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# CPD for ICT in D&T: using LSP!

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**CPD**       **Continuing Professional Development**
**ICT**        **Information and Communications Technology**
**D&T**      **Design and Technology**
**LSP**       **The Learning Schools Programme**

The UK Open University in collaboration with Research Machines plc has designed a school-based, supported self-study in-service teacher education programme in improving teaching and learning using ICT. This paper considers the pedagogy, systems design, mix of media and teacher support for this innovative programme with reference to the subject of Design & Technology. It sets out the context of the initiative within the government agenda for improvement to the education system, and considers the obstacles to the effectiveness of the programme.

## Introduction

In 1999 the government allocated £230 million (US$368 million) from the national lottery New Opportunities Fund to begin the process of developing the ability of teachers and school librarians to become more aware of how Information and Communications Technology (ICT) can be used to improve teaching and learning. The focus is on the better teaching of a subject (or across subjects in primary schools) rather than a concentration on simple computer skills or certain software.  The need for basic training is still there for many teachers, but that is not the purpose of this initiative.  The New Opportunities Fund (NOF) sees the key features for this initiative as:

- A focus on the knowledge, understanding and skills that teachers need to enable them to make decisions about the effective use of ICT in the classroom.
- Integration of training in IT skills with training in the use of ICT in their subject.
- Most training to be provided through school-based learning involving the use of ICT in the classroom.
- A close link to the development of the National Grid for Learning, and to the National Numeracy Strategies.
- At the end of their training, all teachers will be helped to develop an action plan for their future development in the use of ICT.

(http://www.nof.org.uk/)

The current UK government has an agenda designed to modernise the teaching profession and to raise standards. The Green Paper *Teachers: meeting the challenge of change* (1999) called for better leadership for teachers, better rewards, better training and better support.  However, the present UK government has embraced the strategy of the previous one and sees a commercial framework as the best way of encouraging high quality providers of training.  Following a call for accreditation, over 100 providers have been approved and schools are able to select whichever provider best meets their needs.  The Learning Schools Programme, a partnership between The Open University and Research machines plc, has become the largest provider of such training.  The partnership has 'accredited provider' status in all four nation states of the United Kingdom, and to date almost 120 000 teachers are registered on the programme.

## Expected Outcomes

Each teacher on the programme is working towards a set of expected outcomes.  New teachers entering the profession are expected to be proficient in the use of ICT for teaching and learning and government prescribed expected outcomes are intended to bring serving teachers to the same standard.  The principal aim of the ICT training based on these expected outcomes is to equip teachers with the necessary knowledge, skills and understanding to make sound decisions about **when, when not, and how to use ICT effectively in teaching particular subjects.**
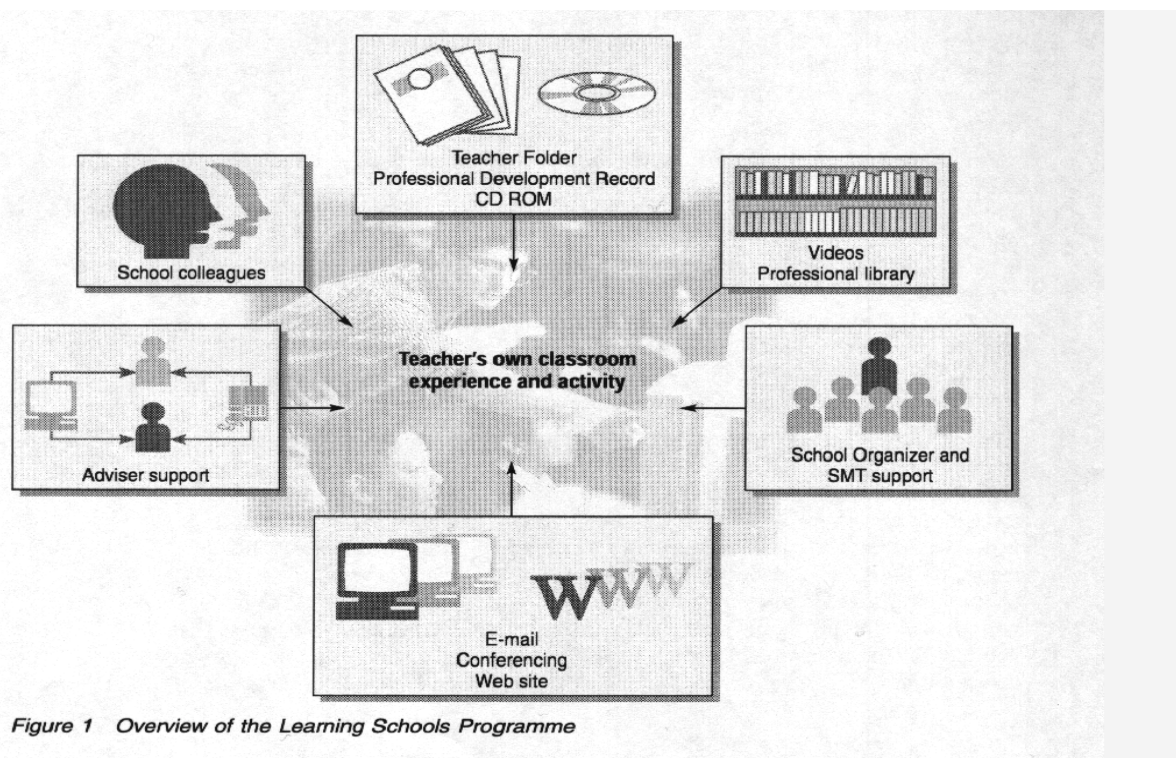
The outcomes are highly detailed, but the Learning Schools Programme (LSP) has simplified and condensed these long and detailed government regulations into 12 areas covering Planning, Teaching, Assessing and Evaluating, and Personal and Professional Development.

