Advancing Education

the Naace Journal

Autumn 2011

Editorial Ramblings

In which your editor muses on the propensity of politicians and the fearful chattering classes to equate high standards and progress with a 'golden age' of their own mis-remembered past. This as the future economic powerhouses of the world educate their young people for the future.

As I look out at the changing schools landscape I'm reminded of some words in that haunting Irish lament, "The Island" notably:

'Still trying to reach the future thru' the past
Still trying to carve tomorrow from a tombstone'

and

'Up here we sacrifice our children
To feed the worn out dreams of yesterday'

The English in particular have a particular affinity with the past, which must always have been a better place than the future that the next generation will inhabit – after all, it didn't do us any harm! But perhaps it did. Britain as a whole was once the technological centre of the planet – certainly in the 19th century industrial revolution and again for a brief period in the mid 20th with computing, radar and the jet engine. But our education system has never adapted or developed to meet the needs of a hi-tech world.

Partly a sociological issue, since the upper classes in Victorian Britain saw an elitist system based on Classics, great kings and just enough geography to know why so much of the globe was coloured pink and what that meant as only for them. The developing middle classes took this as their model, despite concerns as early as the 1850s that technical education in Germany was far in advance of that 1870 Act did was to provide basic low-level reading, writing and 'rithmetic. Advancement of the poor was not on the agenda, just the creation of factory fodder. Fisher in 1917 at least gave England a universal education system but one which despite the 1944 Act has not really advanced for almost a century.

And now we are in the midst of yet more turmoil. Traditional subjects are good, the curriculum of a 1960's independent of grammar school the model just as it was for the aspiring classes over a century ago, '*Still trying to reach the future thru' the past'. At least the lost legions of learners may be able to write a Latin epitaph on the tombstone of the economy.

So will we continue to '*sacrifice our children to feed the worn out dreams of yesterday'.* That does appear to be the current philosophy, flying in the face of a world that is dissolving as I write. What is more important – Latin or XML, low level 'Office' skills or an understanding of programming or search engine optimisation, capes and bays geography or the economic geography of the Web. We need literate, numerate young people with a sound knowledge of science but they also need to be able to function as independent life-long learners able to adapt to the new economic and industrial environments. Online learning, web literacy, the ability to find

information and create new knowledge, the facility to create quality content, to programme apps and more are skills needed now and even more so in the future. A return to old 'traditions' will not only harm our young people but the whole future of the country.

And so to this issue of Advancing Education where we also look to the future. Fiona Aubrey-Smith considers the evolution of Technology for Learning, taking us into the realms of Web 3.0 and makes the point that we must use technology as a catalyst for educational reform. It goes without saying that this requires appropriate training of teachers and we have two fascinating research papers on this subject. Amrit Pal Kaur of the University of Adelaide presents an exploratory study of trainee science teachers attitudes to use of certain ICT tools while Pete Bradshaw and Sarah Younie explore trainee teachers engagement in a cross-curricular news project. Important lessons in both papers.

We also have three fascinating papers on the integration of technology into the learning experience. Andrew Lickley reports on a YHGfL project using QR codes and PSPs with primary children at the Dales Countryside Museum while Dr Arjette Karemaker explores the use of Clicker to support early learning and literacy. Also, Steve Higgins integrates multi-touch technology in classrooms at Durham University.

Apart from the Naace event at Policy Exchange there is still much debate on ICT which may filter through to policy makers. Bob Harrison offers his views on the changing landscape of ICT in schools and reports on a Westminster Education Forum debate and a TDA Music technology event. It's not all gloom and doom!

There is light at the end of the tunnel, a theme take up by Richard Smith who offers some useful pointers for the many of us taking our first faltering steps in the new world of freelance school improvement. And finally, in our sponsoring partners section are articles on MOBI, TextHelp and Espresso Primary.

All in all a bumper issue.

Paul Heinrich
Editor

Postscript

An education version of The Island.

The Education Island:

They say standards of education are falling
Those mighty schools collapsing in the heat
They're showing pictures on the television
Young people rioting on the street
And we're still at it in our own place
Still trying to reach the future thru' the past

Still trying to carve tomorrow from a tombstone.

Chorus.
But hey! Don't listen to me!
Cos this wasn't meant to be no sad song
We've heard too much of that before
Right now I only want to change the system
To raise standards not see them falling
I want to take you to the island
And trace your futures in the sand
And in the evening when the sun goes down
We'll learn together in the world online

They're raising free schools over by the car park
Building academies by the factory walls
Witch doctors praying for a mighty showdown
No way our holy dogma is gonna fall
Up here we sacrifice our children
To feed the worn out dreams of yesterday
And teach them classics will lead us into glory

Now I know us plain folks don't see all the story
And I know this ICT stuffs just copping out
And I guess these young people bored stiff in the classrooms
Know what real learning is all about
And how this twisted wreckage we call tradition
Will bring us all together in the end
And we'll go marching down the road to freedom
Freedom

With apologies to Dolores Keane et al.

Naace

A Case Study of Texthelp Read&Write GOLD in advancing students' independent learning, self-esteem and inclusion

Author: Texthelp Systems Ltd

The King's School, Devon, is an 11-18 comprehensive school with just over 140 staff and 1100 students. Penny Dowling, SEN Literacy Teacher at the School, believes their purchase of Read&Write GOLD literacy support software has been a "resounding success" as the solution has led to improvement in students' quality of work, their independent learning and self-esteem.

Penny elaborates on this by stating "We chose to purchase a site licence of Read&Write GOLD software after discussions with Texthelp staff at the BETT exhibition in London. The demonstration of the latest version of the software showed such enhanced features that would provide support to a very wide range of students at secondary level."

Read&Write GOLD for Schools is Texthelp's world leading literacy support software designed to assist pupils with dyslexia, literacy difficulties and English as a Second Language. The software provides pupils with a unique set of tools to assist them with learning in the classroom and at home. Read&Write GOLD helps pupils to improve their reading skills, enhance the accuracy of their writing and organise research for school projects.

Read&Write GOLD is easy to use and features include: Screen Masking (to tint or mask sections of the window), Texthelp text-to-speech voices, a Translator (which translates selected words into French, Spanish, German or Italian), Spelling, Dictionary & Homophone support, and the software also echoes back Dragon text.

Penny explains "The staff and students who have been using Read&Write GOLD feel that it has been a resounding success! Such a wide variety of students are able to find features which support and enhance their learning profiles. This would include students who have learning difficulties or those who benefit from the study skills aspects. The vast majority of students have been able to improve the quality of their work and advance their levels of independent learning. This in turn has a positive impact on their self-esteem."

Read&Write GOLD installation, training and use

Penny continues "The software is now available across the school's network and can be accessed by staff and students in any room which has computers. On purchasing Read&Write GOLD, I attended a full day's training provided by the Texthelp training team. This enabled me to write a short and concise version of the Read&Write GOLD training program, which I emailed to every member of staff, highlighting the excellent training videos attached to each feature. I requested that staff make themselves familiar with the software and encourage their students to use it, when possible, for the production of written work. I provided training to any student who needed it, for example, for years 7-9 who experienced problems with learning differences, literacy, comprehension, memory, specific learning difficulties, organisation, handwriting, as well as students from years 10-13 who received training on the study skills features of the software.

I also ran a training session for the Learning Support Department to include the SENCo and the team of Teaching Assistants. This enabled them to use Read&Write with other students attending Learning Support sessions for a wide variety of learning needs.

Students have been mostly quick to learn how to access a wide variety of features and select those of most benefit to their personal learning profile. Some students preferred to be shown how to use features and some preferred to watch the videos, then try using the feature themselves. Students who have been trained are gradually helping other students in their classes to become aware of the benefits of the software.

Students' access to Read&Write GOLD is excellent when a lesson is held in a computer suite, Learning Support, 6th Form Centre, Library or teaching room, where a bank of laptops are available with headsets. However, subjects in which there is

a high amount of written work required, such as English, History and Religious Education, do not at present have any word processors available in their teaching rooms, which is currently being discussed.

As Moodle becomes more available, an additional licence for Read&Write will be beneficial so that students can access the software from home when doing their homework."

Feature support & benefits to students

Penny states "It has been interesting to note that although Read&Write GOLD's text-to-speech feature most obviously benefits students who experience a variety of literacy difficulties, the ability to listen to their own work for proof reading, plus the Study Skills features and quick access and storage of information from the internet (Fact Finder & Folder) has been welcomed by students with no significant learning difficulties as well. This makes Read&Write GOLD particularly inclusive. Regarding the benefits students receive from Read&Write GOLD, I have noted the following information:

Students who have been unable to 'see' their spelling errors are now able to 'hear' them through the text-to-speech features and those who have been unable to read back their own work, or fluently read text on the internet (not well enough for good comprehension) can now listen. Comprehension and access to information is vastly improved. Also proof reading and redrafting becomes easier and more efficient with Read&Write GOLD. Students have also found it easier to find appropriate websites more quickly by listening to the content, when previously their difficulty with reading slowed down their comprehension.

The talking Spell Checker: once spelling errors have been identified, students can now hear the difference between words which they would not have previously been able to distinguish between visually. This is enhanced by their ability to listen to sample sentences. This is also good practice for listening to good sentence structure. Also the Sounds Like/homophone feature is really very supportive! So many students are unable to visually tell the difference between like sounding words and it is excellent to be able to hear a definition and a sample sentence to show the context. I have also noticed where some students previously had a strong dislike for homophones, many have become interested in how many there are!

The talking Dictionary is very beneficial to those students who find fluent reading difficult. Listening helps them select a wider and more appropriate variety of vocabulary. They now have more confidence to try new words in their written work.

The Fact Mapper is one hundred per cent loved by every student so far, right through from years 7 to13, whether they have any learning difficulties or not! It improves efficient and specific access to information from the internet. More able students also like the Fact Folder to store information and images for project work and research.

Students who have to collate, organise and group topics of information have found the coloured highlighting and easy ability to collect and cluster ideas excellent, with regards the Study Skills feature.

Students have become more aware of their learning preferences when selecting the most beneficial features to suit their learning profile. They can personalise their Read&Write GOLD toolbar. They have also seen that some features will be even more useful when they need to produce more written work and use research and study skills in years 10-13.

Students of all ages have felt an increased confidence in producing their work due to gaining more independence. Not having to ask for so much help and reassurance for reading, spelling, vocabulary, comprehension, selection of relevant info has improved their self-esteem. Those who have been specifically trained have also really enjoyed showing other students a new skill!"

Quotes from students and staff on Read&Write GOLD

Some students have made the following comments regarding Read&Write GOLD software: -

"Read&Write GOLD has improved my spelling and my use of punctuation, my writing now makes sense! I can now 'hear' the differences between words when I couldn't 'see' them before."

"I like the variety of voices and speeds and the range of different icons to help with written work. The dictionary is great as I can 'hear' the definitions. The easy access to the internet in the middle of writing some work is magic!"

"My best friend is now the Read&Write GOLD spellchecker!! Microsoft 'Word' is now only second!"

"Homophones are so much easier now because I can hear them with their definitions and in a proper sentence."

"I get a better sense of the meaning of words and texts, both mine and internet information."

Teachers at The King's School have also made the following comments: -

"Some students have found Read&Write GOLD very supportive for Art research."

"Several students have been using this software in my lessons. It has increased the quality of the work they have produced and I feel that it is a very valuable tool."

"Read&Write GOLD is great! I use it with my students when we have access to computers. It is really discreet (hiding away at the top or side of the screen). Students can use their own headphones and the text-to-speech allows students to maximise hearing their work read aloud. The ability to open a webpage browser and have this information read back is fantastic!"

"I am pleased to see students appearing more confident when producing written work with Read&Write GOLD. They feel they have a better 'toolkit' of strategies available to them. They seem to concentrate better on their work and are more prepared to try and correct or improve spelling and vocabulary themselves."

Penny concludes "I view the Read&Write GOLD software as a key part of a learning and study toolkit. I would thoroughly recommend it to other schools and colleges."

For further information on Read&Write GOLD, please contact Elaine on Tel: 028 9442 8105, email elaine@texthelp.com or visit website www.texthelp.com

RSS What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Naace
A Report on the TDA Event "Music technology in schools

Author: Bob Harrison

It was fitting that the TDA event "music technology in schools" was held in Piccadilly Gate, Manchester, the dual home of the Halle orchestra and computer scientist, Alan Turing.

The synergy and tension between music and technology is beginning to create some challenges for schools, policy makers, teachers, music industry and academics so the TDA got some of these groups together to try and bring some clarity and coherence to the discussion.

According to John Paynter, one of the most influential and creative music educators, who died last year, "Music is getting excited about sound" and many believe that the combination of Paynter's words and the advances in digital and mobile technologies, not to mention the digital expectations of pupils, mean schools need to think afresh about what this means for the music curriculum.

Described by one of it's own members as a "bit isolated" the music education community consists of a polarisation of views; the primary school teacher who believes there is no place for technology in music who said: "Children have too much exposure to technology I want them to learn how to play the recorder when they are in school."

At the opposite end of the spectrum there are those who believe thatll sound generating devices are a form of technology and that there is a place for mobile devices, including smart-phones, to be an integral part of a child's musical development. "We are getting mixed messages from the Government", said one music adviser, "On the one hand pupils are are carrying powerful musical devices around in their bags and pockets and on the other hand Ministers are saying mobile phones should be banned in schools? It doesn't make sense!"

There was common ground amongst the experts that music education should contain the musical processes of Understanding (listening) Expression (performance) and Creation (composing) but there was little clarity about how technology can be the catalyst to achieve this.

Policy Context hampering progress?

Music education "expert" and ex BECTA adviser David Ashworth made a bold attempt to summarise the context and challenges the advances in digital technology presents to music education in a comprehensive overview "Music Technology in Schools-a consideration of the issues,the opportunities and possible ways forward" but some in the audience were concerned about the overall policy context which was undermining the efforts of many teachers.

"It is difficult to generate enthusiasm amongst teachers of music when they have seen their budgets cut, the Local Authority music service decimated and the government obsession with academic subjects, such as the eBacc and PISA tables", said one leading music educator.

In addition to this,the shadow of the National Curriculum Review was seen by many as the most significant threat to a comprehensive music education for all pupils. The Review, which reports back to the Department for Education early next year, is thought to be considering a slimmed down National Curriculum. Jonathan Savage, Reader in Education at the Institute of Education, Manchester Metropolitan University, was worried:

"Should Music disappear from the National Curriculum, it could spell the end of a systematic and developmental music education in the lives of most of our children. What we would see, is a privatisation of music education services delivered to schools rather than being integral and located within schools".

The TDA were anxious to keep the mood music positive and the focus on moving forward and all the delegates complied but there was a tangible undercurrent of frustration, especially amongst teachers in the room.

A music industry input

Curiously, the music technology industry was under-represented at the event, although the Associated Boards of the Royal Schools of Music (ABRSM), a major business in the music education arena through the provision of instrumental music examinations, did attend the event and address the conference. This seemed a little and strange and some delegates wondered if it was because they reflect the Minister's vision of music education? It is no secret that the schools minister's view of music education is to provide "the opportunity for all children to learn an instrument or sing" and some music specialists feel this narrow view of what constitutes a music education will provide little space for the creativity and

innovative use of digital technologies that were highlighted throughout the day.

So what happens now?

This event was part of a wider consultation about the place of music in the curriculum and the technology element will form an Annex to the Nationa; Plan for Music Education (part of "a plan within a plan"). This separation of technology from the wider plan itself seemed to stir some unrest.

"If digital technologies are so embedded in the everyday lives of children surely we just need a plan for the learning and teaching of music and having a "plan within a plan" just perpetuates the divide?", one delegate added.

The TDA suggests the future direction could involve the following stages;
- A coherent plan
- Identification and sharing best practice
- Affordable CPD
- Authentic music technologies
- Live performances
- Dissemination
- Implementation

And whilst this outline received universal nods and approval from the delegates some felt it had the feel of an industrial mindset being applied to a digital age.

