Innovative Performance and Virtual Portfolios - a tale of two projects

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Abstract
It has become increasingly evident over the last few years that a number of pressures have combined to reduce learners' innovative performance at GCSE in design and technology. 'Playing safe' with tightly teacher-managed projects has been seen to be a formula for schools guaranteed A-C pass rates. The first research project described here outlines an approach developed in TERU at Goldsmiths College to shift the balance of assessment in favour of learners who can demonstrate innovative, risk-taking performance. At the successful conclusion of this first project, we were invited to explore the extent to which the approach we had developed could be made to work with digital tools and result in *virtual* portfolios. This second project 'e-scape' is now in a second phase of development and will result in school trials in June and July 2006. It has profound messages for the future not only of design and technology, but also of performance assessment more generally.

Key words
assessment, innovation, risk-taking, virtual portfolios, e-scape

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A. Identified shortcomings in design and technology

In 1999, the latest version the National Curriculum (NC) was published, including the most recent formulation for design and technology. One of the welcome additions to each of the subject areas for NC2000 was the articulation of 'importance' statements, in which the vision of subjects is encapsulated. The Statement for design and technology reads as follows:

> ***The importance of design and technology***
> *Design and technology prepares pupils to participate in tomorrow's rapidly changing technologies. They learn to think and intervene creatively to improve quality of life. The subject calls for pupils to become autonomous and creative problem solvers, as individuals and members of a team. They must look for needs, wants and opportunities and respond to them by developing a range of ideas and making products and systems. They combine practical skills with an understanding of aesthetics, social and environmental issues, function and industrial practices. As they do so, they reflect on and evaluate present and past design and technology, its uses and effects. Through design and technology, all pupils can become discriminating and informed users of products, and become innovators.*
> *(DfEE 1999 p15)*

At the time of publication, the DfEE, in concert with the Design and Technology Association (DATA) established a Strategy Group for design and technology, charged with the task of steering the subject through the following years. The group undertook a number of development tasks, including an externally commissioned review of the literature concerning the impact of design and technology and a review of new technologies that might be encouraged to support the growth of design and technology in the immediate future. One task - undertaken by members of the group itself - was to review the internal coherence of design and technology as presented in NC2000, with particular regard to the match between the vision statement the Programmes of Study (PoS) and the Attainment Target (AT).

It was noted that the vision statement encapsulates the need for creativity, innovation and teamwork in design and technology.

- 'intervene creatively'
- 'creative problem solvers'
- 'members of a team'
- 'become innovators'

It was also noted that whilst the PoS is less clear on these points, there is at least an implicit recognition of their importance and the scope or flexibility to interpret these imperatives into school curricula. However it was noted that the Attainment Target is starkly bereft of any reference to, or recognition of, these key factors.

Beyond NC requirements, related problems were evident with GCSE assessments, partly through the syllabus specifications themselves (which lack reference to innovation, creativity and teamwork), and partly, inadvertently, through the impact of 'league-tables'. Teachers, departments and schools are now almost as dependent upon the GCSE results as are their learners, and a typical response in schools is that teachers impose ever-more rigid formulas on student project portfolios to guarantee success. The concern of the DfES Strategy Group was that as GCSE project work portfolios become more formulaic, innovative learners may be penalised by comparison with well organised, rule-following learners. This has the result that, in relation to the design and technology vision statement, the wrong learners (or at least some of the wrong learners) are rewarded with the best grades in GCSE assessments.

B. The problem of portfolios

The concept of a 'portfolio' is problematic, arising in part from the fact that the term portfolio means very different things to different people.

Through custom and practice in design and technology it is possible to observe several forms of what a portfolio might be.

i) The most common meanings of 'portfolio' defines it as something akin to a box-file into which the learner (probably guided by the teacher) can place work to demonstrate that certain operations, or skills, or processes have been experienced. Viewed in assessment terms, the learner's portfolio becomes a collection of evidence that is then judged against some rubric to arrive at a mark or a level. A portfolio of this kind is conceived as little more than a ***container*** for evidence.

ii) A somewhat more sophisticated view of portfolio arises from process-rich areas of the curriculum, where teachers encourage students to document the story of a developing project or experience. This results in learners ***reporting*** what they have done at various points in the process.

