefore, to consider this phenomenon of interactive text in a little more detail.

More than a tool kit

ICT provides us with very useful tools for writing, editing, storing, accessing and sending texts. Thanks to this, it can provide valuable support for learning and teaching literacy, proving particularly useful in situations where the quick easy manipulation of text is at a premium. However the literacy potential of ICT extends far beyond such use. With ICT we can access and create types of text that simply could not exist in paper form. These are what I am calling ICT texts. Acknowledgement of the existence and importance of such texts moves ICT from simply providing a tool for literacy into being the medium within and through which some of the literacy itself exists. The reading and writing of ICT texts has to become an integral part of what we mean by literacy.

Paper texts in electronic form

Of course it is possible to take a pre-existing paper-based text, and put it into electronic form by scanning, typing or programming it into a computer. In literacy teaching many Big Books and other paper texts are now being made available in such electronic form. These are potentially very useful, particularly as a way of sharing the text with a large audience, or when easy editing/manipulation is required. However such texts are not really what I mean by ICT texts. Although 'translated' into digital form, the texts themselves do not become essentially different, only the way that they are stored and accessed changes. Similarly ICT can be, and often is, used to write what are essentially paper texts. For example, a word processor can be used to write a letter, which is then printed off and sent. This is a most valuable process, but the text produced is, again, not an ICT text proper, even whilst it is in its electronic form, or even, indeed, if it is sent in electronic form. It remains essentially the same text as it would be if it were on paper.

What is an ICT text?

In contrast, an ICT text exists primarily in electronic form and cannot easily be transferred onto paper. This is not to say that parts of it cannot be printed off as hard copy, but the paper version does not then work in the same way as the electronic original. For example you can print off a page from an internet website, but the resultant paper will not respond if you touch a particular hyperlink in the way that it would on screen.

Where do we find ICT texts?

Sites on the World Wide Web are a prime source of ICT texts. However many interactive CD-ROMs and other computer software including some 'games', particularly those of the 'role-play' and 'adventure' types, also constitute ICT texts. Television text services are another source of such texts, and we should probably consider e-mail and mobile phone text message 'conversations' as ICT texts too, since they exist primarily in electronic rather than paper form. However in the primary classroom we can perhaps most valuably start by concentrating on some of the websites and interactive software.

What are the features of ICT texts?

ICT texts often have distinctive features that are not found, or not fully found, in paper-based texts.

ICT texts are usually read in a non-linear way; that is in a way that is chosen by the reader rather than pre-sequenced by the author. Whereas, with most books, the reader starts at the beginning and reads the pages in sequence, with an ICT text this does not apply. The reader selects various routes through the text, often out of large numbers of options, depending up on interest, inclination, or the specific nature of the reading purpose. In this way the ICT text is more like using a set of encyclopaedias, or reading a newspaper than reading a novel. However routes through ICT texts can be far more complex and multi-layered than a newspaper or a printed encyclopaedia.

Another distinctive feature of ICT texts is that they often contain hyperlinks. By clicking on certain words, pictures or icons the reader can move instantly to another part of the same text, or even to another text altogether. In a sense this is more like using a reference library than reading a single text, but it all happens very easily and quickly on a computer.

Perhaps even more significantly, many ICT texts are multi-modal. They present their information not only through written words and pictures – as do books – but also through sound, animation and video, modes of communication simply not compatible with paper presentation.

Many ICT texts are dynamic too; they can easily be changed and updated. For example an internet site about football can potentially include the very latest scores, whereas a book will always be fixed in the time it was printed. Unlike a book, you may well find that on revisiting an ICT text that it has actually changed since the last time you read it.

ICT texts are interactive

Most important of all, however, many ICT texts are interactive. They change and respond according to what the reader does. True, a reader engages with a paper text, but the text itself does not actually change however the reader responds to it. Reading an ICT text is a truly active involvement, where the reader, in an ongoing exchange, influences the actual text – at least in terms of its presentation, sometimes even of its content or outcome. This leads to what is in many ways an importantly different quality of reading experience – and one that seems to offer a great deal in educational terms.