Bob Harrison is Education Adviser, Toshiba Information Systems (UK) Ltd and Consultant, National College for Leadership of Schools and Children's Services He can be contacted at BobharrisonSET@aol.com

Links:

Dr Jonathan Savage: http://www.jsavage.org.uk

John Paynter: http://www.guardian.co.uk/education/2010/aug/03/john-paynter-obituary

ICT in Music curriculum (BECTA Archive):
http://www.teachfind.com/becta/becta-schools-curriculum-music-ict-secondary-music-pupils-entitlement

Music Education: http://www.teachingmusic.org.uk/resource/15627

Henley reviewhttps://www.education.gov.uk/publications/standard/publicationDetail/Page1/DFE-00011-2011

David Ashworth: http://www.teachingmusic.org.uk/r/DavidAshworth and http://www.davidashworth.org.uk

NUMU: http://www.numu.org.uk

Next Brit Thing: https://www.nextbritthing.com

TDA: http://www.tda.gov.uk/

Vital: http://www.vital.ac.uk

RSS What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
Light at the end of the tunnel: ICT Consultancy in UK schools – 5 key points

Author: Richard Smith, AmazingICT

Educational ICT consultants have had a terrible time in the UK over the last year. From being seen as key players in terms of school improvement many have lost their jobs or are hanging on for dear life.

In this short article I provide you with five points that might be useful to you over the coming months

Background: In July 2010 I had a feeling that things were going to change in the world of education. Therefore, I approached a headteacher and asked if they would be interested in seconding me in to a school for a day a week for 3 terms. My line manager at the LA was supportive and I started working in an organisation that is a federation of a primary and secondary school from September 2010.

Point 1: Don't be afraid of suggesting new ways of working to headteachers. They are under so much pressure that they will be delighted to receive new and innovative ideas

The model I use for working with the teachers is a simple but effective one. I work for 3 consecutive weeks with a teacher and their class. I then move on to the next teacher for 3 weeks. However, before moving on the 3rd teacher I spend a week with the 1st teacher to build on what we covered before. This rolling programme continues for the whole year. Due to the fact it contains regular reviews teachers and students are encouraged to consider ICT as a 'constant' rather than something that is just used on 'special occasions'

The feedback has been positive. For example, Debbie Cawte who is in charge of the primary school said '*As well as introducing a raft of engaging activities, including "blogging", across our school, Richard has ensured that our children now know how to use their digital lockers in which they can easily store their work for access whether they are at home or at school*'.

Point 2: Make good use of links that you already have in schools and colleges. Lots of schools have cupboards full of kit but need support in making the best use of it.

The school was keen for me to develop video content that would encourage parents to visit the Virtual Learning Environment. The content we have created includes:

- A school video that that shows teachers and students having fun and dancing to a pop song. This was based on the great idea from Bolsover school which has received over 12000 views http://www.youtube.com /watch?v=-ORaS-mJqWA
- Students demonstrating numeracy techniques that parents can watch at home
- Animations with a background song recorded by the students to explain concepts such as odd and even numbers

Point 3: Spend time creating interesting content that can be added to a website or learning platform. Teachers will love learning more about how to use free tools such as 'moviemaker' and the audio network https://audionetwork.lgfl.org.uk

The positive feedback plus a decision to take 'voluntary redundancy' from an LA that was under financial pressure has resulted in me becoming an independent educational consultant. I have received mentoring from the Business Enterprise Support http://www.enterprisesupport.org free of charge. This required a detailed business plan to be produced and attendance on two business courses. In addition I have included headteachers and teachers in providing feedback on planned courses, pricing and a brand image. The image is based around the fact that schools need someone to help them juggle all the requirements of ICT.

Point 4: Make use of all available advice. Just because you are a competent educator doesn't mean you will make it in business. Outsource to others if you feel they can do things more professionally (as with the logo above)

Once set up you need to work really hard to become recognised in schools as someone that can provide well researched advice at a reasonable (but not necessarily cheap) price. My first full day course last week only attracted 4 delegates but I

Naace: Light at the end of the tunnel: ICT Consultancy in UK schools –...

http://www.naace.co.uk/1716

made a profit and the four teachers went back to the school having had a very positive experience. In fact, two of them posted very good comments on twitter mentioning http://twitter.com/#!/amazingict in a very positive light. In addition, two of the schools booked a place on line and paid using a credit card using a system called http://www.eventbrite.com .This was something I was unable to trial while working for the LA.

Point 5: Make use of modern technology such as twitter, www.mailchimp.com for emailed newsletters and a dedicated website which reflects your own brand.

The number of schools I work in on a regular weekly basis has now increased to three providing a regular income and experiences that I can share with others as I build up regular customers that are determined to keep ICT at the forefront of their plans.

Richard Smith can be contacted via his website www.amazingict.co.uk

RSS What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Privacy | Terms and Conditions
© Naace 2006 - 2011 | Naace Registered Charity Number: 1060683

Naace
Pre-Service Science Teachers' Attitudes towards the use of selected ICT tools in Teaching: An Exploratory Study

Author: Amrit Pal Kaur, University of Adelaide, Australia

Research into the field of Information and Communication Technology (ICT) integration in education has indicated that teachers' attitudes towards ICT play crucial role in the use of ICT by them. But there is serious lack of qualitative studies to investigate the ICT related

attitudes of the pre-service teachers, particularly science teachers. This qualitative study was conducted to explore the ICT use related attitudes of pre-service science teachers at the University of Adelaide. Specific aims were to identify the factors leading to these attitudes and to investigate the changes in their attitudes after teaching practice. The research was carried out in two phases i.e., pre- and post-teaching practice. Open-ended questionnaires were used to collect data from self-selected participants, followed by in-depth one-to-one semi-structured interviews of purposefully selected participants in the second phase. The findings from data analysis, using comparative and open-coding techniques, indicated that overall attitudes of student-teachers were positive. But issues like lack of ICT facilities at schools and lack of ICT related knowledge and skills among student-teachers were emerged. It is recommended that student-teachers should get appropriate training and opportunity to use ICT in educational contexts. Further large-scale research is needed to give suggestions for new policies.

Keywords: Pre-service Teachers; Science teaching; Attitudes; Information and Communication Technology (ICT); ICT tools.

Introduction

Background and Context

ICT (Information and Communication Technology) can be defined in simple words as a broad subject concerned with digital technological tools and resources used to communicate, create, store, manage and process information (Tinio, 2003). Todays' society is a technology-rich society and we live in a world with digital technologies continuing to influence many aspects of every individuals lives (Elliott, 2004) through technologies in the home, business, commerce, media and education. So, to help today's students to be successful in present and future life, it is important to develop them as creative and confident users of ICT (Steketee, 2005). To meet this challenge, in the last two decades, the ICT education and integration of ICT into education has become an important feature of the educational landscape especially in the developed countries (Paas, & Creech, 2008). The belief which forms the basis of this change is that ICT has the potential to bring revolution in the field of education (Albirini, 2006) by improving the standards or quality and bringing changes in methods of teaching and learning (Reynolds, Treharne, & Tripp, 2003).

Research has indicated that, the teachers play the key role in the effective use or integration of technology in education (Lee et al., 2007), so teachers should have the knowledge, skills and confidence in the use of ICT in their classrooms (MCEETYA, 2005, p. 1; ACS Policy Statement on Computer Literacy, 2005, p. 6). In Australia, many efforts have been initiated by the Government to facilitate the integration of ICT into education and science education has always remained one of the major concerns (Dawson, Forster, & Reid, 2005). The school systems are in the process of providing teachers with ICT infrastructure and professional development (Dawson, Forster, & Reid, 2005). The pre-service teacher training courses also incorporate ICT education as the part of the overall teacher training (Steketee, 2005). As a result of this, it is expected that novice teachers including science teachers will effectively use these facilities, and their expertise, to improve the teaching and learning process of science (Dawson, Forster, & Reid, 2005).

But in spite of these attempts, it has been seen that only providing training in the knowledge and skills of ICT to the teachers is not enough (Fitzallen, 2004) because teachers' attitudes and beliefs about teaching and learning using ICT is an important factor, playing a central role in the integration of ICT into the classrooms (Albion, 1999; Mumtaz, 2000). So, it has also been suggested that it is vital to understand the attitudes of the teachers towards ICT, and only then would it be possible to encourage them to integrate ICT in their teaching (Albirini, 2006).

Reason behind the Study and its purpose

It is evident from previous research that there is significant relationship between levels of use of ICT and teachers' attitudes (Williams et al., 2000). This suggests that there is strong need to develop a kind of attitude among the teachers, so that they view technology as an effective tool to improve the teaching and learning process (Polonoli, as cited in Steketee, 2005) and this becomes an important component of the professional development of the teachers. It is necessary to ensure that the teacher education programs prepare teachers mentally to effectively integrate ICT in the classrooms (Lee et al., 2007). In-depth study to understand the point of view of the teachers regarding ICT and uses of ICT in the classrooms is the pre-requisite to make this happen. Not much research has been done in the area of teachers' attitudes towards Information and Communication Technology (ICT) (Higgins, & Moseley, 2001); the available research studies are

mostly quantitative in nature, but qualitative studies which explore and investigate the attitudes of the teachers are negligible. Most importantly, only a few studies exist on the beliefs and attitudes that student teachers hold in relation to their use of ICT in their teaching (Sime, & Priestley, 2005) which is not sufficient to properly guide teacher education programs.

This unavailability of information regarding the beliefs, perceptions and attitudes of the student teachers towards ICT integration is a big gap in the process of encouraging and preparing novice teachers to use technology as an integral part of their teaching approach. And this lack of information serves as the major reason behind doing this research.

The overall objective of this study was to gain an in-depth understanding of the attitudes of the novice teachers toward teaching with technology. Apart from the overall objective, the more specific aims of this research were to identify the factors which lead to both positive and negative attitudes of the science student teachers towards the selected ICT tools. Secondly, the researcher wanted to find out that whether there was any change in student teacher's ICT related attitudes after the experiences which they had during teaching practice in the schools. Another purpose was to examine what kind of change had occurred in their attitudes towards using ICT following their teaching experience. The fourth aim of the researcher was to explore the reasons behind the differences in pre- and post-teaching practice attitudes, if any. This was done to identify the possible factors which could influence the integration of ICT in science teaching and learning.

Research Questions

The following questions are addressed in this study:

RQ 1: What are the attitudes of the Graduate Diploma in Education science students of the School of Education, University of Adelaide towards the use of selected ICT tools in science teaching and learning?

RQ 2: What are the reasons given by these Graduate Diploma science students to justify their positive attitudes towards the selected ICT tools in science teaching and learning?

RQ 3: What are the reasons which contribute to the negative attitudes of these Graduate Diploma science students towards the selected ICT tools in science teaching and learning?

RQ 4: What are the attitudes of the Graduate Diploma in Education science students towards ICT integration in science education after having practical experience during their teaching practice in schools?

RQ 5: In what ways the practical teaching experience has effect the view points or attitudes of science student-teachers regarding incorporation of different ICT tools in science teaching and learning?

RQ 6: What are the reasons behind the attitudes and change in attitudes, if any, of these student-teachers?

Theoretical Underpinnings

This study of the attitudes of the graduate diploma science students was based on 'The theory of Reasoned Action' which was proposed by Martin Fishbein and Icek Ajzen in 1975. It states that "people are relatively thoughtful creatures and are aware of their attitudes and behaviour" (Fishbein, & Ajzen as cited in Bordens, & Horowitz, 2001, p. 176). In this research, the participants were asked about their view points or attitudes towards certain ICT tools by keeping in mind that they were aware of their own attitudes. As this research was exploratory and interpretative or understanding-oriented in nature, a qualitative approach was adopted (Creswell, 2005, p. 44).

Insights from the Literature

The research literature related to attitudes, particularly teacher's attitudes towards the use of technology in education; relationship between attitudes and behaviour; ICT in education; and teacher education was identified and reviewed to inform this study. Based on the meanings given by various researchers, attitude could be defined as a favourable or unfavourable tendency of individuals towards an entity based on the evaluation of this entity by the individuals (Ajzen, & Fishbein, 1980, p. 26-27; Petty, & Cacioppo, 1981; Fazio, 1986; Eagly, & Chaiken, as cited in Johnston, 2002; Johnston, 2002). Recent studies in the field of attitudes provided the theory that an attitude consists three components which are affective, behavioural and cognitive (Burns, 2000). Further to understand the relationship between attitude and behaviour, the researcher explored the 'Theory of Planned Behaviour' which suggested that the likelihood of a particular kind of behaviour depends upon many factors and one such factor is attitude towards that behaviour (Ajzen, & Fishbein 1980).

The information regarding different phases of the integration of technology into the educational system of Australia was reviewed to enlist various efforts made by the Australian government to promote the introduction and integration of ICT in every sector of education. Some of the recent policies and plans are: the Commonwealth government's distribution of approximately 21,000 surplus computers and IT equipment to schools across Australia from the year 1998 to 2001 (MCEETYA, 2001); the establishment of national goals for schooling in the twenty-first century by Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) in 1999 (ACS, 2005); *Learning in an Online World* national action plan developed by Education Network Australia (EdNA) Schools Advisory Group (MCEETYA, 2000; Webb, & Downes, 2003; MCEETYA, 2005); *Learning for the Knowledge Society: an education and training plan for the information economy* was launched in 2000 for both the education and training sectors, including schools, vocational education and training, and higher education (MCEETYA, 2001); *The Learning Federation: Schools Online Curriculum Content Initiative,* as part of the

government's innovation strategy: 'Backing Australia's Ability: Innovation Action Plan' (MCEETYA, 2001); the reports from Commonwealth-funded project, *The Quality Teacher Programme* and *Making Better Connections: Models of teacher professional development for the integration of ICT into classroom practice* provided advice and recommendations for successful integration of ICT into the classrooms (MCEETYA, 2002; Webb, & Downes, 2003).

A number of early studies in the field of teachers' attitudes towards ICT pointed towards a common conclusion that the teachers' attitudes toward technology play a major role in both the initial acceptance of ICT and in their future behaviour related to its usage in teaching and learning (Borko, & Putnam, as cited in Higgins, & Moseley, 2001; Scrimshaw, 2004; Albirini, 2006; Sime, & Priestley, 2005). Further it was found that the teachers who are less technologically capable can be encouraged to employ different technologies in their teaching when they have positive attitudes towards technology (Cox et al., 2003; Albirini, 2006). And one of the main agents identified as successfully bring teachers to this point, is the ICT-based professional development of the teachers both at pre-service and the in-service level (Jones, 2002; Reynolds, Treharne, & Tripp, 2003; Australian Computer Society, 2005; Lee et al., 2007). Much of the published research has focussed on ICT integrated pre-service teacher education which has been seen as an effective tool for improving the pre-service teachers' preparedness to transfer this integration into their own classrooms (Dawson et al., 2005; Steketee, 2005).

From the review of literature for this study some key points emerged. Firstly there is extensive evidence that one of the major factors which influence the decision of the teachers to use the different tools of ICT is their attitudes towards such technologies. The review has brought to light that there is a significant body of quantitative research which has examined these attitudes; however qualitative research which has the potential to gain a deeper understanding of the attitudes is very limited. Secondly there is only little research done till today into the topic of the student-teachers attitudes towards ICT in education and that is also only of quantitative in nature. To bring the attitudes of more and more student-teachers toward favouring the various technologies, it is important to have a deep understanding of their perceptions and beliefs related to these technologies.

Research Methodology and Methods

The methodology and methods of data collection were based on two important considerations which were the nature of the research and available time to conduct the research. This research was interpretative in nature and a wholly qualitative approach was used to get better understanding of the phenomenon under study (Shank, 2006) i.e., attitudes towards specific ICT tools by collecting detailed data about small number of people which is directly quoted or described by them (Labuschagne, 2003).

Sample

The population for this study was graduate diploma science students of the School of Education, University of Adelaide. This population had 32 graduate diploma science students. From this population, the participants were self-selected and out of the population of 32 students, 19 participated voluntarily in pre-teaching practice study and 14 participated post-teaching practice study. Among these 14 participants who participated in second phase, 5 participants (who had also participated in the pre-teaching practice study) were purposefully selected by the researcher for the interviews.