In this kind of 'presenting' or 'reporting' portfolio, it is not unusual for students to use linear digital presentation technologies, e.g., PowerPoint, to give a blow by blow account of where they have been in the project, and how they finally got to the end.

However, whilst these two accounts might be seen as part of the picture, neither of them captures the dynamic capability dimension that informs our view of a design and technology portfolio.

The central problem, in both cases, is that the portfolio construction is conceived as a second-hand activity. First you do the activity, whatever it is, and then afterwards you construct a portfolio that somehow documents it. The portfolio is a backward-looking reflection on the experience.

iii) A third and far richer view of the concept of the portfolio is evidenced in schools (particularly in design and technology) where the portfolio grows dynamically with the project - and in the process it shapes and pushes forward the project. The best analogy is neither a *container* nor a *reported* story, but is rather a ***dialogue***. The designer is having a conversation with him/herself through the medium of the portfolio. So it has ideas that pop up but may appear to go nowhere - and it has good ideas that emerge from somewhere and grow into part solutions - and it has thoughts arising from others comments and reflections on the ideas. Any of these thoughts and ideas may arise from procedural prompts that are deliberately located in the activity to lubricate the dialogue. Looking in on this form of portfolio is closer to looking inside the head of the learner – revealing more of what they are thinking and feeling, and witnessing the live real-time struggle to resolve the issues that surround and make up the task. Importantly, this dynamic version of the portfolio does not place an unreal post-activity burden on learners to reconstruct a sanitised account of the process. Creative learners are particularly

resistant to what they see as such unnecessary and unconnected tasks, and this significantly accounts for their underperformance in portfolio assessments that demand such post-hoc story telling.

But real-time dynamic portfolios are not tidy, nor is it possible to present them in a pre-determined PowerPoint template. It is more like a designer's sketchbook: full of notes and jotting, sketches, ideas, thoughts, images, recordings and clippings. These manifestations are not random, but are tuned to the challenge of resolving the task in hand. And the point of the portfolio is that the process of working on it shapes and develops the activity and the emerging solution.

Our three categories of portfolio are somewhat dissimilar to those identified by Ridgway, McCusker and Pead for Nesta Futurelab in their literature review of e-portfolios.

There are three distinct uses for portfolios:
- *The first is to provide a repository for student work*
- *The second is to provide a stimulus for reflective activity – which might involve reflection by the student, and critical and creative input from peers and tutors*
- *The third is as showcase, which might be selected by the student to represent their 'best work' (as in an artist's portfolio) or to show that the student has satisfied some externally defined criteria, as in some teacher accreditation systems (e.g. Schulman 1998).*

(Nesta-Futurelab 2005 p4)

Whilst their first category is the same as ours, their third seems to be little more than an extension of this, allowing for the repository to contain work selected over time and used, inter alia, for assessment purposes. It is a container with some display potential. Furthermore, whilst their second category contains some elements of *dialogue* potential, it does not capture the dynamic creative essence of portfolios as we see them operating in design and technology.

These disagreements demonstrate the thorny territory that is conjured-up merely by the use of the term *e-portfolio*. We are very conscious of this issues and it demonstrates the absolute necessity of being very clear about what is proposed within Phase 2 of project e-scape.

C. DfES project 'assessing design innovation'
The problem being addressed by the Design and Technology Strategy Group was that assessment pressures, linked to the publication of league tables, have distorted the nature of the D&T portfolio. Essentially, in order to ensure success for learners, teachers have increasingly shifted from the dynamic 'dialogue' notion of portfolio to the more passive 'reporting' form that is easier to control and present neatly. Teachers have felt obliged to control the portfolio to maximise students' opportunity for getting marks.

The Strategy Group recommended that research be undertaken to examine the extent to which, and the ways in which, innovation and team work might be more fully recognised and rewarded in assessment processes, particularly within GCSE. The Technology Education Research Unit (TERU) at Goldsmiths College was asked to undertake the work and develop a system of assessment that would measure and reward design innovators. The project was launched in January 2003 and concluded in December 2004. The thrust of our work arising from this brief has been to reinvigorate a view of portfolio assessment that transforms it back into dynamic dialogue mode.