ICT texts for literacy teaching

We therefore have a new kind of text in the educational context. It is, however, one that is already a well-established and ever-growing feature of the way we read and write in the 'real world'. This means that ICT texts can and should sometimes be used as the principal or subsidiary text in literacy teaching, for example occasionally replacing a Big Book for shared reading, or a paper book in guided, paired or independent reading. Of course not all ICT texts will be suitable for such use, and selection for readability, age-appropriateness, and relevance to learning needs has to be just as careful as with any other text.

Once selected, a suitable ICT text will involve a good deal of 'conventional' reading. Such a text can, just like any other appropriate book, be used to encourage and support the development of reading skill. However the use of an ICT text is also introducing the need for reading skills over and above those needed for a paper text, for example, non-linear navigation, 'radial' reading and orchestrating information from multi-modal sources

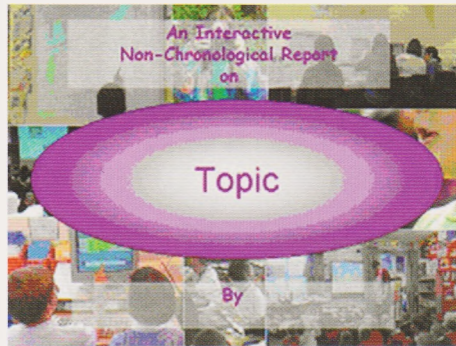
When teaching with an ICT text, the teacher first needs to ask, 'What generic experience, understanding and skill do children need in order to read this text?' but then also to ask, 'What additional experience, understanding and skill do children need in order to read this ICT text?'

In this latter context, key questions to the reader will possibly be:

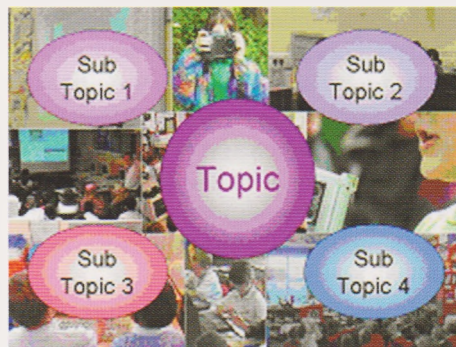
- How will you navigate this text and why?
- How will you respond to it in order to fulfil your reading purpose?
- What are the particular language features of this type of text, and why?
- How will you obtain (orchestrate) information from the multi-modal sources?

These are interesting questions that primary teachers are only just starting to explore.

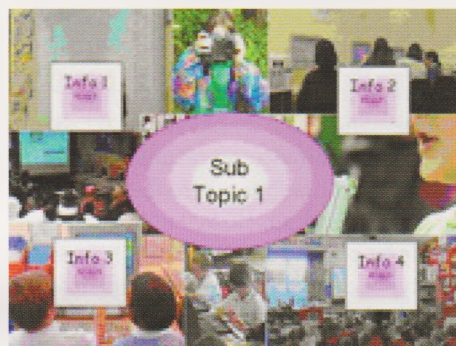
Finding suitable ICT texts for use in a primary classroom remains a problem. The Primary National Strategy has therefore recently created a number of simple ICT texts, mostly built as hyperlinked PowerPoint presentations, which are now being tried out in classrooms across the country. Several of these are available as resources on the set of DfES CD-ROMs 'Learning & Teaching Using ICT'. (Ref: DfES 0390 2004 GCDI)