Study Instruments

Among the qualitative methods, there are many different types of techniques to collect the data. In this research, two open-ended questionnaires were used. There were some closed-ended questions in both the questionnaires, but these questions were only related to asking the general information from the participants. The questionnaires for this research were designed by the researcher based on the thorough review of the literature. Both the questionnaires were further divided into sub-sections based on the questions asked about different types of ICT tools. The researcher asked questions about five specific ICT tools which are PowerPoint, Interactive Whiteboard (IWB), Simulations, Animations, Virtual Reality Programs (VR Programs).

In the second phase of this research, one-to-one semi-structured interviews were also done by the researcher to get comprehensive information from the student-teachers, particularly about their ICT related experiences and opinions, along with allowing the emergence and discussion of any other issues concerned with the research (Barrio, 1999). So, the interview was moderately structured including some general pre-planned (based on the research questions and responses of participants to questionnaire) and some emerging questions (emerged from the interviewees' responses). All the efforts had been done to take care of all the ethical issues related to the data collection process as well as during all the other steps of the research process.

Data Analysis and Findings

Data Analysis in Pre-teaching practice study

In this research, open coding technique was used by the researcher for analysing the information obtained in the form of written responses to questions of an open-ended questionnaire (Gibson, 2006; Neuman, 2006, p. 460-464). The data was analysed by hand because the researcher wanted to have a hands-on feel for it (Creswell, 2005). The responses were read carefully by the researcher to get a general sense of the information and keywords were marked which were ultimately used as indicators for coding and a total of 35 general codes or categories were generated from it. After assigning codes,

the researcher examined, organised and linked all the 35 codes and discovered key themes of this research project from them (Neuman, 2006, p.462). The researcher also made links between the codes and the research questions which ultimately gave rise to five themes. These themes were positive attitudes, negative attitudes, ambivalent attitudes, reasons for positive attitudes, and reasons for negative attitudes. These themes provided for in-depth understanding and some answers to the research questions.

Data Analysis in Post-teaching practice study

In the second phase of the study, the analysis of data was done in two stages; first after collecting the written responses (filled questionnaire) back from the participants, and second after conducting all the five interviews. The questionnaire data from the first-time respondents (six participants) was analysed using the open-coding technique and the responses from second-time participants (eight participants) were analysed using comparative (to compare with their responses in the pre-teaching practice study) as well as open-coding technique to generate codes and themes. The themes generated from the questionnaire data provided by first-time respondents were same as of in pre-teaching practice study and those which were generated from the second-time respondents were: positive change in the attitudes, negative change in the attitudes, no change in the attitudes, reasons for the positive change, and reasons for the negative change. The audio-taped interview data was first transcribed into text data (Creswell, 2005, p. 232-234) and then hand analysed by an open-coding method (Creswell, 2005, p.234; Gibson, 2006; Neuman, 2006, p460-464) with the purpose to have in-depth understanding of the experiences of the participants (who volunteered to participate) in their teaching practice, and changes in their attitudes regarding ICT as a whole. From the interview data, again five themes were developed; attitudes before teaching practice, experience with ICT at teaching practice, support from schools and teachers, availability of resources, and attitudes after teaching practice.

Findings from Pre-teaching practice study

The findings are based on the analysis of information from seventeen questionnaires which were returned by the participants. All the seventeen (100%) participants have access to computers and sixteen (94%) participants have access to internet away from university. Most (16, 94%) revealed that they access internet daily. When asked about their competence level of working with different technological devices, seven (41%) participants selected the highly competent level, nine (53%) chose the competent level, and one (6%) chose novice level option. Six (35%) participants specified that they have a very high confident level in using the technological devices, ten (59%) participants indicated reasonable confidence and one participant (6%) indicated no feelings either way.

The findings from the analysis of responses of the participants to open ended-questions related to five ICT tools included in the questionnaire have been summarised in the Table 1 below.

Table 1: Attitudes towards different types of ICT tools

S. No	ICT tool	Positive attitude	Ambivalent attitude	Negative attitude	No response	Total Participants
1.	PowerPoint Presentations	7	10	0	0	17
2.	Interactive Whiteboard (IWB)	14	0	3	0	17
3.	Simulations	15	2	0	0	17
4.	Animations	8	8	1	0	17
5.	Virtual Reality (VR) Programs	16	0	0	1(No experience)	17

These findings indicate that while current student teachers appear confident and competent, and generally see a place for ICT in present and future science education, they are also generally thoughtful, and place the use of these technologies within a critical and educational framework. However a very crucial finding here was that a number of participants revealed that they lack practical knowledge, and they need to learn skills for using some kinds of ICT tools, such as IWBs. This means that their unfavourable attitudes towards certain uses of ICT (including IWBs) might be due more to their concerns about their own competence in using them.

Findings from Post-teaching practice study

The 14 participants who filled the questionnaire in the post-teaching practice study were divided into two categories based on their participation. Six were designated as first-time participants and eight form the category of the second-time participants.

First-time participants

Table 2 shows the experience of using ICT tools at teaching practice of all the six participants. It is clear from this table that most extensively used tool (used by all the six participants) was PowerPoint presentations. Half of them (three participants) had experience with simulations and animations. Two participants out of six had the experience of interactive whiteboard (IWB). No participant had any kind of experience related to virtual reality programs. Table 3 summarize the attitudes of these six first-time participants towards all the ICT tools explored in this research. As indicated in the table, many participants were not in the position of giving any kind of response to express their attitudes towards some ICT tools because of lack of experience in using these tools in their teaching.

Table 2: Experience with different ICT tools at teaching practice

Total number of first-time participants = 6

S. No	ICT tools	Participants who had experience	Participants who had no experience	Participants who used the ICT tool by themselves	Participants who saw others using tool	Both used by themselves and saw others
1.	PowerPoint Presentations	6	0	4	0	2
2.	IWB	2	4	0	1	1
3.	Simulations	3	3	2	1	0
4.	Animations	3	3	2	0	1
5.	VR Programs	0	6	0	0	0

Table 3: Attitudes towards different types of ICT tools

S.No	ICT tool	Positive attitude	Ambivalent attitude	Negative attitude	No response	Total Participants
1.	PowerPoint Presentations	2	2	0	2	6
2.	Interactive Whiteboard (IWB)	0	0	3	3 (No experience)	6
3.	Simulations	3	1	1	1	6
4.	Animations	2	0	4	0	6
5.	Virtual Reality (VR) Programs	1	1	0	4(No experience)	6

Second-time Participants

The findings depicted in this section are mostly related to the changes in the attitudes (Comparison was done between pre and post-teaching practice responses) and reasons behind those changes. First of all the responses to close-ended questions asked in the questionnaire are summarised in Table 4 followed by findings from the response to open-ended questions in Table 5. Here also, the tool which was used by maximum number of student-teachers (seven out of eight) was PowerPoint presentations. The number of participants who had some kind of experience with IWBs, simulations and animations were five each. Out of total eight respondents, only one used VR Programs in her teaching practice.

Table 4: Experience with different ICT tools at teaching practice

Total Number of second-time participants = 8

S. No	ICT tools	Participants who had experience	Participants who had no experience	Participants who used the ICT tool by themselves	Participants who saw others using tools	Both used by themselves and saw others

1.	PowerPoint Presentations	7	1	2	1	4
2.	IWB	5	3	1	2	2
3.	Simulations	5	3	4	0	1
4.	Animations	5	3	3	0	2
5.	VR Programs	1	7	1	0	0

Table 5: Change in attitudes towards various ICT tools after teaching practice

S.No	ICT tool	Participants who become more favourable	Participants who become less favourable	Participants with no change in attitudes	Participants who had no views	Total Participants
1.	PowerPoint Presentations	3	3	2	0	8
2.	IWB	3	1	2	2	8
3.	Simulations	5	1	2	0	8
4.	Animations	3	1	4	0	8
5.	VR Programs	1	0	6	1	8

Table 5 clearly shows the change in attitudes of the eight second-time participants towards the use of various ICT tools after their experience at teaching practice. This table is made based on the responses of all these participants to the open-ended questions in the questionnaire and the interview responses of the selected five participants are also used. Further these participants were asked about their overall views towards ICT use in teaching and the findings after analysing their responses are summarised in Table 6 which indicated that overall views of these participants shifted towards positive side.

Table 6: Comparison between the pre-teaching practice and post-teaching practice overall views regarding using ICT in teaching of the all the eight second-time participants.

S.No	Participant	Overall views before teaching practice	Overall views after teaching practice
1.	Participant A	Ambivalent	Positive (if available)
2.	Participant B	Positive	Positive (only if necessary)
3.	Participant C	Positive	More Positive (well experienced)
4.	Participant D	Ambivalent (more towards positive)	Ambivalent (more towards negative)
5.	Participant E	Positive	Positive (if used properly)
6.	Participant F	Positive	Positive (if used properly)
7.	Participant G	Ambivalent	Positive
8.	Participant H	Positive	Positive (if available)

Conclusions and Recommendations

The purpose of this research was to provide a window into science student-teachers' perceptions or attitudes about integrating Information and Communication Technology into science teaching and learning and to explore the impact of the practical teaching experience (teaching practice) on these attitudes. The findings indicate that while current student teachers appear confident and competent, and generally see a place for ICT in present and future science education, but they become clearer in their approaches towards ICT after the experiences which they had with ICT during their teaching practice. On the whole, their attitudes move towards the favourable direction as far as the value of ICT is concerned in

making science teaching and learning more effective. But their willingness to use these tools in their teaching depends upon the availability of resources, facilities and support at the schools.

In spite of being a small-scale study, the findings of this study brought into light some vital reasons behind the intimidation faced by teachers when using technology. The key issues which originated from this study are (a) Importance of knowledge and skills of using ICT (taught in the university), (b) importance of practical experience of using ICT tools in teaching (in university and during teaching practice), (c) importance of proper infrastructure and resources related to ICT (at university and teaching practice schools), and (d) importance of encouragement and support to student-teachers to use ICT (before, during and after teaching practice).

On the basis of these findings it is suggested that (a) the student-teachers should be given all the opportunities, resources and facilities to learn to use different ICT tools during university classes before their teaching practice, (b) special sessions should be arranged for student-teachers at university to show them various methods to incorporate technology in their teaching, (c) the teaching practicum should be planned in such a way so that all the student-teachers get equal opportunity to teach in schools which support ICT, and have all the resources available, (d) the efforts done by student-teachers to incorporate ICT in their teaching should be considered in their assessment.

Given that this research was qualitative in nature, and only a small number of student-teachers from one university participated in it, the findings of this research cannot be generalised to the whole population of science student-teachers or to student-teachers in other fields of study. It is also suggested that a large-scale study, including large number of student-teachers from science and other subject areas, should be done to generate findings and suggestions to make better policies for teacher education. Research is also needed to study how the ICT related attitudes of mentor-teachers influence the use of ICT by student-teachers.

Amrit Pal Kaur can be contacted at amrit.kaur@adelaide.edu.au

References:

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour* (pp. 4-27). New Jersey: Prentice-Hall.

Albion, P. (1999). *Self-Efficacy Beliefs as an indicator of Teachers' Preparedness for Teaching with Technology*. Association for the Advancement of Computing in Education (AACE). Retrieved June 14, 2008, from http://www.usq.edu.au/users/albion/papers/site99/1345.html

Albirini, A. (2006). Teachers' attitudes toward information and communication technologies: the case of Syrian EFL teachers. *Computers & Education*, 47(4), 373-398.

Australian Computer Society. (2005). *Policy Statement on Computer Literacy*. Retrieved April 7, 2008, from http://www.acs.org.au/acs_policies/docs/2005/ComputerLiteracy.pdf

Barrio, C. (1999). *The Use of Semistructured Interviews and Qualitative Methods for the Study of Peer bullying*. Nature and Prevention of Bullying. Retrieved November 27, 2008 from http://old.gold.ac.uk/tmr/reports/aim2_madrid1.html

Bordens, K., & Horowitz, I. (2001). *Social Psychology* (2nd ed.) (pp.158, 176). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Burns, R. (2000). *Introduction to Research Methods* (4th edition) (pp. 553-566). Australia: Pearson Education Australia Pty Limited.

Creswell, J. (2005). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (2nd edition) (pp. 11-12, 38-49, 202-243). New Jersey: Pearson Education Inc.

Cox, M., Webb, M., Abbott, C., Blakeley, B., Beauchamp, T., & Rhodes, V. (2003). *ICT and pedagogy: A review of the research literature*.ICT in Schools Research and Evaluation Series- No. 18. Becta. Retrieved June 16, 2008, from http://files.ictopschool.net/bestanden/bronnen_digitale_generatie/ict_pedagogy_summary.pdf

Dawson, V., Forster, P., & Reid, D. (2005). Information Communication Technology (ICT) integration in a science education unit for pre-service science teachers; students' perceptions of their ICT skills, knowledge and pedagogy. *International Journal of Science and Mathematics Education*, 4 (2), 345-363. Retrieved May 18, 2008, from http://www.springerlink.com.proxy.library.adelaide.edu.au/content/y0x518613141l5u5/fulltext.pdf

Elliot, A. (2004). *When the learners know more than the teachers*. Information Age. Retrieved May 19, 2008, from http://www.infoage.idg.com.au/index.php?id=667259628

Fazio, H. (1986). *How do attitudes guide behavior?*. Handbook of motivation and cognition: Foundations of social behavior. Retrieved July 5, 2008, from http://www.getcited.org/pub/103374822

Fitzallen, N. (2004). *Profiling Teachers' Integration of ICT into Professional Practice*. University of Tasmania. Retrieved May 17, 2008, from http://www.aare.edu.au/04pap/fit04868.pdf

Gibson, W. (2006). *Thematic Analysis*. Retrieved July 25, 2008, from http://www.ilit.org/air/files/thematic_analysis.doc

Higgins, S., & Moseley, D. (2001). Teachers' thinking about information and communications technology and learning: beliefs and outcomes. *An international journal of teachers' professional development*, 5(2), 191-210.

Jones, A. J. (2002). *Integration of ICT in an Initial Teacher Training Course: Participants' Views*. Paper presented at the Seventh World Conference on Computers in Education.

Johnston, H. (2002). *Shaping Beliefs and Attitudes: A Handbook of Attitude Change Strategies*. University of South Florida, Tampa, Florida. Retrieved June 24, 2008, from http://www.principalspartnership.com/AttitudeHandbookforUPWebs.htm

Labuschagne, A. (2003). Qualitative Research – Airy Fairy or Fundamental?. *The Qualitative Report,* 8(1). Retrieved July 18, 2008, from http://www.nova.edu/ssss/QR/QR8-1/labuschagne.html

Lee, C., Teo, T., Chai, C., Choy, D., Tan, A., & Seah, J. (2007). *Closing the gap: Pre-service teachers' perceptions of an ICT based, student centered learning curriculum*. Nanyang Technological University. Retrieved March 15, 2008, from http://www.ascilite.org.au/conferences/singapore07/procs/lee-cb.pdf

MCEETYA. (2000). *Information and Communication Technology: Development of Key Performance Measures*. National Report on Schooling in Australia 2000. Retrieved June 26, 2008, from http://cms.curriculum.edu.au/anr2000 /index.asp?pg=ch10_perf.htm

MCEETYA. (2001). *Information and Communication Technologies student outcomes: Development of online curriculum and resources*. National Report on Schooling in Australia 2001. Canberra. Retrieved June 26, 2008, from http://cms.curriculum.edu.au/anr2001/ch9_policy.htm

MCEETYA. (2002). *Information and communication technologies education: The policy context*. National Report on Schooling in Australia 2002. Canberra. Retrieved June 26, 2008, from http://cms.curriculum.edu.au/anr2002 /ch9_policy.htm

MCEETYA. (2005). *Learning in an Online World: Progress Report 2005*. MCEETYA ICT in Schools Taskforce. Canberra. Retrieved June 26, 2008, from http://www.icttaskforce.edna.edu.au/icttaskforce/webdav/site/icttaskforcesite/users /root/public/learning_online_progrss_06.pdf

Mumtaz, S. (2000). Factors Affecting Teachers' Use of Information and Communications Technology: a review of the literature. *Journal of Information Technology for Teacher Education*, 9(3), 319-342.