The principal outcome of the project was a developed portfolio assessment system that sat somewhere between a formal examination and a piece of coursework. It was designed to operate in six hours - typically two mornings - and presented learners with a design task that was to be taken through to a prototype.

The following structure is characteristic of the activities developed. The task ('light fantastic') centres on re-design of a light-bulb packaging box, so that, once the bulb is taken out for use, the package/box can be transformed into a

lighting feature, either by itself or in association with other 'liberated' light-bulb package/boxes.

(i) Read the task to the group and (through brief Q&A) establish what is involved.
(ii) Explore a series of 'idea-objects' on an 'inspiration table' and in a handling collection designed to promote ideas about how boxes/packages/containers might transform into other forms and functions.
(iii) Put down first ideas in a designated box in the booklet.
(iv) Working in groups of three, learners swap their booklets and each team-mate adds ideas to the original.
(v) Team-mates swap again so that each team member has the ideas of the other two members.
(vi) Booklets return to their 'owner' and team members discuss the ideas generated.
(vii) The teacher introduces the modelling/resource kit that can be used throughout the two mornings.
(viii) Learners develop their ideas in the booklet, and/or through modelling with the resources.
(ix) Learners stop to reflect on the user of the end product and on the context of use, before continuing with development.
(x) At intervals, learners are asked to pause and throw a dice with questions on each face. The questions focus on procedural understanding, e.g. 'How would your ideas change if you had to make 100?' and learners answer the questions in their booklet.
(xi) Photographs are used at approx one hour intervals to develop a visual story line to illustrate the evolution of models and prototypes.
(xii) At the end of the first morning, learners and their team members reflect on the strengths and weaknesses of their evolving ideas.
(xiii) The second morning starts with a celebration of the work emerging from day one. This is based on Post-it labels that highlight learners' thoughts about the qualities in their ideas.
(xiv) Further prototype development.
(xv) Regular hourly photos and pauses for reflective thought on strengths and weaknesses.
(xvi) Final team reflections, when (in turn) team members review each others' ideas and progress.
(xvii) Individually, learners then 'fast-forward' their idea illustrating what the product will look like when completely finished and set-up in context.
(xviii) Learners finally review their work from start to finish.

All the learners' work was structured into an A4 workbook that folded out to become an A2 sheet. The activity was designed to be administered by teachers in ordinary design and technology facilities. The workbooks were carefully designed to unfold throughout the activity, ensuring that students always had sight of the instructions for the sub task they were currently working on and the work they had just completed.

Figures 1 and 2 show two learner booklets. The first is for 'Your name in lights' and the photo storyline demonstrates the progress of the ideas from inception to final prototype. It is clear that the strength of this idea emerges predominantly through the medium of 3D modelling. The second booklet illustrates a student who is equally comfortable with developing ideas through drawings and with 3D modelling. In both cases, the booklet allows us to 'see' their very different modes of working in operation.

The concept here was for light-bulb packaging to become pentagonal and tapering, allowing 'used' boxes to build into a spherical lighting feature that – when illuminated by a light at the centre - projected letters around the wall. The learner's strap-line for it was 'Your name in lights'.

In this case the learner developed his prototype using a combination of graphic modelling and 3D modelling, supported by a considerable amount of reflective comments and critique.