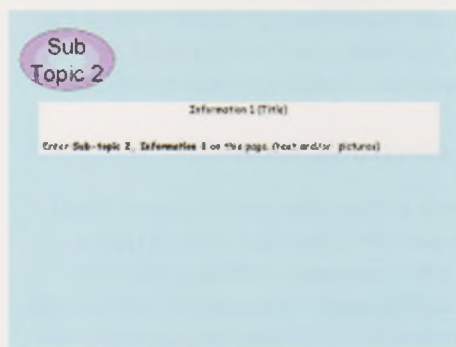
Introducing the topic



Sub topics branching out from the main topic



Exploring each sub topic in detail



Information page

Fig 1 Illustrative screens from a simple interactive template for a non-chronological report, built in PowerPoint

Additionally educational publishers, software developers and others are becoming increasingly aware of the potential of ICT in literacy learning and teaching and I am now confident that the availability of high quality interactive texts, well-matched to primary classroom reading needs, is set to improve in the very near future.

Already where teachers and schools are beginning to use ICT texts as part of their children's reading repertoire, it is becoming very clear that such reading experiences:

- engage the reader in a very active, dynamic way (providing remarkable levels of motivation for, amongst others, reluctant boy readers)
- very effectively promote and support the development of important learning and thinking skills
- provide an outstanding context for dialogue and discussion
- facilitate focus on some key aspects of text (sequence and structure, author/character perspective, etc.) as well as developing radial reading and related visual and media literacy skills
- extend reading into the 'new literacy' of the ICT medium in ways that relate meaningfully to the everyday experience of many children.

Most important of all though, there is something in the flexible and interactive nature of such texts that strongly supports and promotes creative thinking and response. Teachers regularly report that, whether used as a class resource, for example displayed on an interactive whiteboard, or as a group of individual resources, for example accessed in a computer suite or from a set of laptops, engagement with such texts can provide quite outstanding contexts for extended dialogue, role play, drama, dance, music making and other creative activities. There is something very liberating and stimulating about the way that such texts allow and cater for individual, flexible and free-ranging exploration of both fiction and non-fiction content, accessed through a variety of visual and aural as well as written modes.

Interactive writing

The obvious corollary of interactive reading is interactive writing - for children to create 'texts' combining digital images, video and sound with the written word and organise these into simple hyperlinked, non-linear formats within the ICT medium. Pedagogically, this activity too is in its early days. However, where teachers are supporting children in creating such ICT texts as the outcome of literacy activity, recognition of the enormous potential is immediate. Early indications are that encouraging and supporting the writing of such ICT texts:

- engages the writer in a very active, dynamic way (providing remarkable levels of motivation for, amongst others, reluctant boy writers)
- brings the content and structure of writing into a new and very dynamic relationship
- involves strong elements of design as well as language and style considerations
- requires particularly careful consideration of the potential readers, and how and why they will access the content
- extends writing into the 'new literacy' of the ICT medium, facilitating the exploration of multi-modal communication
- encourages creative thinking and learning.

For example, the Primary National Strategy has recently produced PowerPoint templates for hyperlinked versions of all the major non-fiction text types (these have been distributed to all LEA Primary Strategy teams, and should

be available through LEA Consultants). Each represents all the salient features of a particular text type, but also allows exploration of the additionality of presenting such information in a multi-modal, non-linear way. Again both teachers and children are finding that this adds considerable engagement to writing tasks, giving a voice to many who are reluctant to create text as words on paper as well as extending the communication potential of others too.

It is a mark of the creativity that these texts engender that a group of children in a primary school I recently visited took one such interactive writing template (in this instance the one designed as a procedural text) and turned it into a highly creative, imaginative and entertaining 'Interactive Poem', with their own video and digital images forming an integral part of the text itself.

It is imperative that teachers and children press on with this kind of exploration of the real and creative potential of reading and writing on-screen. The ICT text is opening up to us broader concepts of literacy and new opportunities for creativity that we cannot afford to ignore.

No more books?