Neuman, W. (2006). *Social Research Methods* (pp. 299, 322-331, 458, 460-464). USA: Pearson Education, Inc.

Paas, L., & Creech, H. (2008). *How Information and Communications Technologies Can Support Education for Sustainable Development: Current uses and trends*. International Institute for Sustainable Development (IISD). Retrieved October 10, 2008, from http://www.iisd.org/pdf/2008/ict_education_sd_trends.pdf

Petty, R., & Cacioppo, T. (1981). *Attitudes and Persuasion : Classic and contemporary approaches* (pp.6-7). Dubuque, Iowa: Wm. C. Brown Company Publishers.

Reynolds, D., Treharne, D., & Tripp, H. (2003). ICT-the hopes and the reality. *British Journal of Educational Technology*, 34(2), 151-167.

Scrimshaw, P. (2004). *Enabling Teachers to make successful use of ICT*. British Educational Communications and Technology Agency (Becta), UK. Retrieved May 24, 2008 from http://partners.becta.org.uk/upload-dir/downloads /page_documents/research/enablers.pdf

Shank, G. (2006). *Qualitative Research: A Personal Skills Approach* (pp. 1-18, 38-53,133, 124-144). New Jersey: Pearson Education, Inc.

Sime, D., & Priestley, M. (2005). Student teachers' first reflections on information and communications technology and classroom learning: implications for initial teacher education. *Journal of Computer Assisted learning*, 21, 130-142.

Steketee, C. (2005). *Integrating ICT as an integral teaching and learning tool into pre-service teacher training courses* (pp. 101-113). Issues in Educational Research (IIER). The Institutes for Educational Research. Retrieved May 18, 2008, from http://www.iier.org.au/iier15/steketee.html

Tinio, L. (2003). *ICT in Education* (pp. 4-11, 21-24). United Nations Development Programme. Bureau for Development Policy, New York. Retrieved May 23, 2008, from http://www.apdip.net/publications/iespprimers/eprimer-edu.pdf

Webb, I., & Downes, T. (2003). *Raising the standards: ICT and the teacher of the future*. Technology Education Federation of Australia. ACT, Australia. Retrieved May 18, 2008, from http://delivery.acm.org.proxy.library.adelaide.edu.au/10.1145 /860000/857137/p131-webb.pdf?key1=857137&key2=4613762221&coll=GUIDE&dl=GUIDE&CFID=68593816& CFTOKEN=70034406

Williams, D., Wilson, K., Richardson, A., Tuson, J., & Coles, L. (1998). *Teachers' ICT skills and knowledge needs: Final Report to SOEID*. The School of Information and Media, The Robert Gordon University, Scotland. Retrieved August 17, 2008 from http://www.scotland.gov.uk/library/ict/append-title.htm

 What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Privacy | Terms and Conditions

Naace
PSP and QR codes at the DalesCountryside Museum
Author: Victoria Parsons, YHGfL

A project at the Dales Countryside Museum in Hawes used hi-tech equipment to help youngsters learn about their heritage when the Museum, owned by the Yorkshire Dales National Park Authority, teamed up with the Yorkshire and Humber Grid for Learning (YHGFL) for the pilot scheme.

Pupils from Hawes Primary School used 15 Sony Play Station Portable 2 (PSP2) machines loaned to the Museum by YHGFL to create resources relating to their favourite objects on show. The seven to 11 year olds took photographs, researched and wrote stories about items in the Museum's collection, made films about their own special things and interviewed family and friends about their treasured possessions.

By scanning in a QR code next to each object, the children can bring up the information, film, sound and photos on the PSP2 machines to reveal more of the stories behind the artefacts.

Overview and Aim

Dales Countryside Museum is owned and managed by the Yorkshire Dales National Park Authority. It is a key tool of the Authority for communicating messages about the special qualities of the Yorkshire Dales National Park. The PSP project fitted perfectly with another project which we were delivering. This related to the "Treasured Possessions" project, collecting stories and images of things that are special to the people and communities linked with the Yorkshire Dales. Schools, community groups and museum visitors have been thinking about what's special to them, what things might become treasured possession in the 23rd century and what the Dales Countryside Museum should collect today to save for future generations. They've been choosing the things they think are special in the Museum, interviewing their families about the things that are special to them and creating digi-stories that will be on display in the Treasured Possessions Exhibition.

The objectives for the project were:
- To forge stronger links between the museum and the local Primary School and encourage a sense of ownership within the school and local people (parents, grandparents) of the museum, the museum's collection and links with local people, objects and places.
- To collect stories, drawings and digital stories about Treasured Possessions for our exhibition and museum galleries
- To develop educational workshops and enhance museum trail for visitors.
- As an innovative and exciting way of involving the children in the museum's Treasured Possessions project which will encouraged them to produce work in a range of mediums including drawings, stories, poetry, oral history recordings and digital stories. This work can then be displayed within the Treasured Possessions exhibition during February and March 2011 and again during 2012.
- To development sustainable workshops that can be offered to other schools or community groups
- To develop a trail around the museum galleries to enhance the visitor experience and incorporate the stories, pictures and photographs of objects collected through the Treasured Possessions project into the galleries.

Key Outcomes
- The children and teaching staff have been enthusiastic and engaged throughout the project. The children are rightly proud of their achievements and hosted a very enjoyable open evening to show their project to their parents and grandparents.
- Children feel a pride and ownership of their heritage and local museum
- New links with local primary school and teaching staff.
- Museum and teaching staff have an understanding of how PSP and marker technology can be incorporated into museum visits, educational workshops and the classroom
- Local families visiting through this project and open evening understanding that the museum can and does have relevance to their heritage and life now.
- Raised the museum's profile within Yorkshire Dales National Park (YDNPA) IT department
- Strengthened relationship between Museum and YDNPA IT department

The Plan

10/11/2010	DCM	Initial visit
		CBBC Relic quiz
17/11/2010	DCM	Introduction to PSP's and markers.
		Groups of 3, each with a PSP
		Badges and markers on museum models to find.

		Look at Relic quiz and see if questions need altering.
24/11/2010	DCM	Choose favourite museum artefact to research and write information that can be used with PSP marker. Take picture of chosen object with PSP. Use worksheet.
01/12/2010	J*** not available Work in class	Write up research on your favourite object. Use internet, books etc. Also write a creative imaginary piece about a day in the life of the object. Copy both sets of info into 'paint'.
08/12/2010	DCM	Bring each individuals info with them to transfer to DCM laptop ready be assigned to a marker and loaded to PSP groups. 3 groups 1 with Jane and laptop assigning markers 1 with photo hanger putting paper copy into quilt form 1 with PSP's recording video information of their objects
15/12/2010	Christmas stuff at school? Chk with Mrs D***	
Christmas holiday		
12/01/2011	DCM	Use PSP's to check out trail of markers does it work? Do we need to change anything? Would we do anything different next time? Your own treasured possession. What is it? What is its story? Fill in TP worksheet –draw your object, tell its story. At home ask Dad/Mum/grandparents about their special object.
19/01/2011		Bring photograph or draw a picture your relative's special object to bring into the museum. Bring your own special object photo to the museum Can you find a place in the museum you would like to see it?
26/01/2011	J*** not available Work in class	Research and write information that can be used with PSP marker. Write up research on your favourite object. Use internet, books etc. Also write a creative imaginary piece about a day in the life of the object. Copy both sets of info into 'paint'. Video, writing, drawings and photographs
02/02/2011	DCM	Bring each individuals info with them to transfer to DCM laptop ready be assigned to a marker and loaded to PSP groups. 3 groups 1 with Jane and laptop assigning markers 1 with photo hanger putting paper copy into quilt form 1 with PSP's recording video information of their objects

09/02/2011	DCM	
16/02/2011	DCM	Sony case study- camera man?
		Open evening........ask LD for date
		Treasured Possession PSP trail with parents
Half term		

About second sight

The Dales Countryside Museum was looking for a hi-tech project to engage with its local schools and help provide outreach further afield. Due to its geographic location GPS and 3G based systems are unreliable. Second sight is fully contained on each device with resources triggered via the camera. Development is underway to use the technology on other hand held systems.

The second sight system is developed by Black Ridge Technologies and ConnectED education.

Second Sight on a PSP

Second Sight enhances student and teacher's access to audio, video and interactive educational content. This ground breaking new technology works with traditional printed content to trigger audio, video and interactive 3D images. Second Sight enables teachers to blend the use of their established text books, display materials and audio visual content in a way that has not been easy to deploy in the classroom before. Using Second Sight teachers and practitioners can easily create their own content for use. Second Sight comprises a PC based content creation suite and a second sight viewer for the PSP.

Second Sight Creation Suite:

A simple PC based programme which matches the codes to a resource and uploads them to the psp. A resource can be: Audio (.mp3), Video (.mp4), Image (.jpg) or 3D Augmented reality (.gmo)
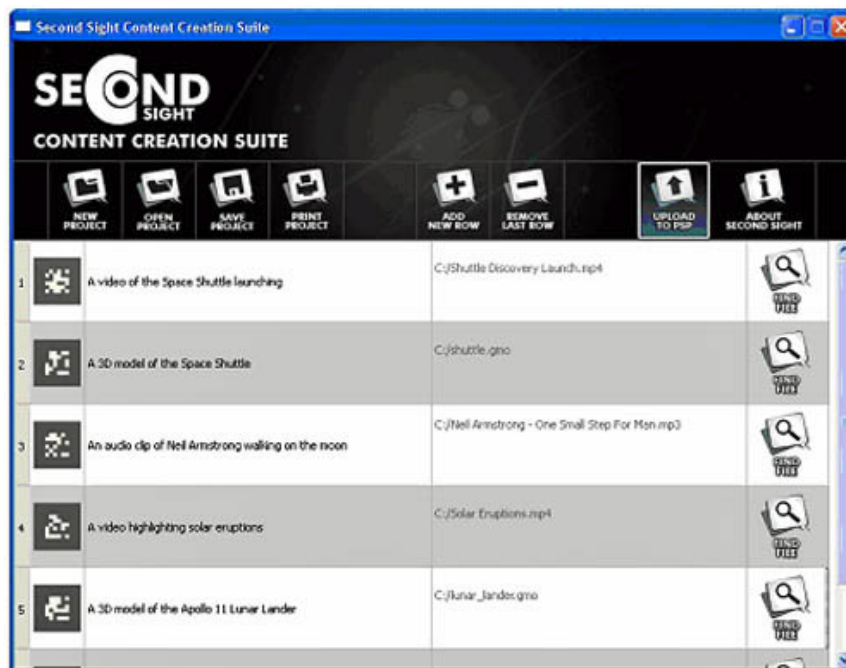
Second Sight Creation Suite

Second Sight PSP Viewer

Example PSP Code (a simplified QR code)

Second Sight PSP Viewer - a Play Station Portable (PSP 3000) with camera (!go Cam) and memory stick which holds the media.

A UMD (disc) for the psp which controls the camera and displays the triggered media. The media is triggered when the camera detects 1 of 50 simple codes.

What we did

Stage 1: To create a PSP trail around the museum of each class members favourite museum objects. To include their research, drawings, poems and creative writing related to the object.

Stage 2: To add their own treasured or special objects to the trail, encouraging the children to think about how and why museums collect and what they feel the museum should be collecting in the future.

Stage 3: To add the treasured or special objects of someone they know from an older generation, ncluding oral history recordings, digi-stories and photographs of the objects.

Stage 4: To incorporate the above work into a virtual tour of the museum

With the help of our IT department we acquainted ourselves with both the software and the PSP machines. As an introduction to the PSP's and creative content experience we then made each child and member of teaching and museum staff a marker badge, these badges described the wearers likes and dislikes which had been previously collected, as well as introducing everyone to each other.

The children's enthusiasm was contagious, the museum and teaching staff got to grips with the PSP's and the projects outlines and objectives were explained to the children.

To better introduce the museum's collection to the pupils, the children were split into groups and created a CBBC 'Relic of the Museum Quiz'. This gave a better understanding of what we might or might not need to put into our virtual museum tour, the tour is now available at the DCM and is advertised on the CBBC website. Photographs of the collection were taken using the PSP's to be added to the virtual tour if needed.

The children quickly felt at home within the museum and were able to easily describe the interior of the museum and understand the spatial layout of the collection.

Each child then chose their favourite object from the museum collection and back at school produced a piece of research and a story about their object, these were loaded into an experience, the children placing the markers next to their object around the museum. With 12 PSP's available the children could go round the museum in pairs discovering the additional information using the markers

For homework each child interviews their relatives talking about their Treasured Possessions, and then created digital stories using the recorded oral histories and images.

These once converted to the correct format were played on the screens within the museum's exhibition hall and on the PSPs via a trail of markers. Homework was set to think about their favourite object from home, something treasured but not necessarily expensive and digital stories were created for these. The next week's homework was to ask someone from home, parent or grandparent what their treasured possession was and another digital story was created.

Each child created two digital stories; these will be used in our

current exhibition and in our 2012 exhibition as part of the Stories of the World Cultural Olympiad.

The support and input from the teaching staff and Andrew from Yorkshire and Humber grid for Learning has been immense and without this the project would have been much less successful with regards to the content created and maintaining the children's enthusiasm.

To mark the end of the project we held an open evening at the museum giving the children the opportunity to show their parents, grandparents and Friends of the Dales Countryside Museum the work they have created and displayed themselves in the Treasured Possessions exhibition. The children decorated cakes with icing 'markers' and helped host the evening. This enabled the children to show their relatives how to use PSP's to read the markers and tour the museum to discover the children's work through the markers placed in the galleries. This highly successful evening celebrated the work the children have put into the project that they are rightly very proud of and enabled the museum to engage with families that have never or rarely visit the museum forging useful links with the school teaching staff, school PTA and parents. Some 44 parents, carers, siblings and school children came along to see the project.

Barriers

A number of barriers were identified:
- Staff time, and lack of IT resources/know how.
- Fiddly, time consuming job to convert all the word documents into jpegs
- General uncertainty about what document types needed to be converted. What they needed to be converted to, and what additional software was needed to do this.
- Shame the .wmv files could not be used without conversion.
- Unable to convert .wmv files ourselves at the museum (software plus know how issue!), depended on YHGFL and the schools IT teacher for help.

Enablers

- The Museum was able to develop and deliver the PSP project as a result of external funding for the Museum Project Officer post. Had the post created by this funding not been available the museum would have been unable to participate in this project due to lack of funded staff time.
- Quick upload of the created experience has given museum staff the confidence to create more experiences to keep the children's interest and enthusiasm.
- Support of IT staff from the school is needed.
- Support of National Park Authority IT staff.

The support and input from the teaching staff has been immense and without this the project would have been much less successful with regards to the content created and maintaining the children's enthusiasm.

Impact

- Children were engaged throughout.
- Children were enthusiastic about creating work to see on the PSP/marker.
- Incidental learning –the children liked 'not having to do any writing', and didn't perceive creating the word documents as work.
- Excellent behaviour and responsible use of the PSP machines.
- Children very eager to share their knowledge and confident use of the machines to other less able (older!) people.
- Museum staff not usually connected with education have enjoyed hearing the children as they have moved around the museum, and have stated how nice it has been to hear the children talking to each other about the exhibits.
- Excellent relationship built with the teaching staff of the school that will hopefully continue. Staff have already expressed an interest in borrowing the museum's handling collection more often.

The children now feel the museum and associated local Dales heritage belongs to them, and confidently talk about it at home.

One little girl wants to come and work at the museum when she is retired!

Implications and Next Steps

- Financial!
- Staff time to create resources and initial outlay for PSP kit and set up.
- We would like to incorporate the PSP/markers both within the museum collection and our education offer. We see

potential to use the 'virtual museum' map

Hints and Support

The support of Andrew Lickley (YHGfL) was invaluable. Without his help converting files would not have been converted to show on the PSP.