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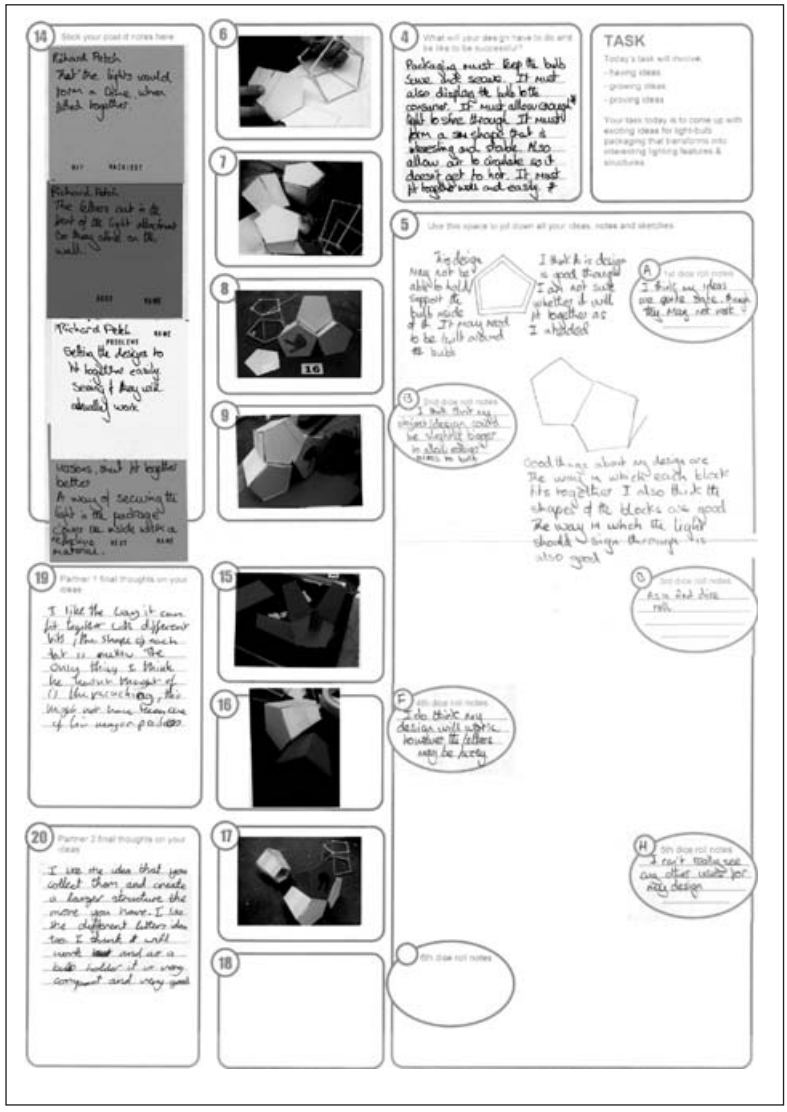

Figure 1a: 'Your name in lights' learner booklet

Figure 1b: Some initial prototypes

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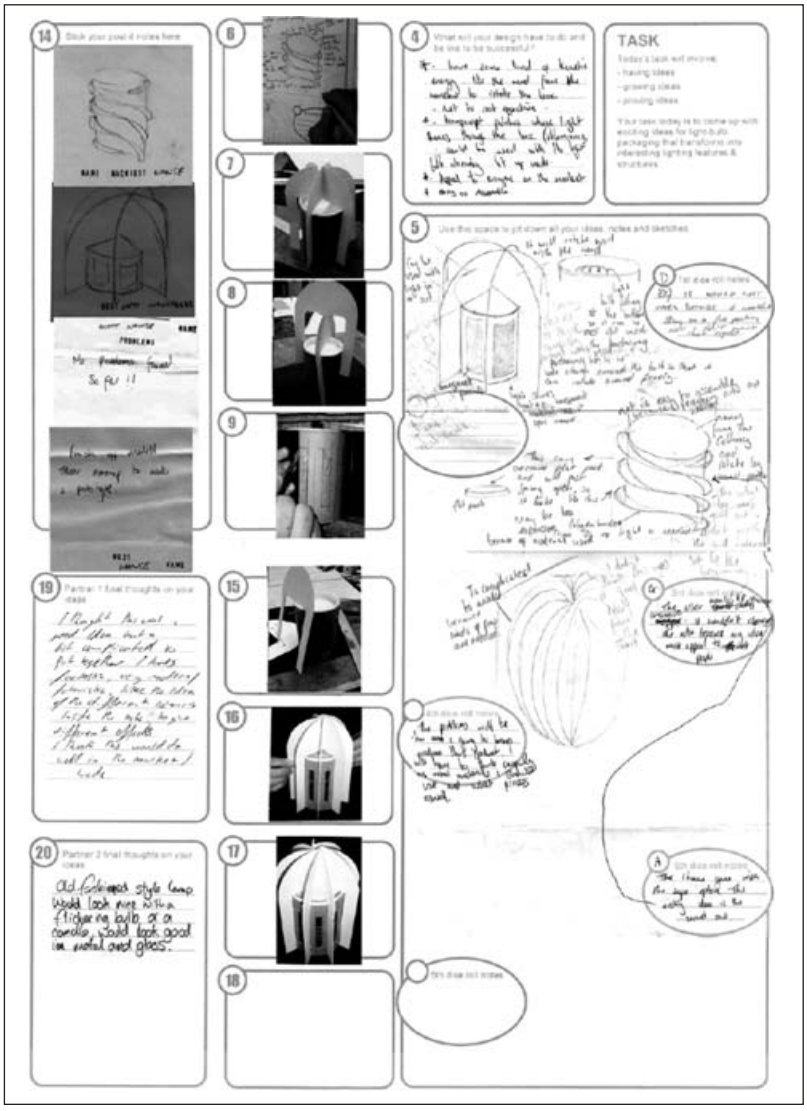