This does not, of course, mean that the book has had its day - far from it. Those of us who enjoy curling up with a good book will continue to do so. Adults and children sharing books will remain the cornerstone of early and developing literacy. However ICT cannot and must not be ignored. It should not be seen as a threat but as an exciting possibility. ICT is not restricting or reducing what we mean by literacy. On the contrary it is providing a context for vital and developing language use, involving new kinds of very exciting texts that simply cannot exist in paper form. If teachers can find the courage to allow children to engage with both the reading and writing of interactive texts, they will quickly begin to reap enormous rewards not only in terms of extending and enhancing the reading repertoire but in motivating and engaging children, further developing their core literacy skills and stimulating their creativity.

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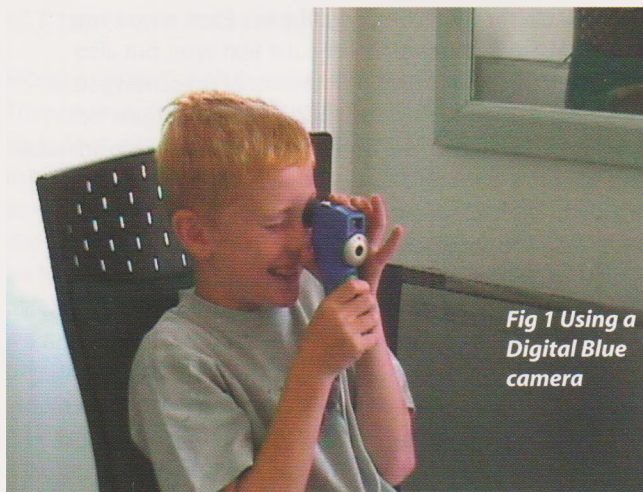


Fig 1 Using a Digital Blue camera

Making Movies

Helen Williams

Does it cost a fortune to be creative with ICT?

Do you need sophisticated equipment and complex technical know-how?

What does it mean to be 'creative' anyway?

It is sometimes said that if you give a child a toy, then she will only play; if you give a child a 'proper' tool, then she will do some serious learning. Well, any primary teacher knows what nonsense that is. The statement implies two falsehoods: that play isn't learning, and that learning can only take place outside the context of play.

But if you give a child something that *looks* like a toy, but has powerful technology under the bonnet, does that make a difference to the way it is used and the outcome of its use? Can children use toy-like resources to produce original, creative outcomes, which demonstrate a whole raft of higher order skills otherwise associated with much more expensive and sophisticated equipment?

It was these and other questions which led us to think about what difference it makes if you give children an expensive, high-end digital video camera or a cheap and cheerful blue plastic one.

Schools know only too well how technology bites massive holes into the budget. The idea of using digital video as a creative medium is exciting and challenging but... so costly! If there is already a digital video camera in school, does anyone know how to use it? Are the children given access to it? And how can we organise the use of one camera with twenty-eight children?

There is another way...

It is possible to buy a set of five Digital Blue PC Movie Creator cameras and associated video editing software for little more than the price of one decent camcorder. These cameras are small, lightweight and designed for children to use. The output is of a very low resolution, but they are easy to operate and, when used in conjunction with the video-editing software, will take children through the whole process of *plan, capture, edit and publish* in just the same way as when using a 'proper' camcorder and software such as

Windows Moviemaker or iMovie.

At our Educational ICT Centre in Norwich, we have been working with children from 7-13 years old on a series of digital workshops called *CreateIT! – Putting the IT into CreativITy*. Using the Digital Blue PC Movie Creator camera and software, children have undertaken a variety of activities including stopframe animation, reportage and storytelling.

This work is now the basis of a **Bill Tagg Research Bursary**, to be conducted in 2005. (Further information about the Bill Tagg Bursary can be found on the Naace website www.naace.org.)

The intended investigation comes, in part, from the identification by Becta of several key areas for further research in the field of DV in education and, importantly, from our own enthusiasm for the subject matter. It will focus on the use of digital video to foster creativity in the primary classroom, with specific reference to two questions:

- Does the cost and specification of the digital video equipment used in primary schools impact on learning and the creative process?
- Can the use of digital video be justifiably mapped onto the current National Curriculum for KS2?