Perhaps the software could come in a package containing the correct/relevant conversion software to play on the PSP experiences, saving time and uncertainty as to what needed to be converted and what to convert it with. This would obviously increase the cost of the software, but for us in the long run would save staff time and money.

An enthusiastic and dedicated school teaching staff is invaluable and really helps push a project like this along.

Examples of some of the children's work put onto the psp's

Lead Mines by Harrison

Once there was a lead mine that collapsed. It is hard to know what happened for sure. People investigated what happened but they couldn't find any evidence about what happened but people think that they may have been an earthquake. But truth be told there were only two survivors who were unknown ...... they starved and soon died.

The story of cheese by Lizzie

Hello I am crackers, no that's my name I'm not actually crazy, I am cheese, cheddar cheese. I look like cheese, I smell like cheese, and I hope I taste like cheese.

At the moment I am with my friends, creamy and blue, in a big mixing pot. Now I'm being frozen with eggs called Egbert and Yoko. I have now been tasted and shaped and wrapped and I'm now on my way to the supermarket. I hope someone comes and eats me soon. I am put out in a fridge so people can come over and buy me. (I hope I taste good!) then this farmer comes over to buy me! But this is the bad news, he doesn't eat me! Instead he sends me to the Yorkshire dales museum and I get put in a glass box with other cheeses around me. Then I get a mouse on my back. (I hope he doesn't eat me!!!)

Viking ring facts by Megan

Type: Vikings and Saxons

Period used: 9th or 10th century

Material: Metal and Gold

Where found: Sedbergh

This is a beautiful and elaborate gold ring. We are unable to say much about the owner as it was not found near an archaeologist site. However the owner may have been quite a rich person because the ring is made out of gold. It may have been a royal present, according to stories at that time; Kings gave rings to their warriors. Gold rings were represented as the sign of a King's man. I personally think that it is very beautiful and I would love to own it. It is a double banded ring made from gold, at the back there is a piece of gold wire coiled around the gold strip to fasten it together.

Viking ring story by Megan

Hello, my name is Cavo and this is the story of the war between the Anglo Saxons (boo!) and us, the Vikings (yippee!) In the story it is the 9th century. I was young then but now I am old, nearly dying through I must finish this story before I die. I am in the story of course. I am the warrior. I have tried to find that ring for years now but I cannot find it, I hope whaen I die that other people will read my story and try to find the ring.

Sometime in 435 BC there was a King called Aico. Alico was a good king he looked after his warriors after war. But one day he announced they were going to have a battle with the Anglo-Saxons. Hegot ready his best men for fighting. One of his warriors was called Cavo. They were just about to ride off on their horses to start the battle when Aico picked up a gold ring and called out :

"Cavo. Come here please!" Cavo walked up to the king.

"Yes your majesty"

"take this ring, it will give you good luck"! Cavo reached out and took the ring.

"thank you!" said Cavo. A few minutes later the warriors had set off to fight the Anglo-Saxons. But while Cavo was fighting the ring slipped off his finger and fell to the ground. When the battle had finished the ring was deep in the ground, In hundreds of years it will be found and put in a building where artefacts are if they invent anything like that because of it been so beautiful.

Roman Coins by Kornelija

It was a long time ago when there was a roman called Antonio who was very brave and strong and he was about to get his armour on for the big war which is going to be soon. It was time that the war has started but Antonio forgot that he has still got his money in his pocket, at the war while Antonio was fighting he felt rattling in his pocket it sounded like it was money so he ran passed as quick as he could so he wouldn't get killed, he hid and then checked his pocket and it was money so Antonio dug up a hole then buried his money in it and then covered the hole up.

Antonio got back to the war, he was hoping he will survive so he can dig his money up, he kept on fighting and fighting then a enemy killed Antonio. Antonio never got to dig up his money so the money stayed there for a long time.

The Bed Pan – by Kory

Bed warming pans were often made in copper as a thin tray could be made. This ment it was quite light – important when the pan was full of coal or ashes and had to be carried up and down stairs.

The maid always went to see the master and mistress and they would say I am going to retire in fifteen minutes or so. So the maid ran up the stairs, ran into the master and mistresses room, put the bed pan between the bed sheets and it would warm the bed up ready for the master and mistress to get into bed

The open evening

On the 3rd March 2011 the Museum opened it's doors to the local community, parents, staff and pupils to celebrate the resources created. Parents were also able to have a go with the psp's round the museum.

You can see examples of our work at: http://shareit.yhgfl.net/hawes/Hawes

Victoria Parsons can be contacted at victoria.parsons@yhgfl.net

RSS What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Privacy | Terms and Conditions
© Naace 2006 - 2011 | Naace Registered Charity Number: 1060683

Naace
Some Research Findings on the use of Clicker to Support Early Learning and Literacy

Author: Dr Arjette Karemaker, Nottingham University*

Successful development of reading skills is critical for school attainment as well as everyday functioning. Approximately 1.7 million (5%) UK adults are thought to have literacy skills below the level expected of an 11-year-old child (DfES survey, 2003), with similar figures existing for other western societies. Effective interventions, designed to support the development of early literacy skills, both in typically developing children and those that are struggling with learning to read, are thus necessary to prevent a high incidence of reading failure in modern society.

As part of my ongoing research into early learning and literacy, I have taken part in a series of studies investigating the effectiveness of a whole-word multimedia software intervention (Clicker) in supporting developing literacy skills in children aged 5-6 years:

- First, the natural usage of the Clicker software in the primary classroom was explored by comparing children exposed to the Clicker software to those not exposed, and measuring changes in basic literacy skill acquisition (Study 1).
- Second, performance gains in recognising and naming words and phonological awareness in typically developing children (Study 2a) and struggling beginner readers (Study 2b) were measured following specific intervention with Oxford Reading Tree for Clicker compared to traditional Oxford Reading Tree (ORT) printed books.
- Third, attitudes towards ICT usage in the Year 1 primary classroom were assessed by comparing the attitudes of class teachers who use Clicker software as part of their normal literacy instruction practice with those who do not (Study 3).

In each study, the effectiveness of the Clicker Software was assessed in the context of normal literacy instructional practices.

Study 1 compared literacy development in children from schools in which teachers use Clicker as a natural part of their reading instruction (Clicker schools) with that of children from schools in which Clicker is not provided (non-Clicker schools). In general, the Clicker schools were using the software on a daily basis for 1-2 hours, with a combination of individual learning and whole-class work using an interactive whiteboard. The study indicated that children from schools in which Clicker was used to support early literacy acquisition achieved greater effect sizes in phonological awareness, grapheme awareness, decoding, spelling, and receptive vocabulary than children from non-Clicker schools. In particular, children from Clicker schools achieved significantly greater gains in phonological awareness and grapheme awareness compared to non-Clicker school children.

To overcome the inherent difficulties with assessing the effectiveness of 'normal' classroom usage of Clicker software in Year 1 primary school classrooms, a second study was undertaken, with the aim of directly comparing the effectiveness of using Oxford Reading Tree for Clicker with using traditional ORT printed books to support the development of early literacy skills.

Study 2 was conducted with two groups of children varying in reading ability. Group 1 was made up of typically developing Year 1 children (Study 2a), whilst group 2 consisted of Year 1 pupils who were struggling with learning to read (study 2b). The children were each given two interventions (ORT for Clicker and traditional ORT Big Books). Each study was conducted in school over a five week period in which pupils were assessed on key measures of literacy skills in the week preceding and following each intervention.

The class teacher led the ORT for Clicker intervention on a SMART interactive whiteboard. This whole-class activity was followed by a focus activity in which each participating child worked through the accompanying activities on an individual laptop computer. The Big Book intervention also involved a whole-class activity in which the class teacher read the Big Book aloud to the class, after which each participating child conducted individual activities using pen, paper and regular-size ORT books.

The results of studies 2a and 2b indicate that both interventions led to significant gains in performance on almost all measures of literacy skill compared to the baseline. However, intervention with ORT for Clicker significantly improved all measures of literacy skill for typically developing children (Study 2a) compared to the ORT Big Book intervention. Likewise, compared to intervention with traditional ORT printed books, Year 1 children who were struggling with learning to read (Study 2b) showed significant improvements following intervention with ORT for Clicker in written word recognition skills

and attitudes towards computer enjoyment.

Together, these two studies provide compelling evidence that ORT for Clicker is effective in supporting the development of early literacy skills in Year 1 primary school children across a range of reading abilities, compared to traditional teaching practices using printed texts from the same reading scheme. In addition, results from Study 2b showed that using ORT for Clicker promoted significantly increased ratings of computer enjoyment for struggling beginner readers compared to intervention with traditional printed books. Therefore, interventions with whole-word multimedia Clicker software may also be an effective way for teachers to break the vicious circle between low ability and low motivation for struggling readers.

Study 3 investigated the effectiveness of Clicker software in promoting positive and reducing negative attitudes towards using ICT as part of normal teaching practices by comparing the attitudes of the Clicker school class teachers with those of the non-Clicker schools that participated in the project.

Results showed that the attitudes of teachers from the Clicker schools were significantly less negative than those of teachers from the non-Clicker schools towards using ICT in the primary Year 1 classroom. They suggest that regular usage of Clicker software by Year 1 primary school teachers is associated with less anxiety, aversion, and negative attitudes towards ICT in society, and more enjoyment, enthusiasm, and appreciation of the importance of ICT in supporting learning, compared to teachers with no experience of using Clicker. It is likely that Year 1 teachers like using Clicker software because it is designed by ex-teachers specifically for teachers and is based on standard teaching practices, which eases implementation of the software within the typical school curriculum.

Overall, these studies provide evidence that Clicker can be an effective intervention to help development of early literacy skills and language acquisition in 5-6 year old children across a range of abilities, and in addition help to foster positive attitudes in both pupils and staff towards ICT-based learning. Long-term follow up studies are needed to establish if the performance gains reported here after intervention with Clicker are sustainable over time. In reality, class teachers must divide their support between many children. This form of multimedia software may be an effective classroom aid in helping children learn to read and enjoy books independently and at their own pace.

* Dr Arjette Karemaker is currently at the Department of Education, University of Oxford

RSS   What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Privacy | Terms and Conditions

Naace
SynergyNet: integrating multi-touch technology in classrooms at Durham University

Author: Professor Steven Higgins, Director for Research, School of Education Durham University

It is almost thirty years since Seymour Papert's seminal book Mindstorms offered a powerful vision in which the nature of children's learning and thinking would be transformed by the use of computers. While our electronically sophisticated classrooms reflect our technological advances, there is little evidence that the learning is very different from that of past generations. Are computers changing the way we learn or are they, in the main, more elegant and animated digital replacements for books and blackboards?

An important educational approach that has yet to fulfil its potential is collaborative student groupwork. While the idea of a small group of school students, engaged together in collaborative problem-solving, holds great appeal in both individualistic and collectivist societies, it has typically been difficult to raise the standard of group interaction to a level where real intellectual, as well as social, gains are effected.

SynergyNet represents an attempt by researchers in Computer Science, Education and Psychology at Durham University to draw upon the most recent technological advances to transform group learning processes. This £1.2 million research project, funded for four years by the EPSRC/ESRC funding councils through the Teaching and Learning Research Programme's Technology Enhanced Learning programme seeks to realise Papert's vision by transforming group learning processes and whole class pedagogy in schools.

The technology behind this vision is based on the multi-touch technology pioneered by the i-Phone, and now being embraced by many leading technology companies. Central to SynergyNet is the use of classroom tables that contain a large built-in multi-touch surface. Multi-touch surfaces are similar to PDAs, interactive whiteboards (IWBs) or tablet PCs in that they remove the need for a mouse or keyboard by allowing the user to interact directly with a finger or stylus. However, unlike these technologies, multi-touch surfaces can detect simultaneous contacts by multiple fingers or pens. Therefore, two or more students can work on the table and interact with digital information at the same time. So a single multi-touch table could act as a set of individual digital work spaces and/or a single large computer workspace allowing students both to work individually or to cooperate on a task.

Our concerns that, in the past, developments in ICT have achieved little more than the replication of existing learning processes has been more recently fuelled by evaluations of the use of IWBs. Despite their promise, studies have found that often practice has emphasised teacher-led classroom approaches not unlike those of the time of chalk and talk.

We believe that to make a real change in pedagogy it is necessary that, whenever new software is developed, careful consideration must be made about its operational use within the classroom, how it fits into existing classroom structures, and the pedagogic adaptations necessary to use it to the greatest effect. All our work will therefore be carefully driven by feedback from the those involved, so teachers and students will be active participants within this research.

Our vision for the classroom is that all students should have direct access to this technology at all times. Multi-touch hardware is embedded within learners' tables. This means that all classroom-based activities can be supported, as needed, by technology and students can move easily between class and group activities and individual tasks. It will also bring increased opportunity for both collaborative and competitive activities between groups. Digital information can easily be passed or content flicked from one table to another and electronic feedback can be presented on each table to indicate the progress or success of the different groups.

For the teacher this technology offers a new, and challenging, way of working. A teacher can demonstrate or introduce an activity from their presentation board then send the task to all of the tables quickly and easily. In our classroom the teacher can monitor what is going on at each table from a 'teacher console' by displaying small representations of each table (rather like thumbnail images). This enables a teacher to monitor, at a glance, the progress of each group. It therefore increases the choices a teacher can make about group work. The teacher can freeze a task, choose a group's work to project on the board or on each of the tables for discussion, then ask all of the groups to continue with the version of the task shared with the whole class. Alternatively each group can return to their own version of the activity. A further opportunity provided by SynergyNet's digital workspaces is for teachers to replay group actions and, thereby enabling them to review their teaching reflectively or be involved in collaborative coaching.

Our early work suggests that the multi-touch surface is effective at supporting the initial stages of group work in particular where pupils have to become familiar with the task. The requirement that all information is kept on the surface means that the children tend to enlarge and share information collectively with the group. The facility to move and shrink information also means that the process of decision-making by he group is effectively recorded on the table surface.

We have also experimented with mobile control by the teacher, who can monitor activities using an iPad or tablet PC. So in one task where the pupils have to create calculations to make a given total, the teacher can monitor what groups and individuals are doing and intervene on the basis of their strategies. The teacher has the option of making the task easier or harder as they observe the different groups by removing numbers or operations from the keypad the pupils are using to enter their solutions. Of course in a digital environment all of the actions of the pupils can be captured, so all of the correct and incorrect calculations can be stored and analysed automatically, integrating assessment into the task and reducing the need for separate summative tests of performance.

Progress so far has concentrated on the development of an infrastructure to run the multi-touch applications and of a set of software building blocks to enable the learning content to be easily and quickly developed. A small range teaching materials is now available and these are now being run on the new multi-touch tables to investigate the impact of the technology on children's learning.

Educationists will be all too aware that developing meaningful learning activities that offer more than the mere replication of existing practices is a task that will more than rival the technological challenges of producing the equipment. Papert's vision resulted in the mass production of electronic turtles, programmed by Logo, which after a tidal wave of enthusiasm, now sit gathering dust in school cupboards or have been consigned to the dustbin. Since then, many technological advances have been introduced to schools but these have usually failed to live up to their technological promise. We are determined to ensure that SynergyNet will draw upon the lessons of the past thirty decades of use, underuse and misuse of ICT in schools to ensure that the promise of multi-touch technology and meaningful pedagogy for groupwork can be realised.

Professor Steven Higgins can be contacted at s.e.higgins@durham.ac.uk

RSS What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Privacy | Terms and Conditions

Naace
Talking our first steps in using the eInstruction MOBI
Author: Jenny Brightman, Baxia Software and Staff at Stramongate Primary School, Kendal

Matt Beresford, Deputy Head and Year 2 teacher, and Tom Morgan, Year 5 teacher, are both taking their first steps in getting to know and use the eInstruction MOBI. Both teachers have taught for many years using interactive whiteboards, but both were keen to try the eInstruction MOBI and explore how the MOBI can enhance the teaching and learning experience within their classrooms.

Tom took a little time to get used to using the MOBI. Tom first started using the MOBI with his class at the end of the Autumn term. "As it is a handheld device it took some getting used to, as you write in the pad while focusing on the board at the front of the room. The children also found this challenging at first but they soon became more confident with its use. Once this initial period of discovery was over the class began to notice similarities between the MOBI and other software they have used and so once the basic skills were mastered they could quickly progress through the other utilities."