Figure 2: Learner booklet showing drawings and 3D modelling

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The outcome of learners' work during this project was most encouraging. It was possible to demonstrate that different levels of innovation were identifiable in the work and that the best work was highly innovative. Critically, the consensus of teachers and learners was that the portfolio system acted as a dynamic force to drive the activity forward with pace and purpose. A second round of trialling was undertaken in association with the four Awarding Bodies for England and Wales. This involved eight schools and approx 300 learners, all of whom did two activities. The data from this trial is fully reported in the project report (Kimbell et al 2004).

In the process of working on this project, we were able to identify other features of the portfolio, or of the setting within which it works, that significantly impact on its effectiveness. And the key one is the learning and teaching culture created by the teacher in the workshops and studios in which learners operate. This culture in turn influences each of the following features:

• ***Motivation***
For learners to be fully engaged and performing at their best requires levels of motivation that in design and technology at GCSE level must be maintained over an extended period (typically six months). Our six-hour activity was equally dependent upon generating enthusiasm for the task and we used a number of techniques to generate and maintain it.

• ***Ownership***
Who is the portfolio seen to belong to? Is it the learner's, teacher's, department's, or the GCSE Awarding Body's? Learners' sense of ownership of the work is typically a pre-requisite for fully engaged performance.

• ***Environment***
For dynamic creative work to be generated by learners, the environment must be one in which the working atmosphere in conducive to those values. In terms of our project, this required teachers to be open not just to learners' ideas but also very flexible in how they encouraged learners to express and develop them.

• ***Ideas***
At the heart of dynamic creative portfolios are ***ideas***. We were explicit in encouraging learners to *have* ideas, to *grow* their ideas and to *prove* their ideas. Equally we encouraged teachers to facilities these features of learners' performance. The project 'assessing design innovation' was completed in the autumn of 2004 and reported to DfES /QCA in Dec 2004. However, at the time of reporting, we were becoming increasingly aware of the impact of digital technologies on learning, on design and technology, and on our assessment activities in particular.

D. E-learning
The present government has embarked on a major programme to digitise many of the activities and services it offers, driven by (among other things) the promise of greater control, improved efficiencies, cost savings and better standards of service. This focus on developing new ICT systems straddles many aspects of government from (e.g.) taxation, registration, legislation, communication, health and education.

These initiatives have developed as largely isolated programmes and we have now reached a point where it has become clear that there is a pressing need to, and significant additional benefits to be gained from, joining these systems up. An obvious common denominator to facilitate a more connected approach is the individual citizen and recent e-government proposals anticipate binding existing systems together through new bridging services such as personalised e-learning systems and e-identity cards.

E-learning is a term that has emerged to describe a wide range of digitally enhanced educational experiences; from a straightforward internet search or the completion of a simple screen-based multiple choice question, to full blown multimedia managed learning environments providing access to complete courses.