The Becta review of research in this field (see *What the research says about digital video in teaching and learning*, Becta ICT Research, 2003 www.becta.org.uk/research) can be summarised as follows:

Digital Video...

- increases motivation and engagement
- develops literacy skills
- can be used across the curriculum and age phases
- accommodates different learning styles and abilities.

There is a steadily accumulating evidence base regarding the use of digital video equipment in schools, but much of it has been with 'high-end' cameras and software (and the costs and technicalities associated therewith). The research project we intend to undertake poses the hypothesis that the technical specification, and therefore price of digital video equipment, need not be a factor in successful integration of digital video work into the primary classroom and children's creative use of it.

We propose to use three types of digital video equipment in order to compare the learning process and the output from the same basis but using significantly different resources:

- Type 1 – high-end, 'proper' DV cameras combined with Pinnacle Studio 9 editing software. Cost to school: camera £400-£800, software £59 single user plus site licence.
- Type 2 - Digital Blue PC Movie Creator camera combined with its own 'child-friendly' editing software. Cost to school: camera and multi-user software, £85.
- Type 3 – low-cost, modestly specified pocket DV cameras (Mustek DV4000, NisisDV4) combined with Windows MovieMaker2. Cost to school: camera +/- £100, free editing software (assuming XP OS on machines).

Our premise for this research project, therefore, is that the *creative process* of movie making is the same, regardless of the cost of the equipment, and that the *outcome*, in creative terms, will be just as valid. The only difference will be in the

technical quality of the finished product: lower resolution, fewer fancy editing effects and so on. The experience, and the quality of the learning, is just the same. We have yet to find a child who has expressed disappointment at the image quality of a finished movie.

This approach to making videos has significant implications for classroom use. With a set of 6 or 8 cameras, it is possible to organise a class of children into manageable production 'teams' where each takes on specific roles and responsibilities: camera operator, director, interviewer, editorial chief, continuity and prop managers. A huge advantage of the accompanying software is that it comes with a site licence, so whilst some children are out filming, others can be editing the footage back at the computer.

We have found that children approach work with the Digital Blue PC Movie Camera and its associated software in much the same way, regardless of their age and prior experience. First comes the novelty stage: the editing software is full of gimmicks (its origins being in the 'edutainment' market) and it is these which children take such delight in using. Whatever the starting point, be it children's own films or one of the plentiful clips in the supplied stock footage, it is certain that the first attempt at editing will be peppered with aliens, thunderbolts, helicopters and explosions, with an inevitable swarm of ants thrown in for good measure. It's rather like the overuse of fonts we all got tempted by when we first discovered the power of desktop publishing, and it is an important phase to go through before any serious editing can take place. Using as many gimmicks as possible, children have enormous fun editing and compiling their movies, but it is fair to say that the original focus or storyline may well become lost in a quagmire of green slime.

The second stage, usually seen after more than one experimental piece, will see the child becoming increasingly focused on the intended outcome. Editing choices become more discriminating and there is less use of irrelevant effects. Transitions between scenes are limited to one or two types and more attention is paid to the planned storyline. Running parallel with this is increased expertise in actual filming technique: the camera is held more steadily, the direction of voices is considered and there is less frantic panning around the scene.



If children are able to return to the activity for a third or fourth time, then another stage becomes apparent. It is then possible to see some truly creative and well-organised work emerge. Children will think critically about the process and the intended outcome, will set themselves high standards but will now have realistic expectations of what they and the resources can do. If working in pairs or small groups, (much better than working alone on this type of project) children will learn tolerance, compromise and effective negotiation in order to achieve a highly valued outcome.

But is it creative? Creativity skills include: imagination; innovation; aesthetic awareness; the ability to visualise an idea; making judgements; being innovative and taking risks. All of these things are apparent in film making, even at its most exploratory and unfocused stage. The more familiar children become with the technology and the language of film they use to articulate their ideas, the more sophisticated will be their use of these creativity skills.