"The children were all very excited about using the MOBI. While the initial interest was merely excitement at a new piece of 'kit', as the children explored its features they could begin to see the potential learning implications and were eager to test out their ideas in front of the class. Here the MOBI works very well as it can be passed around by the children in a collaboration of ideas. In Numeracy it is often used during the mental starter. While some children work on their own wipeboards others can add their ideas to the board at the front. This lead to children being inspired by others ideas and building upon them as a whole group. This peer lead learning is great for the children as it makes the work more personal a meaningful. Similarly in Literacy children can edit a piece of text in real time with other children saying whether they agree or disagree with their changes and inclusions. The MOBI can then be passed to a different group so they can make any amendments. In these sessions the children have always been engaged and eager to join in the discussions and without the need to go to the whiteboard at the front of the class they are all more forthcoming with their ideas. This feature of the mobi, allowing children to guide their own learning and 'play teacher' could have some very positive impacts on learning."

"As I, and my Year 5 class, have become more adept at using the MOBI we are beginning to appreciate the potential it has. It is able to target children who are reluctant to come to the front of the class and give them a chance to interact. It can support the lower ability children as you can constantly refer back to and annotate any whiteboard screens for the lesson. It can also stretch and extend the most able as they can challenge each other and learn together in creative collaboration. As yet I don't feel I have fully explored the MOBI potential, simply because it has so many possible applications. As with any piece of technology the MOBI will only be as good as the person operating it. However as this will often be the children themselves, the MOBI has proved itself to be endlessly creative, exciting and valuable."

Matt saw the MOBI in use in Tom's classroom, saw how much the children enjoyed and were engaged using the MOBI and asked for one for his classroom.

Matt found that the children in his class Year 2 class were naturally keen to start using the MOBI. Like Tom, Matt started off slowly, getting used to the MOBI and exploring the tools available.

"After having been an 'early pioneer' into Interactive Whiteboards my approach to learning using the new MOBI has been similar in that I have been trying to learn on the job and discovering the many applications during my class teaching. An initial period of free play allowed me and the children chance to discover using the device in mouse only mode and then begin to use the basic applications such as pen tools, eraser and highlighting tools. It really is a case of the 'sky's the limit' and the MOBI just requires time to learn and become familiar with the software, which is very similar to other interactive software products and so quite quick to assimilate.

The children were highly motivated by the MOBI and were all very keen to have a go. They learn new ICT skills so quickly and they are now pestering me to use the MOBI more and more! Again, allowing the children time to explore the MOBI's pen tools has allowed them to make the necessary adjustments to their hand/eye coordination and to realize that they need to

look at the screen rather than the MOBI to write, underline etc."

"Although I am still getting used to the endless possibilities of the MOBI a number of clear and powerful benefits are emerging. A teacher can teach from any position in the class. This variety of positions means that the teacher can teach next to any children with more challenging behaviour and keep a closer control of this. It also means that you can observe the children from a different position allowing you to see more clearly the teaching experience they see from their perspective. This variety of teaching positions seems to keep the children on their toes. As the children become familiar and therefore quicker at using the MOBI, lessons can become more interactive as the MOBI can be passed around the class or group and the children can immediately demonstrate their understanding by annotating their thoughts onto the IWB (interactive whiteboard). Recently I was working with a higher ability group of children within a mixed ability class setting. I was able to work with this group sitting at the back of the classroom and still use the MOBI to teach the group. The group was all watching the IWB (interactive whiteboard) as I explained. Crucially I could still manage the rest of the class from this position yet still teach effectively without having to keep getting up to demonstrate at the board and disturb the rest of the children. MOBI software can immediately use 'screen capture' mode. This is very powerful as it seamlessly enables the teacher to capture a web page, annotate the web page with say the features of an explanation text and then revert back to other pages within the same URL. In my opening sentence I said that the possibilities are endless. Practice, reflection and a creative approach to use will lead to the MOBI becoming a must have gadget for any teacher."

Further information is available from: Banxia Software Ltd - Top InterWrite PRS Partner 141 Highgate, Kendal, Cumbria, LA9 4EN, UK Tel: +44 (0)1539 815660 Fax: +44 (0)1539 815661 Web: http://www.banxia.com

RSS 🔑 What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Privacy | Terms and Conditions
© Naace 2006 - 2011 | Naace Registered Charity Number: 1060683

Naace
The Evolution of Technology for Learning

*Author: Fiona Aubrey-Smith, Head of Educational Development, UniServity*

More than 7.2 million students, teachers and parents across the UK log into the UniServity online learning space every week , forming one of the largest active online learning communities worldwide. While many schools are already seeing an impact, others are just starting to think about how to make them work in an efficient way for their school; particularly critical in these 'getting more for less' economic times.

So why this variance in how schools are using web-technologies; where are we up to, and most importantly, what happens next?

Web 1, Web 2, Web 3 & beyond

First – an introduction to the trend-shift in Technology, in relation to Learning. The way I find easiest to explain it is with this dissection-of-the-earth concept.
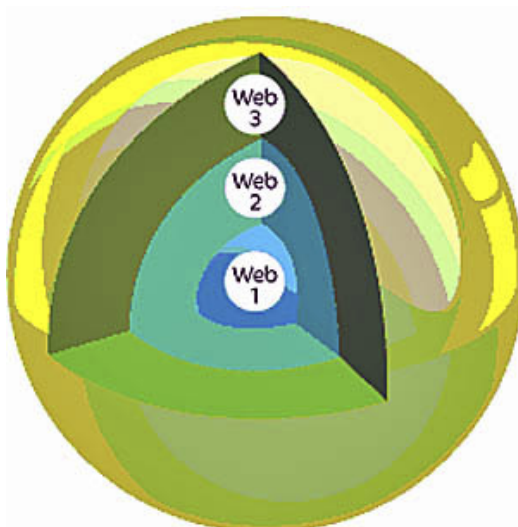
First, a **Solid Inner Core of Web 1** (by which I mean Content, Users, Documents, Files, Websites, Equipment) that required investment, and thanks to which is now well established & embedded in most organisations. Nearly every school has a website, network, intranet, file storage, MIS and lots of equipment to access & manage it all with. Schools provide Curriculum Links, Parents Newsletters & Podcasts, Push out Real-Time Assessment & Attendance Data Reporting, Share Teacher Planning, and a whole host of other things being pushed or published.

What's the Impact? This kind of technology improves Efficiencies: for example Microsoft's School in a Box paper quantifies average school savings of £350,000 a year. A fairly good argument for Return on Investment or Value for Money!

And whilst it's generally controlled by one person or a small group of people, it also begins to Extend Opportunities through Anywhere/Anytime access, for Students, Staff, Parents, Managers, Stakeholders & wider Community.

So Web 1 being a pretty well established core of technology which has developed gradually over the last 15-20 years, and now provides a firm foundation to build upon.

Wrapped around that, is the **Web 2 Interactive layer** (blogs, forums, wikis, games, IWBs, voting devices) the stuff within the learning platform agenda. It's more fluid, and whilst is still set up by a Gatekeeper; usually a teacher, it's no longer just controlled by a technician, manager or administrator. It distributes the ownership across stakeholders within schools (eg; Teachers set auto-marking quizzes, Students co-construct subject knowledge repositories wikis for revision, School Council members discuss whole-school issues in forums, and Learners keep Learning Journal Blogs and submit ePortfolios for Exam Board assessments).

What's the Impact? Take the example of school learning platforms, which according to OECD are now in 93% Secondary & 69% Primary Schools, and have been identified as the Highest School Improvement Priority for 2011/12 in 73% Secondary / 66% Primary Schools.

In 2009-10 academic year, in one study of 3,500 schools using UniServity's online learning solution, there were over 4.5+ million new learning resources added that year with a rising 7.5+ million visits per week, and a Consistent & Significant Positive Correlation between higher usage & better Ofsted outcomes.

Why? Because of "Connectedness" between Home & School and between Students, Peers, Teachers & wider Stakeholders in Learning. It's that old expression *"The whole is greater than the sum of the parts"*.

But interestingly, whilst 81% of those schools describe their learning platform as "embedded in T&L", the most common current activities are the *Delivery of Teaching*. It is significant to note therefore that the biggest priority for the majority of schools at present, is a shift "**From Delivery of Teaching to Facilitating Learning**". It's the #LearningRevolution

Which leads us nicely to look at what's now going on in the world of technology – Building on Web 1 & Web 2, to **Web 3** (The Personal, The Semantic, The Mobile, The Relevant).

- *It's Technology making that difference:*
- *Saving workload, time, costs and resources*
- *Shifting Responsibility (Accountability) to the Individual & Raising Standard*
- *Making meaning from the vast range of Data captured by schools and technologies*
- *Connecting people, resources & experiences.*

This is **all** about learners taking responsibility for themselves; their own learning, their own future, their own lives. It's:

- *On-Demand Access to PEOPLE (MSN says Fred is online, Facebook Recommends, LinkedIn suggests you join)*
- *On-Demand Access to CONTENT (Amazon's You Might Like [Amazon eBooks now outselling printed books], Twitter Hashtags, GoogleBooks, iTunesU, AppStore)*
- *On-Demand Access to TECHNOLOGY (Mobile/Handheld/Console/TV based Internet, Wireless/3G – not just dependent on kit bought with school IT budget, but using what people; students/staff/parents have already got)*

Web 3 is the bit that recognises that no two people or schools are the same and embraces that. In Teaching vocabulary it's the *Differentiation done for you*, to *allow learners to then steer their own Personalisation*, and **re-professionalising the Teaching Workforce** to focus on adding value rather than administering tasks. It's shifting the focus off the Technology (so that it becomes a vehicle/a utility) and shifts the focus instead onto LEARNING. The bit that's important. The bit that raises standards.

The Technology is at last catching up with the Pedagogy; becoming automated and democratic enough that it will allow us to re-focus back onto Pedagogy, Practice & Learning.

Interestingly, as we start to move out towards **Web 4**; connecting the connectedness, the significance of "Relevance" increases. All these separate Web 2 & 3 'activities' can seamlessly connect with each other.

For example, if you're a Learner, working towards Maths Syllabus B, as part of Class 10/Ma/1, aiming for a target Grade A, and you're finding Algebra tricky, you're likely to find "x" resource useful. So Web 4 uses your activity to recognise this and make that suggestion to you. Saving you time, and enabling you to focus on relevant Learning Support. This maximises time spent Learning, which leads to better Progression & increased Attainment.

We see this kind of usage of profiles & behaviours in the quality of Google+ Search Results already. Those of you who have seen "Shift Happens" or Michael Wesch's YouTube films will recall the message about "The Web is Us". Our activity generates information, and that information can be used to support our Future Activity more meaningfully.

In Education, put simply, this means that much of Teachers & Leaders time can be freed up. Re-professionalising the Teaching Workforce to be able to focus on Enabling Learning through Human Dialogue; Questioning, Supporting and Encouraging. Re-focusing back onto behaviours of pedagogy and practice.

This isn't about us (Teachers, Leaders, Researchers, Industry). It's about THEM – the Learners.

Our role is now shifting from Leading & Managing, to Facilitating & Supporting; described beautifully by RSA Animate's recent 'Changing Paradigm's in Education'.

Technology can be a driver in itself for educational reform; through its ability to Connect: People, Information, Experiences, Opportunities.

And that Connectedness is at the heart of where I believe we should be focusing our attention as we look to the future.

Consider the fact that Learners spend only 7/24 hours, 5/7 days, 39/52 weeks at school. That's just 15% of their time. However, Schools are 100% accountable for their Learning. So, what are the opportunities for engaging with the other 85% of those learner's lives? With the other people who influence that learner? With other resources that could help empower those other influences or leverage that 15% of time in school?

For example; **Assessment Data.** It's supposed to be Assessment **FOR LEARNING** to raise standards for learners. Yet, how many students & parents really understand assessments, what they mean and how they can use the information themselves to progress? All they need is accurate and up-to-date information, and relevant & usable resources to contextualise & support them further.
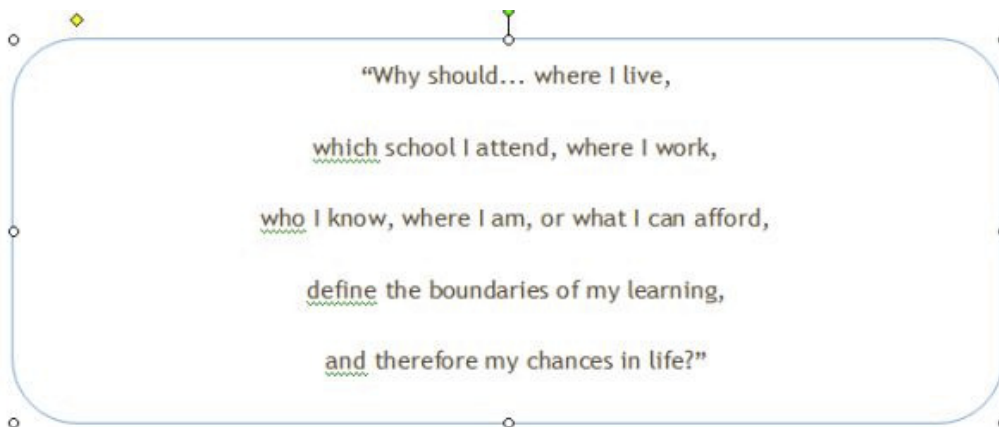
As seen in things like QR codes (bar codes that you zap with your phone to get to websites) offer quick & easy opportunities for parents to connect by mobile phone with data, resources, information & support to help their child at home.

I had the privilege of visiting Westfields Junior School recently, and they are using screen-audio-capture software for staff & students to make 3 minute films demonstrating Mathematics Strategies. These are then shared via libraries of resources on the school's Life Learning Cloud. This enables students to become more independent & self-help, and parents to be consistent with school practice. Both of which free-up teachers to "make more of a difference". Karine George; Westfields' Headteacher, has a vision for using Technology to value the professionals working in her school, encourage the independence of the learners to equip them with lifelong learning skills, and who is leveraging the connections between school and the rest of student's lives, to maximise their progression and attainment. It's little wonder that the school was recently held up as a shining example of excellence by Ofsted!

Action: Whatever your role in School or Supporting Schools:

1. *Think about how much Information your organisation has, and what the potential is for making this information more effectively used to support those it's meant for.*
2. *Think about how many people your organisation communicates with, and who you'd like to be able to communicate more effectively with beyond this.*
3. *Think about the technology you already have within your institution, but more importantly, how aware are you of what technology is used by those you work with beyond your institution – and how that usage connects back with your organisation.*

Why is all this important? Because of this Vision…

"Why should… where I live,

which school I attend, where I work,

who I know, where I am, or what I can afford,

define the boundaries of my learning,

and therefore my chances in life?"

It's a Vision that's as true for Learners as it is for Teachers, Parents, Advisers, Policy-Makers and any other Stakeholders.

Technology allows us to break free from traditional barriers, and access new opportunities.

The important bit isn't what you've got, whether that's technology, people, access to a good school or even the resources. It's not even about how you are using it.

It's about the Connectedness of all the separate parts of LEARNING, and using technology as a vehicle to make this long overdue aspiration into a reality.

- *Connecting data with supporting resources*
- *Connecting people together so that we can help each-other*
- *Connecting opportunities with relevance and context to our wider lives*

This moment in time is significant for the role of Technology in Education, because whilst we regularly hear about strategies for shifting practice through whole-school change management, teacher training & CPD, it actually goes much deeper than that:

Neuroscientific research has shown that London cab *drivers brains adapt to reflect the patterns of their frequent behaviour*; ie; navigating around routes and traffic. As these synaptic transfers adapt, the structure of the brain changes; parts of the brain become more dominant and shift how the brain cognates. In other words, the more London cab drivers whip round different routes the more effective and quicker they become at on-demand-cognitive-navigation; they're building up a particular kind of muscle memory, sub-consciously, as a direct response to their daily practices.