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With the new focus on joining up e-services, e-learning has gained an additional, longitudinal dimension through the proposal to provide 'personal online learning spaces'. Interestingly, this requirement is identified not just by the DfES but comes as part of an overarching policy direction from the Prime Minster's Strategy Unit. In a document entitled 'Connecting the UK: the Digital Strategy', Action 1 is defined as "Transforming Learning with ICT" and describes the need for everyone to have an electronic portfolio for lifelong learning:

> *Over time we should see the technology join up better across institutions, so that this is available to learners to build on wherever they go – to further learning, or to work-based learning. And in the future it will be more than simply a storage space - a digital site that is personalised, that remembers what the learner is interested in and suggests relevant web sites, or alerts them to courses and learning opportunities that fit their needs. We will encourage all organisations to support a personal online learning space for their learners that can develop eventually into an electronic portfolio for lifelong learning. (Prime Minister's Strategy Unit. 2005, 31)*

Developing a similar theme, the DfES e-learning strategy identifies the provision of a centralised e-portfolio as an important priority for reform, second only to the provision of the infrastructure to make it work:

> *Our second priority extends this personalised support to learners, helping with all stages of education and with progression to the next stage. We will encourage every institution to offer a personal online learning space to store coursework, course resources, results, and achievements. We will work towards developing a personal identifier for each learner, so that education organisations can support an individual's progression more effectively. Together, these facilities will become an electronic portfolio, making it simpler for learners to build their record of achievement throughout their lifelong learning. (DfES e-strategy 2005, 17)*

It is important to recognise however, that these centralised, regulated developments arise in the somewhat more anarchic and dynamic world in which young people live. Here technology is integrated into a wide range of social, cultural and productive aspects of young people's lives to the point where digital technologies have become a ubiquitous element of learners' experiences outside the classroom. One example of this phenomenon is provided by research conducted by MORI for the Nestlé Social Research Programme into the role of mobile phones in young people's lives.

Access to:	**Year 9-10**	**Post-16 in full time education**
Mobile	95%	99%
Internet	85%	95%
E-mail	70%	90%

(Haste H. 2005)

Moreover it is not just that they have access to the technology, they also use it; with 9 out of 10 texting at least once a day and over 25% taking photos daily.

E. E-learning in design and technology

Developing effective approaches to e-learning (embedding ICT) within curriculum subjects has proved to be a significant challenge, and DfES is currently working on a number of programmes to promote more effective and widespread integration of ICT within subject teaching and learning. Design and technology has shown that this integration is possible, and statistics from the annual DfES survey of ICT in Schools reflect increasing use and positive effects.

***Use* of ICT in areas of the curriculum**

Secondary	**D&T**	**English**
Substantial	62%	19%
Some	35%	69%
Little/none	3%	12%

***Positive effect* of ICT in areas of the curriculum**

Secondary	**D&T**	**English**
Substantial	64%	24%
Some	32%	63%
Little/none	4%	13%

(DfES 2003, 15)

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The statistics in this DfES survey suggest that design and technology makes the best use of ICT when compared to other secondary subjects, and this is reinforced in the OFSTED report of 2004.

Secondary design and technology (D&T) departments continue to make widespread and effective use of ICT in their teaching. (OFSTED 2004, 3)

This report goes on to note the range of ICT related activities that are typical in design and technology:

Increasingly, pupils are developing competencies in:

- *Using the internet to carry out investigations*
- *Recording ideas and information using attractive graphics*
- *Simulating and modelling ideas as they develop solutions to problems*
- *Using computers and related machinery to design and make products to high levels of sophistication*
- *Using computers to control systems. (ibid)*

We note however, that this list, pleasing though it might be, tends to place the focus for learners' use of ICT in design and technology onto *doing* and *recording* activities; 'to control', 'to simulate', 'to manufacture'. There is little here that suggests the ICT is being used *formatively* to generate, initiate, stimulate, and *develop learners' ideas*. Nor is there much scope in this list for acknowledging any ICT role in relation to learners' reflecting, reviewing, critiquing and evaluating their ideas.

These are the designedly, intellectual qualities that lie at the heart of learner portfolios in design and technology.