A glance at the National Curriculum in Action website (www.ncaction.org.uk/creativity/spot.htm) gives us an insight into how teachers can spot creative work:

When pupils are thinking and behaving creatively in the classroom, you are likely to see them:

- Questioning and challenging
- Making connections and seeing relationships
- Envisaging what might be
- Exploring ideas, keeping options open
- Reflecting critically on ideas, actions and outcomes.

Making digital videos, in any area of the curriculum, lends itself perfectly to these characteristics of creative learning.

An excellent example of using digital video in a subject-specific focus can be found on Becta's CD ROM: Digital Alchemy (Digital Alchemy – Using DV Assets Across the Curriculum, CD ROM, Becta 2004). This case study uses high-end DV cameras, and it does not address the organisational issues of one camera, thirty children, but it shows quite clearly how the DV medium can be used to demonstrate learning within a tightly focused area – in this case, the water cycle.

Some examples of children's movies (amongst other CreateIT! Activities and some background information) can be seen on our creativity website www.PriorITas.co.uk/creativity. It is important to note two things: the images are low resolution for web broadcast, and the activities were undertaken in an out-of-school context, so there is no curriculum focus as such.

If the activity is to be an effective learning tool within a curriculum context, then the approach to movie making needs to be more rigorous than our examples suggest.

There are various aspects to consider:

- Planning the content – deciding on the focus, allocating roles and responsibilities (this type of activity is inclusive by nature: there is something for everyone to do regardless of ability)
- Working out the plot – storyboarding
- Skills and techniques associated with operating the camera - handling the camera, taking moving and still images, high and low resolution, memory capacity



- Skills and techniques associated with using the editing software - importing video clips, building a timeline, using transitions and effects, incorporating sound
- Understanding the structure of the film – scenes, shots, sequences
- The language of film – types of shot (long shots, close-ups...), points of view, panning, tilting.

Where does movie making fit into the curriculum?

There are many areas of the curriculum where knowledge and understanding can be demonstrated or consolidated through the medium of film. For some children, kinaesthetic learners for instance, making a movie might be the perfect medium to show their understanding of a concept which might otherwise prove challenging. For others, it might be a way to articulate beliefs, concerns or attitudes towards a sensitive subject, such as bullying or prejudice. Films can be made to portray historical events, scientific concepts, mathematical puzzles; to tell stories and to record achievement in dance or drama: the potential is enormous.

Our findings thus far, which are largely anecdotal, are that children engage with the Digital Blue PC Movie Creator camera and software, and the process of movie making, in just the same way as they do with high-end DV resources. We believe that the outcome, whilst of relatively poor quality in terms of picture resolution, is just as valid as that achieved using more expensive cameras and video editing software. We hope to be able to provide some firm evidence of this during the forthcoming research project – watch this space!

Some useful resources relating to digital video work:

- Digit-teens; media literacies and digital technologies in the secondary classroom. Burn, A & Reed, K. 1999. *English in Education* 33, pp5-20.
www.nyu.edu/education/teachlearn/ifte/burn1.htm
- Evaluation Report of the Becta Digital Video Pilot Project - Written for the British Film Institute by Mark Reid, bfi Education, Dr Andrew Burn, October 2002
www.becta.org.uk/(search for Andrew Burn)
- 'Literature review on creativity, new technologies and learning' Loveless, A. School of Education, University of Brighton. 2002 www.nestafuturelab.org/research/reviews/cr01.htm
- Expecting the unexpected: Developing creativity in primary and secondary schools, Ofsted 2003
www.ofsted.gov.uk/publications/
- QCA's NC Action website, 'Creativity: find it, promote it'
www.ncaction.org.uk/creativity/index.htm
- Digital video across the curriculum, Becta
www.ictadvice.org.uk (search for 'digital video')

Helen Williams is a partner in PriorITas, an independent ICT Advisory Service to the education community. Coming from a primary teaching background, she worked in LEA inspection and advisory services for several years before going freelance in 1997. Her training in the arts has been a strong influence on her approach to using ICT in the classroom and she is a firm advocate of using ICT as a creative medium across all subject areas.