*The LSP Teaching Model*

The Learning Schools Programme is a school-based, supported self-study programme. There are three main elements:

- Self-study materials
- Face to face support
- An on-line electronic environment

Subject based self-study materials are provided for every teacher, which includes a CDROM of exemplars of classroom practice and a wide range of supporting text. In addition each school has supporting materials such as a 'professional library' and videos. In-school help with the use of the materials is provided by a number of



Figure 1 Overview of the Learning Schools Programme

School Advisers and Teacher Advisers and all teachers on the programme are linked using a text-based computer conferencing system called FirstClass (See Figure 1).

Teachers go through seven steps as they work through the programme.

Step 1 - Familiarisation with the Learning Schools Programme

Here the teach send just a few minutes looking at the range of materials available to them: The *Course Guide*, CDROM, the book *Teaching in Design and Technology*, the four *books Developing Professional Practice*, the *Special Issues* book, the *Prompt Cards* and the *Professional Portfolio*.

Step 2 - Needs Identification

At the start, each teacher identifies what he or she can do already, and what they want to do by the end of the programme using a planning document called the Professional Development Record (PDR) to help them.  The document is set out into meaningful areas of teaching knowledge and skills, and teachers have little difficulty in prioritising what they want to do.  However, teachers might liaise with a head of department or with a senior member of staff to also identify wider institutional needs. The Teacher Training Agency has also produced needs identification material, although this is rather less holistic in its approach.

Step - 3 Using the Programme Resources

Working alone, or with a colleague, the teacher next explores both the CDROM structure and the on-line resources and conferencing area.  The FirstClass conference environment is accessed via the CDROM if the computer has an internet connection.

Steps 1 to 3 take about five hours.

Step 4 - Meeting Identified Needs

The programme is very flexible.  The PDR identifies a number of elements in the programme which could address an identified need.  For example, the teacher might consider the exemplar lessons on the CDROM, or look at a document on 'Teaching in Design and Technology' or one of the units on Developing Professional Practice.  The programme has also set out 44 professional tasks.  These are activities that a teacher might be engaged in during the year as part of their normal work, and in carrying out the activity they might easily 'hit' an expected outcome.  For example, a teacher might review a scheme of work with respect to the use of ICT, or set up an information system for professional material (e.g. bookmarks, useful sites, folders for electronic documents) for themselves or their colleagues.  First evaluations of the programme showed that this flexibility led to insecurity and some confusion for busy teachers. They wanted more structure. Consequently, a route through the materials for each of the 12 possible identified needs was set out.  Three each for the four areas of

- Planning,
- Teaching,
- Assessing & evaluating
- Personal & professional  development

Step 4 takes up to 20 hours

Step 5 - Completion Task and Self-Assessment Form

The completion task brings together the four aspects outlined above.  The activity is part of their normal classroom work. The teachers plan a sequence of lessons  which incorporate an element of ICT, teach the sequence and evaluate that work.  They return to the Professional Development Record (PDR) and now indicate what they can

now do.  They are required to fill in a self-assessment form which they submit to their School Organiser.