The neurological shift caused by repeated behaviours, permanently impacts the way that the brain works. Put simply; Muscle Memory.

As Nicholas Carr's recent book "The Internet is Changing the Way we Think" said when it hit the headlines a few months ago; people in our society whose behaviour is immersed in technology (ie; the Web Generation) may be finding that their

brains similarly are adapting and changing how they work. The Web Generation's lives are so immersed in technology, and the shift is so profound, that it's happening whether you/we/anyone else likes it or not!

Our challenge is that this is out of sync with traditional pedagogy & practice; teaching & learning, concepts of schooling and education.

The Key Point here is that without a change in practice, perhaps **using Technology as the catalyst or driver for educational reform**, we're not just going to become static in our standards and contributions to the economic workforce, we're actually becoming *less* likely to teach successfully using old and traditional methods of teaching. We can perhaps already see this in the various statistics that our government use for political purposes (eg; PISA).

Something to think about…

Fiona Aubrey-Smithcan be contacted at fiona.aubreysmith@uniServity.com. See also Twitter @FionaAS

RSS What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Privacy | Terms and Conditions
© Naace 2006 - 2011 | Naace Registered Charity Number: 1060683

Naace
The positive effect of Espresso Primary on outcomes and school resources

Author: Espresso

Summary of an independent evaluation completed by Don Passey, Senior Research Fellow, Department of Educational Research, Lancaster University.

A wide-ranging, independent academic evaluation into the efficacy and value of the Espresso digital service has been conducted. It consisted of in-depth teacher interviews, questionnaires and usage data from over 330 schools.

In total, 45 teacher interviews, survey responses from 338 teachers and analyses of usage and performance involving 337 school sets of data have been analysed. The size of this sample represents 4% of the total number of schools currently subscribing to Espresso. The key findings of this evaluation follow.

Teachers use Espresso resources to support teaching and learning widely

Teachers in the survey agreed that Espresso impacts on 19 learning measures. The ten measures of impact that rated the highest (80 to 100%) were associated with Espresso's key product qualities and reflect how Espresso was used by teachers in lessons.

The positive qualities of Espresso that were identified by teachers in the survey were: Espresso is a highly flexible resource; Espresso supports traditional subject?based teaching as well as thematic or topic?based approaches; Espresso supports the delivery of core subjects as well as humanities and languages; Espresso's resources are distinct – rich visually as well as in auditory terms, through video clip and imagery-based materials.
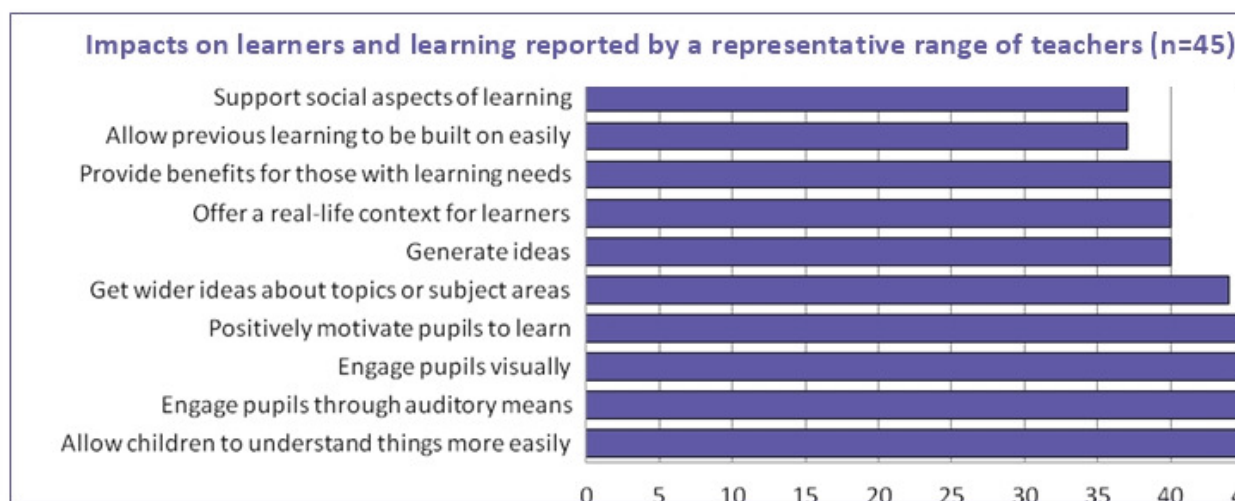
Espresso supports 'deeper and wider' learning

The evaluation shows that Espresso encourages children to think beyond the simple fact, generating interest, questioning and discussion, which deepens and widens the learning of concepts. This can give a child's learning additional meaning and value – it helps them to retain and recall their learning later.

The evaluation shows that Espresso resources impact in all five critical areas of learning that contribute to children's understanding, but impacts particularly strongly in three of the five: megacognitive, cognitive and social.

Megacognitive

Espresso provides a range of up-to-date, real and authentic material which is presented in a wide range of social and geographical contexts. It covers topics that are concerned with emotional and social issues as well as traditional subject topics. In this way, Espresso resources can support deeper and wider meaning to learning, allowing learners to think beyond the simple facts and, crucially, to link learning elements together so they can be transferred to other subjects.

Cognitive

Children approach learning in different ways. The wide range of the interactive resources in Espresso accommodates these differences. Teachers are able to provide activities that suit a wide range of learning approaches: visual, auditory, kinaesthetic, emotional, social, interpersonal, intrapersonal, musical, textual, mathematical and logical. Learning can lead

to longer term benefits when appropriate resources are matched to individual learning approaches; when matched, learning is retained and recalled more easily by the child for use later. Tools that match individual children's learning approaches to support their memorisation processes can support an effective preparation for tests.

Social - developing and using learning through social interactions

Cognitive - gaining knowledge, ideas and understanding

Metacognitive - learning how and knowing how to learn

Megacognitive - developing qualities associated with expert and deep learning

Societal - long term uses of education for societal purposes

Social

The resources in Espresso provide a platform for teachers and learners to interact in different direct and dynamic ways, including explaining, demonstrating, questioning and consolidating. In fact, the research shows that the level of impact is wider than any other resource evaluated by this senior researcher using a framework analysis. What this means for a child is that Espresso can enhance meaning to learning, encouraging the development of practices that are associated with expert thinkers and supporting the needs for emotional learners.

In summary, it is the range, combination and strength of megacognitive, cognitive and social learning that make Espresso unique.

> *"Resources often support certain areas of learning better than others. The width of learning aspects covered by a resource enable teachers and learners to engage more widely and in different ways with those resources. In this respect, Espresso offers the widest overall picture of a set of resources that I've ever evaluated."*
>
> *Don Passey, Senior Research Fellow, University of Lancaster*

Early use of Espresso is associated with higher attainment in the long-term

The evaluation shows that earlier use of Espresso is associated with higher levels of attainment in Key Stage 2 SATs. In these schools, Espresso was embedded into the school's long term plan so teachers were using Espresso resources more frequently from early ages, and, according to teacher responses, likely to be targeting support to children's learning. Use of Espresso supports wider and deeper learning; this can impact understanding and achievement when used over a period of time with children. Although frequency of use of Espresso is likely to be important for some learners, it is the pattern of usage over time that is associated with higher end and longer term results. Espresso offers teachers a variety of resources they can use to target support. It also provides activities to suit the starting point of the learner and the needs of the learner.

Using Espresso saves teachers time and represents a significant value to schools

Espresso saves teachers time – it's a fact. Espresso resources are presented in such a way that teachers find them with relative ease and are able to recognise the positive qualities that they offer. On average, it takes 6.85 minutes to find a resource on Espresso compared to 13.35 minutes to search, vet and assess a resource on the Internet. This saves 50% of a teacher's time and when applied across a school, this represents a significant reduction in lesson planning time. Furthermore, with the ability to access Espresso outside school, teachers have the flexibility and control to plan where and when it best fits in with their lifestyle and priorities.

Example 1: In an hour's PPA time, a teacher could find nine relevant resources on Espresso compared to 4.5 resources on the Internet.

Example 2: If a school has 16 teachers who each spend four hours per week looking for resources, this could benefit the school in time terms by 32 hours, which in value terms is £1,920 based on a teacher average hourly rate of £60.

A school will benefit greatly from teachers who re-gain their valuable professional and personal time to improve their work-life balance.

Summary

Espresso knows that teachers are motivated to help children of all abilities to learn, develop and grow. We, at Espresso, share that motivation and passion. As a result, we are delighted to have had our beliefs confirmed by this independent evaluation which demonstrates that well-planned, consistent use of Espresso can make a significant difference to learning
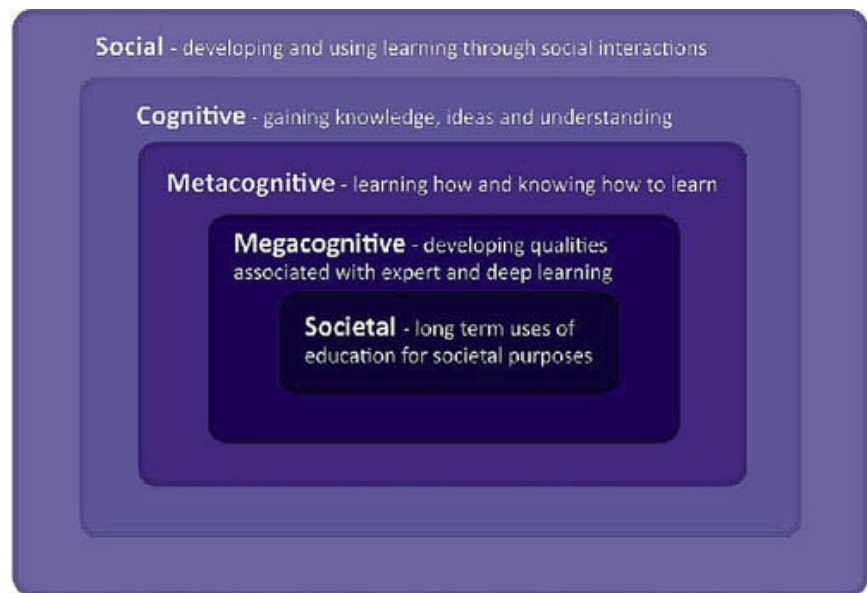
outcomes in your school. We hope that this summary leaves you with even more assurance that your investment in Espresso is an excellent decision – providing best value to teachers and pupils.

For the full report and executive summary please visit www.espresso.co.uk/research

Passey, D. (2011). Independent evaluation of the uses of Espresso online digital resources in primary schools. The report is authored by Don Passey, Senior Research Fellow, Department of Educational Research, Lancaster University.

RSS   What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Privacy | Terms and Conditions
© Naace 2006 - 2011 | Naace Registered Charity Number: 1060683

Naace
There's light at the end of the tunnel . . .

Thank you for editing the entry. This is how the edited entry will appear in the database.
Author: Bob Harrison

. . . but it may still turn out to be a train. Bob Harrison considers the changing landscape of schools ICT.

Just over two years ago the future for ICT in schools and colleges looked bright. There was the Harnessing Technology Strategy, a £200 million fund for schools to support implementation. There was Becta, a national agency to oversee that implementation, as well as provide guidance and support. And there was a £5 billion, 15 year capital train called Building Schools for the Future.

There was no better indicator of the seismic shifts in world of education ICT than RM's recent announcement of a 35% dip in profits and a round of redundancies. The technology firm had been one of the main beneficiaries of the last government's enthusiasm for school computers. Now, according to its chief executive Terry Sweeny, it sees the market as "challenging... and likely to remain so".

These results followed hard on the heels of the results of survey from the British Educational Suppliers Association. Encouragingly, this found that almost 50% of pupils use ICT for more than half their time in school. But, of the 1,300 schools it surveyed, "nearly two thirds will not be able to maintain planned ICT spending in 2012 following a squeeze on budgets".

And in midst of this gloom, there's been little in the way of clarity about what opportunities there'll be, or how best suppliers can access them. The Department for Education (DfE) have retained Becta's frameworks, and some of its key staff, admittedly. And in his review of schools capital Sebastian James suggested an on-line catalogue, or 'Groupon' approach to selling to schools. But this only served to highlight the contradictions inherent in the government's call for a 'schools know best' approach, even as it simultaneously demanded the sort of cost savings you can only get from aggregated procurements.

In a recent speech at the Policy Exchange thinktank, however, Dr Vanessa Pittard, a DfE staffer who was formerly Becta's director of policy and research, finally gave some hints of the way forward. Not only would Michael Gove soon be making another speech on technology (building, one presumes on the single paragraph on digital technologies inserted to his recent RSA speech). But, she said, there is also an embryonic DfE Technology Strategy in gestation – although, she stressed, "it will not be another Harnessing Technology Strategy", and will "not have a big budget, if any".

Given the general thrust of DfE policy, the areas Dr Pittard highlighted as the focus for the new strategy should come as little surprise. It'll be concerned firstly with how technology can enhance the quality of teaching; secondly, how value can be squeezed out of aggregated procurement; and thirdly on the need for schools to become "intelligent consumers" (that, presumably, means more effective buyers). A final strand of the policy will suggest ways in which schools should try to "future proof" their learning environments for technological advances.

This is certainly progress on the previous vacuum. But some commentators will feel this rather restricted and utilitarian view of the part technology can play in improving learning, teaching and assessment is unlikely to deliver a true return on the large investment schools continue make in ICT.

The good news for suppliers, though, is that the pipeline of new academies, free schools and University Technical Colleges will all need to invest significantly in digital technologies. But if the government wants to encourage the market further, it will need to persuade us that the new DfE ICT policy will encourage head teachers to prioritise their ICT spending – and that Michael Gove's words at the RSA are a sign that the government is at last listening.

And there are other questions that only the market itself can answer. Can it provide more robust evidence, to support the contention that effective use of ICT improves learning and raises standards? Will the "consumerisation" of ICT in education mean radical changes to procurement and use? Will the emergence of blended learning achieve the nirvana of increased standards with reduced resources?

So the future of government policy for ICT in schools remains unclear. But one point of absolute clarity is the growing expectations of pupils, parents, and employers. That'll mean increasing pressure on the pedagogy in schools and colleges – whether government ministers like it or not.

Also encouragingly, the 13 new UTCs announced on 10 October include three which specialise in Digital Technologies and IT. One, the Nottingham University Technical College, which will open in 2013, is a partnership between Nottingham University, Djanogly City Academy and my own company, Toshiba

Bob Harrison is a former teacher and principal. He is currently an education advisor to Toshiba Information Systems, a consultant at the National College and a school and college governor. He can be contacted at www.setuk.co.uk .

Aknowledgement - this article first appeared in Education Investor magazine, 2011

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Naace
Trainee teachers' engagement in a cross-curricular news project: impact on professional identity

Author: Pete Bradshaw, Head of Qualification, Masters in Education, Open University and Sarah Younie, Principal Lecturer, De Montfort University

On 7th September at BERA, the above ITTE members presented the findings from their ITTE evaluation project, funded by the TDA into the impact of the BBC News School Report project on trainee teachers.

In short, the project found that the professional identity of trainee teachers, is, in part, defined by their relationship to those who mentor and tutor them. As teachers in training they are in a role with less power than those who are responsible for their training, support and development.

The ITTE evaluation focused on the impact of trainee teachers' engagement in the BBC News School Report project and how this helped to form their professional identity. This was examined through the roles taken by trainee teachers in the project while on placement in schools, the activities they were consequently engaged in and the types of evidence generated for their assessment against the Standards for Qualified Teachers in England.

The evaluation of the project for Training and Development Agency for Schools (TDA), the government agency responsible for teacher training in England, involved the following instruments of data collection - surveys, focus groups and written reports. Respondents included trainee teachers themselves, their tutors as representatives of teacher education providers and their mentors as representatives of schools in which they were placed. The methodological approach was interpretative and phenomenological with qualitative and quantitative data being analysed for emergent themes.