F. Digitally enhanced portfolios

It was during the development of the activities for the previous project ('*Assessing Design Innovation*') that we became aware of the potential for digital enrichment of the activity. Learners increasingly use digital technologies as part of their work in design and technology. They use digital photography to record their designing and manufacturing processes. They increasingly use the internet for information searches; computer aided design (CAD) systems for design development work, and in some cases this extends to computer aided manufacturing (CAM). Also, they increasingly access, complete and store their work on school networks and intranets that allow access from their home computers. This extends the working environment beyond school workshops and studios and allows them time-unlimited access to their work. It also broadens the tool set that is available to them to envision, manipulate and develop their ideas, and in the process it raises important cultural issues associated with the origins of ideas, the ownership of work, teamwork and plagiarism.

These thoughts led us to develop a proposal to QCA/DfES for a digital approach to portfolio assessment. Learning activities in design and technology studios and workshops are increasingly influenced by digital technology, and we believe that the portfolio assessment system that we developed in the DfES 'Assessing Design Innovation' project provides a useful model to explore the possibilities of extending digital working in design and technology into **digital assessment** of learners' performance.

This development involves introducing new technologies into the classroom, as well as extending the range of existing technologies into the domain of assessment. The expanded use of these digital technologies into the realm of assessment will have some serious impacts on current approaches to teaching and learning. We are absolutely committed to undertaking these developments without compromise to the underlying concepts of design and technology as expressed in the '*importance of design and technology*' statement in Curriculum 2000. Indeed we believe that the work may contribute to taking forward our collective understanding of the power of design and technology as a learning vehicle.

G. 'Peripheral' digital technologies
One of the problems surrounding the use of digital technologies in schools is that teachers tend towards the assumption that this needs to take place in a computer suite, rich in desktop or laptop machines where learners work with a keyboard and screen.

Our starting point is very different.

We start from assumptions about the nature of design and technology: the circumstances of which are almost always *workshops* and *studios*. Two of the constants of these typical design and technology spaces are that

- they are full of materials, apparatus, machinery, and specialist work-spaces;
- they are associated with the detritus of manufacturing.

They therefore make challenging locations for computers, keyboards and screens. First there is not enough space; second the space is not clean (glue, paint, flour and water, sawdust) and third learners themselves can get oil, paint, gluey or floury fingers that are not then ideally suited to keyboard use.

For all these reasons we do not believe that digital enhancement of the designing activity will involve computers, keyboards and screens. At least we do not believe that these tools will be at the leading edge of activity. Rather we think that peripheral, back-pocket technologies will be more appropriate: mini digital cameras, digital pens, digital PDAs.

At least at the 'input' level these technologies enable activities in workshops and studios to go ahead almost as normal. They don't take up too much space and (because they can be pocketed) they are not too sensitive to the clutter of the working space.

Interestingly, students at Key Stage 4 now (almost universally) have access to mobile phones, a significant proportion of which have digital cameras as a built-in feature. As the telecoms companies race to differentiate their systems through enhanced features, the current distinction between handheld PDAs and mobile handsets is disappearing as the two previously unconnected technology strands merge. While 'smart' phones, with all the features of a PDA, are currently not marketed to pupils, camera phones are becoming more ubiquitous and other 'smart' features will increasingly work their way onto phones for children. This trend will be all the quicker if it is seen (or marketed) as providing valuable tools for learning, thereby justifying additional parental expenditure.

In short, we are witnessing the growth of third generation computing. Mainframe computer technologies of the 1960s and 70s gradually faded with the emergence of second generation 'desktop' computers. These completely transformed our working relationship with computers, providing us with far greater interactivity, apparently unmediated by the programmers whose services had formerly been essential. We could 'drive' our own second generation computers in the 1980s and 1990s . As the technologies shrank, the growth of laptop computers particularly in the final decade of the 20th Century did not materially change our relationship to computers. They operated merely as slightly more mobile versions of the desktop. But the new third generation of computers is radically different. They are ***far*** more mobile, are equally powerful, and can now genuinely be regarded as 'back-pocket' computers. As such, they are in the process of transforming, once again, our working relationship with computers. The transition to third generation mobile technologies will be just as dramatic as was the transition from the first to the second generation. In the contexts of learning, teaching, curriculum and schools, these transformations will be profound.