Step 6 - Evaluating the Learning Schools Programme

The teachers fill in an anonymous evaluation form which allows the OU/RM partnership to monitor the effectiveness of the Learning Schools Programme.

Step 7 - Developing action plans

At the end of the training each teacher engages in a self-assessment of their progress on the programme and identifies what they 'can now do'.  The action plans drawn up in response to this analysis feed into the school development plan.

Steps 5 to 7 take up to 5 hours.

The total time that teachers take on the Learning Schools Programme, therefore, is approximately 30 hours.  However, the materials stay with the teacher and many use they for self-study for a much longer period if they so wish.

*ICT and D&T*

The national curriculum specifies that Information and Communications Technology capability is intended to be addressed by all subjects.  In detail:

Pupils should be given opportunities to support their work by being taught to:

- find things out from a variety of sources, selecting and synthesising the information to meet their needs and developing an ability to question its accuracy, bias and plausibility
- develop their ideas using ICT tools to amend and refine their work and enhance its quality and accuracy
- exchange and share information, both directly and through electronic media
- review, modify and evaluate their work, reflecting critically on its quality, as it progresses

In the national curriculum for England the following is identified for Design and Technology

During key stage 3 (11-14 year old) pupils … use computers, including computer-aided design and manufacture (CAD/CAM) and control software, as an integral part of designing and making…

During key stage 4 (15 to 16 year old) pupils … use ICT to help with their work, including computer-aided design and manufacture (CAD/CAM) software, control programs and ICT-based sources for research.

And the Teacher Training Agency needs identification material pick up these specific elements for D&T:

ICT has the potential to make a **significant contribution to pupils' learning in D&T** by helping them to:

- generate, explore, model, develop and communicate design ideas

- make products

- control electrical or mechanical products

- gain access to a range of information

(TTA, 1999)


CDROM Exemplars

The CDROM shows the planning, teaching, assessment of learning and evaluation of four examples of the use of ICT to teach Design and Technology. A web-browser is used to interrogate the CDROM. This technique enables a range of different computers from different manufacturers (Acorn, Apple and PC) to use the same CDROM and requires the teachers to become familiar with just one sort of software.

Example 1 - Is about how ICT is used to generate, explore, model, develop and communicate ideas and shows Brian Russell and Amanda Griffiths at Dixon's City Technology College working on the 'badges project'.

 Example 2 - Is about how ICT is used to plan making, find out about the making process, and make products using computer-aided manufacturing. Julie Messenger at Sawtry College is using software called POEM with textiles project about the Olympic Games 2000.

Examples 3 - Is about how ICT is used to research, gather information, use the expertise of others and work collaboratively on team projects. The teacher is Tony Booth at George Ward School and the pupils work with engineers at British Aerospace.

Example 4 - Is about how ICT is used to control products or systems that the pupils design and make. Tig Trafford at Latymer School is using control taught in ICT lessons in D & T projects.

In working through these exemplars a teacher can consider the work of their colleagues, and reflect on how they could do similar work in their particular context. A commentary has been written for every screen to pick up interesting points and to raise questions. In this way a teacher is helped to consider how their pupils could benefit from better use of ICT in Design and Technology.


The 'Teaching in Design and Technology' Document

A group of authors, led by Louise Davies who is a professional officer at the Qualifications, Curriculum and Assessment Authority (QCA), has produced a full-colour document about teaching using ICT in Design and Technology. It covers the following topics:

- *Design and technology* and ICT
- Planning the use of ICT in teaching *design and technology*
- Implementing ICT in the classroom
- Assessing and evaluating
- ICT across the *Design and Technology* department

### *Supporting Teachers on the Programme*

Although this is a self-study programme, it is expected that many teachers will work together, perhaps as a department, and all will be supported by a number face to face sessions and on-line communication.