The paper presented at BERA focused on one of the themes found, that of the impact on the professional identity of trainee teachers exposed to taking up leadership roles. The research showed that their professional identity is enhanced through their being in a leading role in respect of curriculum and working with other staff. Their self perception of role was modified to one in which they saw themselves, and were seen, as equals to qualified staff rather than subservient or dependent on them. Furthermore, engagement in such projects led them to collecting richer, more holistic evidence for meeting the Standards as they took greater ownership for this process, situating it in their leading role in the project. Their identity became defined less by the articulation of Standards and by their relationship to others and more by their own notions of professionalism. A new more equal power relationship developed as they take on responsibility for the project.

Project outline

The BBC News School Report is an annual project which aims to engage 11-14 year olds with news by helping them to set their own editorial agenda for a real audience (BBC, 2011a). Resources, including six lesson plans explaining the basics of journalism, are available on the School Report website1. Schools taking part work towards a national deadline on the news day in March. On this day all the secondary schools involved became broadcasters and simultaneously publish video, audio or text-based news on their school websites. The BBC News School Report site links all the school sites together using an interactive map, and all BBC platforms – including Radio 4, BBC 1, BBC News 24 and regional news and radio – feature samples of students' work from around the country, driving a real audience to all of the work featured on the BBC site. In 2008 nearly 300 schools participated (ITTE, 2009). By 2011 this had risen to over 800 (BBC, 2011b).

The 2010/11 academic year was the fourth in which the TDA worked with the BBC on News School Report and provided funding to ITT providers to support their engagement with it. This funding was to enable working across the partnership and to provide assistant teachers access to training by the BBC. This was necessary as the normal BBC project model was that a school would take part (independently of other schools and HEIs) and in doing so the BBC had a lead teacher named in each of the participating schools.

For the ITE provider, however, engagement in the project meant there was a more complex interaction between stakeholders. Providers themselves liaised both with the BBC and with the schools in which participant assistant teachers were placed. The lead teacher contact for the BBC in a school was, in some cases, the assistant teacher. This resulted in a complex set of stakeholders in the use of the project in ITE – assistant teachers, schools, providers, students in schools, BBC, TDA.

Findings from the case study schools

School A

The ITT model at school A was an employment-based graduate teacher programme. Assistant teachers were placed at the school for the majority of their training year. The project co-ordinator was a newly qualified teacher (NQT) who had been a

GTP assistant teacher the year before and participated in the BBC NSRP as a assistant teacher. The NQT was an English teacher and she used her English class as the participants in the project this year. The pupils participating were one Year 9 English class who had three days off timetable for the project:

- Day 1 was a 'workshop' day. Three workshops were delivered by the assistant teachers, focusing on the skills required for the live day.
- Day 2 was a 'practice' day, where the pupils rehearsed in preparation for the 'live' day event.
- Day 3 was the 'live' day event, with news reported live on the day and uploaded onto the website.

All the assistant teachers in School A reported that they noted an improvement in their relationship with pupils as a result of being involved in the project. This had already taken effect prior to the live day due to their involvement in the workshops. They attributed this to extracurricular nature of the project, the situation requiring a more open approach to the pupils and the pupils' positive response to the challenge of the demanding situation. They all reported an increased respect for the assistant teachers from the pupils.

Assistant teachers reported that they felt more confident in using a variety of approaches and teaching styles as a result of being involved in this project. They felt more free to take risks in their approach and have fun. The assistant teachers reported that they became more relaxed and confident in their teaching as a result of their involvement with the project.

The drama assistant teacher reported that she felt much more confident in taking pupils out of school when she observed the improvement in their behaviour on a trip out to the local BBC radio station. She felt much more able to trust the pupils, having been very under confident about how she would manage the pupils before they went.

The school mentors reported that the assistant teachers "...gained confidence through peer observation, feedback and risk taking. Trainees see each other teaching and value what they see. This improves [assistant teachers] confidence when hearing the feedback. [As a result of team teaching in the workshops] 'them' and 'us' barriers [between assistant teachers and mentors] were broken down."

School B

The ITT model at school B was assistant teachers taking a PGCE qualification placed at the school by an HEI provider. This was their main placement and they had been in another school when the project was initially launched. The assistant teachers were English specialists with concomitant foci on English, drama and media as part of their training and their teaching practice. The project co-ordinator was the media studies lead teacher in the school, who also had a background in broadcast media.

The mentor had arranged for the assistant teachers to take part in the BBC NSRP assisting the lead teacher in working with a small number of selected pupils. The project was focused on in depth work with a few year 9 pupils to produce high quality output. This was done as an extra-curricular activity.

Assistant teachers in School B reported that it was useful to work with pupils they didn't teach. This was reinforced by the mentor and lead teacher. The mentor also added that where there were pupils on the project who were also in classes taught by assistant teachers it was useful for them to see each other in a different context. In particular, the mentor observed that pupils who were difficult in class responded better to the assistant teachers as they had seen them in a different context. The case of a boy who shone in the project but was not easy to teach in the classroom was cited. "He would see the assistant teachers in a different light", the mentor said. Assistant teachers, however, reported that they had not learnt anything about working with difficult pupils as they "had them in their classes". Assistant teachers had been in other schools before the project started and had been involved in other extra-curricular activities. They confirmed that this type of activity brings the benefit of working with a wider range of pupils.

The assistant teachers in School B only had regular contact with one teacher (the lead). They also got to know a governor through the project but it did not involve any additional interactions with the school leadership. They saw that the experience would be seen positively on job applications/CVs and they would be willing to take a lead in it. They saw its importance in providing experience of learning in a project that was extra curricular, national, fun and had a product at the end.

"Any school leadership team should look on a teachers' involvement in the project as a very positive thing" (pre questionnaire).

The mentor concurred with this view, adding that through such extra-curricular experience, pupils see them in a different light. It was also seen as preparation for the assistant teachers' involvement in other extra-curricular events – trips, open evening. This was seen as helping them to meet the standards for QTS. The mentor said that it "Help[ed] us to view them as part of the department" and that, as NQTs they will be able to "take the lead in running" the BBC NRSP.

Working on the project was seen as "provid[ing] evidence that they have worked in wider school activities [and of] linking into wider world and other subjects". This was seen as crucial for the standards. It was also felt by the mentor that working on the project makes assistant teachers feel valued and valuable to the department and school and that assistant teachers often have more flexibility (if not more time) to take part in such projects than teachers.

School C

The ITT model at school A was school-based GTP. Assistant teachers were placed at the school for the majority of their training year. The assistant teachers were English specialists with concomitant foci on English, drama and media as part of their training year. The project co-ordinator had previously been a assistant teacher at the school who had taken part in the BBC NRSP. This was a third year in which this 'cascade' model had operated with assistant teachers from previous years being appointed and then co-ordinating the project with new assistant teachers. The assistant teachers had responsibility for leading the project.

The project was run as an extra-curricular activity with assistant teachers and pupils working on it in school and in the adjacent City Learning Centre. One of the assistant teachers had previous experience of working in the broadcast media. Assistant teachers chose the class to work on the project and they had a whole day to prepare, extra curriculum time and then the live news day. Pupils involved in the project ranged from year 7 to year 9.

Assistant teachers in School C reported that the project gave them an opportunity to think about matching media resources to pupil needs in a way that was not dictated to by the formal curriculum. The mentor reported that there were different interactions with the pupils on the project than in normal classes. These were to do with working with small groups (which one assistant teacher had previous experience of as she had previously been employed as a learning support assistant in the school).

Links were made with the City Learning Centre and local media organisations. This was seen as both a benefit for the authentic learning in the project – the links were with real journalists and a video company – and also for the school itself as a stakeholder in the local community.

A assistant teacher reported that the project gave the opportunity to "raise my profile" with these partners and, by extension, with colleagues in the department who saw her taking a lead and using her own initiative to make links outside of school. She had been given an opportunity for making these links and the responsibility for doing it. These opportunities were not ones that would have occurred without the project. Being involved in the project "puts [trainees] on the map" and was something that was noticed by the headteacher who reported their work to the whole school.

The mentor concurred that the project provided opportunities for assistant teachers to "take control" rather than being handed tasks to do. It also allowed the assistant teacher who had professional media experience to translate this to the school context. In talking about the project and the way in which assistant teachers were perceived by the school leadership, the mentor said that "the headteacher was more aware of who they were and their progress [than of other graduate trainees] because of it". Assistant teachers worked with "people they wouldn't normally have [had] contact with" including ASTs and the leader of applied learning. A mathematics teacher used the material produced in a tutor period as it was so impressive.

The school has an activities fortnight at the end of the school year. Assistant teachers would be able to bring the experiences of the project to helping plan and lead activities in the department and across the curriculum.

Concluding remarks

Throughout the three years of research into the involvement of ITE providers in the BBC NSRP, the value of the project to both the formal curriculum of assessment for QTS and the development of professional identity, has emerged as a significant finding. This has been achieved for a very small input of supporting funds from the TDA. Such support is no longer available perhaps reflecting a more focused budget on core ITE activity. It is the authors' contention that given the benefits found in the research such a move is regrettable.

If teachers in training are given roles of responsibility in such projects then their self-perception of role is modified to one in which they see themselves, and are seen, as equals to qualified staff rather than subservient or dependent on them. Furthermore, engagement in such projects leads to them collecting richer, more holistic evidence for meeting the Standards as they take greater ownership for this process, situating it in their leading role in the project. Their identity becomes defined less by the articulation of Standards and by their relationship to others and more by their own notions of professionalism.

Acknowledgements

project in ITE from 2009-2011. The research team over the three years has included; Pete Bradshaw, Karen Cameron, Helena Gillespie and Sarah Younie. The full reports are available to read on the ITTE website.

Dr Pete Bradshaw can be contacted at prb324@openmail.open.ac.uk and Dr Sarah Younie at syounie@dmu.ac.uk

References

ITTE, (2011), A case study examination of the BBC News School Report project in Initial Teacher Education across three sites. London: Training and Development Agency.

ITTE, (2010), An evaluation of the BBC news school report project in initial teacher education. London: Training and Development Agency for Schools.

ITTE, (2009), An evaluation of the use of the BBC News School Report project in initial teacher education. London: Training and Development Agency for Schools.

RSS What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Privacy | Terms and Conditions

Naace
Westminster Education Forum "The future of technology in education"

Author: Bob Harrison

There was a slightly frenzied feel to the Westminster Education Forum on "The future of technology in education". About 150 policy makers met with interested parties in the education sector to try and bring clarity to the confusion surrounding the procurement and effective use of digital technologies in schools and colleges since the demise of government ICT agency BECTA, the abandonment of the Harnessing Technology Strategy and £100 million raid on schools' own grants for ICT.

The somewhat intense nature of the event was due to the many speakers and panellists who were invited to stimulate the delegates and discussion in five-minute 'provocations'. There was a lot of ground to cover in a relatively short time.

The strategic issues of the importance of technology in schools was tackled in the first part of the morning before moving on to the role of digital technology in assessment after coffee, and finally "Skills and challenges for the future". It was an ambitious aim for the forum but with skillful chairing by Lord Jim Knight, the former schools minister and political powerhouse behind many advances in the use of technology for learning in schools (now also a consultant for Apple Inc and TSL Education), and the discipline of the presenters, the forum covered a tremendous amount of ground.

One of the strengths of Westminster Education Forum events is the "punchy" style followed by detailed transcripts, which provide and opportunity for a more detailed and reflective examination of the issues.

Interestingly this event came fast on the heels of a joint Policy Exchange/Naace "think tank" which suggests that education ministers are beginning to acknowledge they may have got it wrong on the issue of ICT in schools (see "Policy Exchange agrees Government 'mistaken' on ICT" http://www.agent4change.net/ict-policy/government-strategy/1179). And several mentions of a forthcoming "embryonic" Department for Education (DfE) technology strategy which will focus on the use of technology to improve the quality of teaching, savings to be made through aggregated procurement and proposals that schools should become more "intelligent consumers".

Whether this will fully exploit the potential that digital technologies present for learning and improved levels of achievement and attainment remains to be seen. We were told that it will have to be one of the issues subjected to a "more detailed and reflective examination of the issues" by all involved, including education ministers and DfE officials. (You have to wonder whether the assessors will include the DfE's own 'tweeter', challenged by humble calculators, who posted the following comment on Twitter: "educationgovuk Interesting article in the Washington Post on technology in the classroom wapo.st/qMyC1t To some of us the calculators look v hi-tech".)

One thing which emerged from this stimulating and relevant event is the desperate need for headteachers, governors, teachers and local authorities ("schools know best" according to schools minister Nick Gibb) to get the support and advice they need to help schools ensure our children are prepared for the digital world of the third millennium.

It was no coincidence that the strongest contributions to the forum came from educators steeped in pedagogy and learning. Open University senior lecturer Dr Peter Twining, who is director of one of the government's best kept secrets for supporting teaching, the Vital support and development service, queried the increasingly common assertion that teaching is simply a "craft" and that the professionalism of teachers and their understanding of pedagogy are extremely important.

"And I suspect we've moved to an era of where the last Government and maybe the Government before started to turn teaching into a craft, a trade; you know, we talk about teacher training these days, not teacher education," he added. "We've removed an awful lot of the underpinning theory about learning and about philosophy, education, from initial teacher education and we've replaced it with how do you teach synthetic phonics and how to deliver a literacy strategy and we're left with people who've come out beautifully trained to deliver certain styles of pedagogy but who actually don't have the underpinning knowledge to be able to adapt when things change. "I think there's a real danger for us in moving to a model of talking about teaching as being a craft and we really need to be very careful about maintaining professionalism."

His words were music to the ears of one of the best school leaders of the emerging generation of school leaders, Dr Neil Hopkin, executive headteacher of Rosendale Primary School, West Dulwich, and Christ Church CE Primary School, Brixton. He welcomed the stress on pedagogy and gave a grave warning on the negative effect on ICT for learning posed by the new curriculum. "I think that there's a real danger here of what's happening with the new curriculum which will be with us soon... to a certain extent, as you've just mentioned, ICT [and] new technology have disappeared off the radar and let's be

absolutely pragmatic about this from a school leaders' perspective.

"If you're publishing league tables and measuring various different A* to C's or key stage 2 results or whatever it might be, these teachers are human and they're not fools. They will ensure that their schools do well according to league tables, that's simply what will happen and to believe otherwise or to be altruistic is to be too naive. So the reality is, if new technology and ICT has disappeared or is disappearing off the curricula radar, all articulated very nicely about it being very embedded, you go to loads of schools up and down the country and see how embedded it is – absolutely not at all.

"If it's not measured, if it's not going to be an explicit part of the curriculum in the same way, let me tell you folks, it won't happen and what will happen is over the course of, I would predict say three or four years, you will find that the investment of intellectual time and CPD time, the monitoring time, the leadership teams of schools put into these kind of subjects to ensure that other subjects are being delivered through new technologies won't happen.

"And we will find ourselves in three to four years, I'm very worried, we will find ourselves at a country that has fallen a long way off the boil in terms of new technologies. The people in this room are those that need to lobby and agitate for that not to happen, it will be a disaster for us, I can see it coming, I can see it coming."

Such a warning, from such an educator, underlines the increasing and urgent need for strategic leadership of ICT as support mechanisms previously enjoyed melt away.

Bob Harrison is Education Adviser, Toshiba Information Systems (UK) Ltd and Consultant, National College for Leadership of Schools and Children's Services He can be contacted at BobharrisonSET@aol.com

Links:
EXite (Exploiting Information Technology in Education): http://www.exite.org.uk

Vital: http://www.vital.ac.uk

Westminster Education Forum:
http://www.westminsterforumprojects.co.uk/forum/index.php?fid=westminster_education_forum

RSS   What is RSS?

SPECIAL TOOLS

My Profile
Change password
Add article to CMS
Moderate articles in the
CMS
Resource finder
Advancing Education
Computer Education
Naace Communities
Naace CPD
Naace Knowledge
Conference Networking
ICTCPD4Free

Naace
PO Box 6511
Nottingham
NG11 8TN
Phone: 0115 945 7235
Fax: 0870 241 4115
Email: office@naace.co.uk

Privacy | Terms and Conditions
© Naace 2006 - 2011 | Naace Registered Charity Number: 1060683