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www.prioritasdigitalarts.co.uk

Using Spex+ to promote a creative approach to problem solving in Key Stage 2

Jane Finch

This example of a day-long workshop with year 4 pupils was intended to provide a specific group of pupils with additional challenge. Being an 'ICT whiz' was **not** a requirement, although the learning medium was going to be mainly ICT. The day was part of a programme organised by one pyramid of schools in Worcestershire to enhance the level of challenge for Y4 pupils. It was also used as an opportunity for professional development for teachers from some of the schools and formed an element of targeted support to raise achievement for more able, gifted and talented pupils in Worcestershire.

The challenge involved designing a house for a specific family group. The early part of the day was spent learning the software (Spex+) as the children had never used it before. In particular we wanted them to become comfortable with the concept of switching between plan view and 3D view to evaluate decisions they were making. The software provides the resources to design a number of different rooms: bathroom, kitchen, dining room, bedroom, etc. and the pupils investigated all the resources available to them.

One of the first tasks was to encourage the children to believe in their creative potential, to engage their sense of possibility and to give them the confidence to try whatever they were presented with. They were in an unfamiliar situation and needed to be clear that the targets for the day were more about engagement and innovation than finding 'right' answers.

By morning break they were all raring to go and desperate to find out about the 'family' for whom they were doing the designs. Here came the first real creative challenge: they had to agree on the make up of their family. After much discussion around what constitutes a family they came up with a group of characters who developed as the day went on.

The initial description was as follows:

- The parents are both at work all day so they have a nanny to look after the younger children - a 3 year old boy and an 11 year old girl.
- The eldest child is a girl of 19 who is at university.
- This is a detached house in a quiet country lane, so the nanny needs to live in with the family.
- There is a patio and garden at the back of the house.

- There is a swing and a tree house in the back garden.
- There is a small garden at the front.
- The dog lives in the conservatory.



Fig 1 3D View of Conservatory

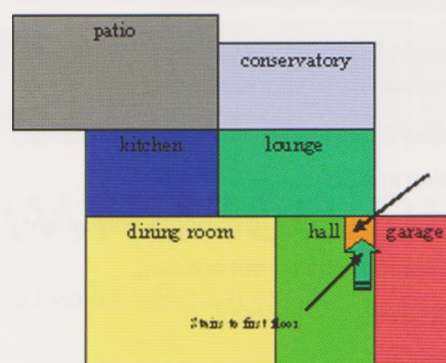
Once the family was defined the children were asked to decide what rooms needed to be in the house. It became clear that for some of the children this house was to be aspirational! Each pair of children adopted a particular room to design and got to work. Some of the children were forced to be very inventive as they had to select resources from a range of libraries within the software to make up the things they needed to create their room. For example, there are no specific resources for a conservatory, so the pair of children designing the conservatory made good use of windows and picked objects from various sources to furnish it.

By lunchtime each pair had developed a first public draft of their room and printed it off for discussion after lunch. They decided to print off both plan and 3D view in order to assist their peers with visualising their design.

Identifying young people's creative abilities includes helping them to find their creative strengths - to be in their element. It became apparent to the children, as the day progressed, that they were bringing different strengths to the project and some children were able to articulate this.

After lunch the children tried to assemble the plan views of their rooms into something that looked like ground floor and first floor plans, but nothing quite fitted! Doors and windows were in the wrong place, for example, as it had not occurred to them at the planning stage that perhaps they should have been taking more account of each other's ideas in order to try to orientate their rooms sympathetically.

Fig 2 Ground Floor Plan



After some manipulation and annotation of the printouts floor plans were created and stuck onto flipchart paper so that everyone had an idea of how they would fit together and what redrafting was required to make this feasible.