School Organiser

Every school nominates a school organiser who is responsible for the administration of the programme. Typically this is a member of the senior management team who has responsibility for staff development. They will arrange when each member of staff begins the programme and monitor their progress. It is the School Organiser who will help with the needs identification process and help to organise the subject-specific support

School Adviser

The local support to a school is usually provided by the Local Education Authority (LEA). This is the local government education department that is acting in a semi-private capacity. A school is not obliged to spend their NOF training money with their own LEA, and so may not choose to work with the Learning School Programme. However, many schools know and trust their local advisers, and they may be going into schools for a variety of support functions in addition to work on LSP. The School Adviser will liaise with the School Organiser to ensure that the subject-based time is used wisely and effectively.

Teacher Advisers

A teacher adviser is a subject specialist who gives the teachers support on the curriculum activities and the use of the teacher packs. 14 hours per 10 teachers for the teacher adviser or *pro rata* has been allocated although this will vary due to local needs, with perhaps more work done on-line in some areas.

### *On-Line Support*

In addition to face to face meetings, each teacher will be able to become part of an on-line community of practice. Using a text-based computer conference environment, the teachers are able to receive extra support from teacher advisers and offer each other peer support during their involvement in the programme. 'Discussions' are possible in a range of forums from local groups of subject teachers in the same area to national conferences.

The Open University has a lot of experience with such conference environments and currently has well over 80 000 students
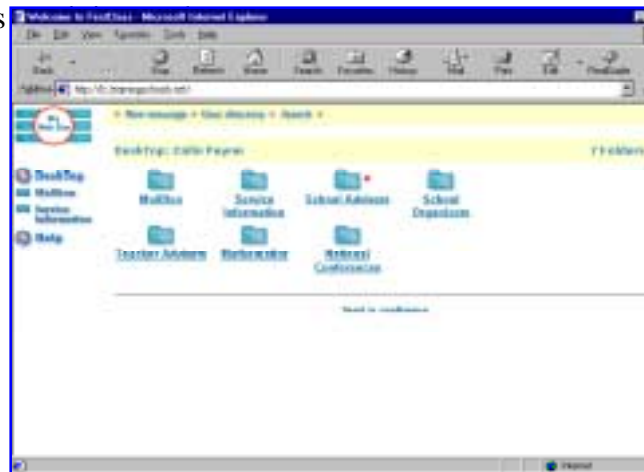


Figure 2 FirstClass Desktop

The web environment is very similar to that used to look at the CDROM. At the local level, the teacher advisers act as 'moderators' of the conference and are responsible for creating a supportive and interesting forum for discussion. At the national level, specific LSP employees take on that role.