H. Project e-scape
It was from these exploratory ideas that project ***e-scape*** (*e-solutions for creative assessment in portfolio environments*) was born. We approached QCA and DfES with the idea, and after some months of negotiation the brief for Phase 1 of e-scape emerged as follows:

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QCA intends now to initiate the development of an innovative portfolio-based (or extended task) approach to assessing Design and Technology at GCSE. This will use digital technology extensively, both to capture the student's work and for grading purposes. The purpose of Phase 1 is to evaluate the feasibility of the approach...
(QCA Specification June 2004)

Phase 1 of the project (Nov 04-Jun 05) was, in several senses, a 'proof of concept' phase, to explore the feasibility of the concept outlined above. This *proof of concept* operates at four levels:

i) Technological
Concerning the extent to which *existing technologies* can be adapted for assessment purposes within the portfolio system as currently designed for the DfES 'Assessing Design Innovation' project. This will include the applicability of other international work in this area and of any relevant system standards.

ii) Pedagogic
Concerning the extent to which the use (for assessment purposes) of such a system can *support and enrich the learning experience* of design and technology.

iii) Manageable
Concerning issues of *making such assessments do-able* in 'normal' D&T classrooms/ studios/ workshops.
- The training/cpd implications for teachers and schools.
- The scalability of the system (including security issues) for national implementation.

iv) Functional
Concerning the factors that an assessment system based on such technologies needs to address:
- The *reliability and validity* of assessments in this form.
- The *comparability* of data from such e-assessments in D&T with non e-assessments.

The work of Phase 1 established that each of these four aspects of 'proof of concept' was potentially both possible and desirable, at least at an experimental/research level. Our report on Phase 1 concluded with a specification of a working system that we proposed to QCA should become a template for developing a prototype in Phase 2 of project e-scape.

I. Sumarising the e-scape approach
Following this template, the procedure for e-scape tasks works (more or less) as follows:

- We run a six hour D&T assessment task in schools.
- learners use the PDA as a digital design sketchbook;
- the PDA helps to structure the activity (as the booklet did), and records all learner input/interaction (writing/drawing/speaking/photographing);
- each PDA is linked dynamically to a secure web-space;
- where virtual design portfolios emerge as the projects unfold,
- along with a photo story-line of learners' real models,
- and reflections from learners and their team.

The result of this six hour activity is that we have models and the virtual portfolio as evidence of learners' performance in the task.

Figure 3 shows one of our early trials. It shows a table on which three youngsters are grappling with their design task. And on this same table are three PDAs each of which is more powerful than the first generation of iMacs. Imagine how this table would be different with three desktops (or even three laptops) on it.

Thereafter, once completed;
- awarding bodies can access and assess the work remotely,
- and conduct moderation remotely,
- using prepared on-line exemplification,
- and can finally log/register results remotely.

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Figure 3: An e-scape early trial

E-scape represents the first attempt to create activity-based performance assessment in real-time using digital tools and resulting in virtual portfolios. If it can be made to work, it will radically alter the nature of performance assessment in schools; making it far more accessible and far more do-able in many more subjects. Imagine an e-scape version for science investigation, or music composition, or drama performance.

We have only just launched Phase 2 of project e-scape, in association with the DfES and QCA. To undertake the project we are collaborating with two technology companies; one concerned with hand-held devices (their associated programming and systems) and the other with web-based e-portfolio systems. We plan to have a working prototype of the system by April 2006 and in June/July will be running trials in 12 schools with approx 250 youngsters at age 15.

The system must work sufficiently well in the field to enable us to run these trials and to collect sufficient data to answer some key research questions. These questions include matters:

- concerning the *nature of design and technology* and what happens to it when learner performance is conducted largely through digital means;
- concerning the *nature of performance assessment* and what happens to it when learner performance is conducted largely through digital means;
- concerning the *technology itself* and in what forms it can most usefully be deployed to facilitate learners' innovative performance;
- concerning *wider curriculum issues* and the more general applicability of the approach.

All of these matters will – we believe – be illuminated by the radical nature of the approach planned for project e-scape. The project (including the conduct and results of the school trials) will be fully reported to DfES and QCA in January 2007.

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