One interesting spin off came from the two children who were designing the teenager's bedroom. There was much discussion about where the stairs would go and the fact that the need for space for stairs meant that there was less bedroom space than they required for all the rooms they had designed. The children designing the teenager's bedroom suggested that their room could be accommodated in the attic. Here she would have some privacy when on holiday from university and could play music without disturbing the rest of the family. In order to get over space issues regarding the need for another flight of stairs they decided on a spiral staircase!

After a short period of editing the revised plans were produced, re-printed and assembled into floor plans.

We discussed how the children were going to be able to communicate their day's work to their own class and teachers. Much discussion centred on estate agents details, but they decided that that was an inappropriate style because their work was not just for anyone, but a specific family.

They were shown how PowerPoint could be used to display an image with a few bullet points to highlight key points. Assembling their ideas in this way would allow them to take everyone's work back to class and would allow them to demonstrate the part that each pair of children had played in the development of the whole plan.

By this time of the day many of the children were very tired but eager to have a complete record of the day's work; they pitched into the final task. At the end of the day, their slides were quickly assembled into a single presentation and they were able to show parents, carers and teachers just what they had achieved.

The narration of their slides by each of the pairs of children was sufficient testament to their involvement in the day. Their bullet points were expanded and they spoke with conviction about their decisions and with fondness for the family they had invented and developed during the day.

Spex+ is from Aspex Software and has been around since 1998. It has developed from its early version through the addition of a range of environments in which pupils can work. It is a simple piece of software giving young students experience of using ICT in a very practical situation. By designing rooms with furniture 'objects' on the screen, students can get to grips with Graphical Modelling (QCA ICT Unit 5a) in a real life context.

The Curriculum on Line website defines a range of key skills and thinking skills that can be supported by the product:

application of number (interpreting numerical information),

communication (using images),

information technology (using ICT to present information)

problem solving (planning & trying out options),

creative thinking (applying imagination),

enquiry (asking questions)

Our focus was on providing an opportunity for the children to make a creative response to a problem they had defined for themselves, but there were elements of all the other areas in various measures.

In developing this activity there was a clear intention to:

- allow for both broad and narrowly focused experimental activity, but always specifying and explaining the purpose of such activity; ensuring those involved felt secure enough to be willing to take risks and make mistakes in a non-threatening atmosphere that challenges but reassures
- encourage an appropriate attitude towards imaginative activity - a sense of excitement, respect, hope and wonder
- assist in the understanding of the time that has to be given to generative thought, free from immediate criticism by the learner or others before ideas are subject to rigorous critical evaluation and further development
- encourage self expression that is oriented towards a given task
- encourage and stimulate learners in periods of free play with ideas and conjecture about possibilities, but complement this with critical evaluation in testing out ideas
- emphasise the use of the imagination, originality, curiosity and questioning, the offer of choice, and the encouragement of the personal attributes that facilitate creativity.

(Ref: National Advisory Committee on Creative and Cultural Education, All Our Futures: Creativity, Culture and Education Report, May 1999)

Clearly Spex+ is a powerful resource... but as with any other resource only as effective as the use made of it! In this session we did not try to use all of the facilities that the software offers, for example, we did not include the use of budgeting, as it would have been too much for a single day's activity. Using Spex+ with a class, over an extended time, would provide even more opportunities to exploit wider possibilities. Most importantly, it would allow that all important gestation period during which ideas can develop, including the ways in which time away from a problem can facilitate its solution.

Spex+ is published by Aspex Software (01822 611060)
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Jane Finch is a Teacher Adviser for ICT in Worcestershire. She has had considerable experience with the use of ICT to support problem solving and thinking skills. She has written a chapter on the use of ICT for problem solving in 'Teaching Thinking Skills Across the Middle Years', ed Belle Wallace and Richard Bentley, pub: David Fulton 2002. She has also written the Teachers' Notes for Inspiration 7.5 (concept mapping software) available through TAG Learning (01474 357350).

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