The way that individuals progress in their use of electronic communications is well documented and the programme has used the work of Salmon (1998) to inform its practice in this area.
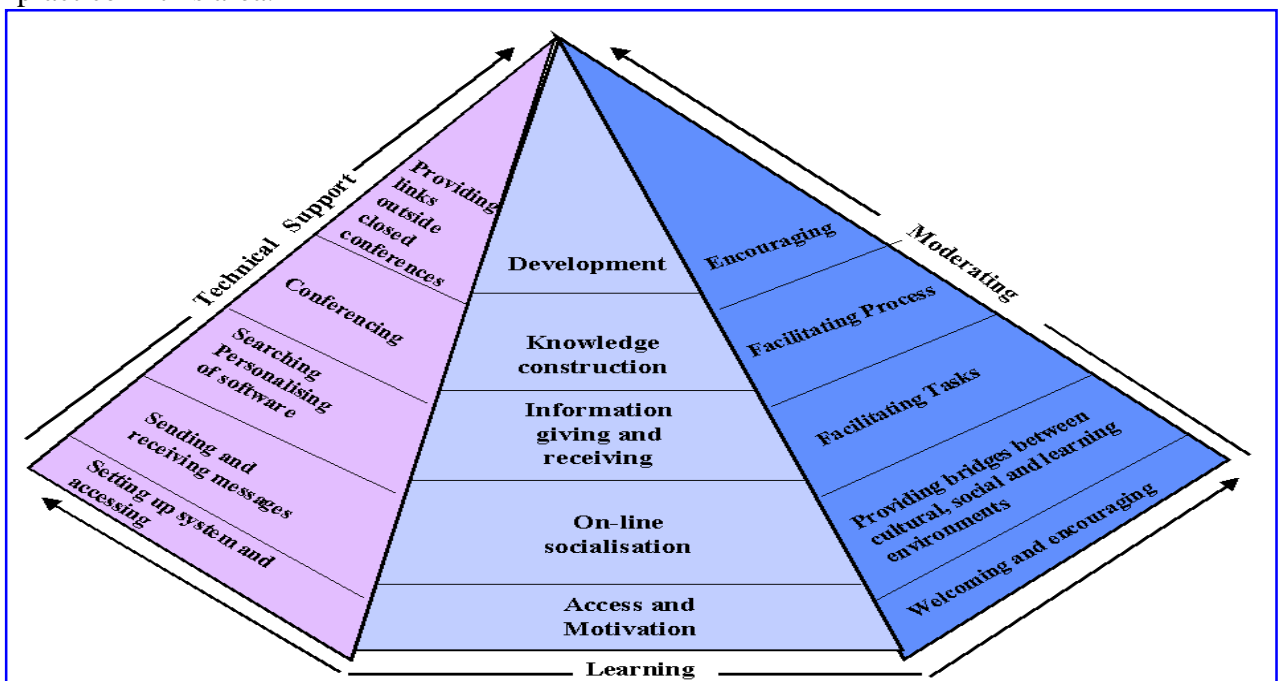


Figure 3 Stages in computer-mediated conferencing (Salmon 1998)
The learning face of the above diagram shows how users move from a preoccupation with the

mechanics of the system and their surprise at gaining 'access' to a more comfortable early appreciation of the social space. Here they build up relationships and frequent users are greeted as friends. As the teachers gain trust in using the medium, they are prepared to swap information and resources and finally fully engage in thinking through aspects of their own practice. Some have said that the more considered response that a text-based system requires providers a more thoughtful arena than is often the case in face-to-face tutorials. In all these different stages, the changing role of the moderator is most important to facilitate maximum benefit for all concerned

### *Challenges to the success of the programme.*

Bob Moon, one of the directors of the programme, has identified four principal challenges that the programme needs to overcome to ensure success:

- classroom culture

The reluctance of teachers to change practice which works for them. In this case the motivation for using ICT by their pupils might be a significant factor in overcoming institutional inertia. Pupils are often very enthusiastic in using ICT in their classroom work.

- teacher resistance to top down training

This initiative comes on top of a change (yet again) to the national curriculum for Design and Technology. Although 'punch-drunk' with change, the new curriculum (Curriculum 2000) encourages the use of ICT and so many teachers will see that it is a necessary and important development. However, unlike many Open University courses, this is being taken up by all teachers not only the enthusiastic ones.

- quality across hundreds of 'sites' of training

The government has encouraged a school-based scheme, and LSP has embraced that philosophy. However, the programme relies on all involved at a managerial level; senior managers in schools and local education staff authority officers all taking their responsibilities seriously. The variable quality of the face-to-face element of the programme is a concern. For example in February 2001, the UK Department for Education and Employment published a critical report on Local Education Authority (LEA) Support for School Improvement, which contains several references to weaknesses in LEA ICT support for schools. Here are some extracted paragraphs:

94      Support for ICT was one of the weakest aspects of the work of the LEAs inspected. It was good in only five per cent and unsatisfactory in 67 per cent of the LEAs in which a judgement was made, with no sign of recent improvement.

249     The most successful aspects of school improvement currently are the National Literacy Strategy and the National Numeracy Strategy. The least successful is provision for ICT. Again and again, LEAs have shown that they can be an effective conduit for central initiatives. Conceiving, then disseminating, well-considered strategies is not their strength. ICT planning in most LEAs focuses on equipment, installation, maintenance and the development of teachers' skills, but necessary distinctions are not made between;
- personal skills as users;

- skills in using ICT for management;
- pedagogic skills for teaching ICT or other subjects using ICT; and
- skills in using ICT for curriculum design.

250     Our sixth recommendation is that consideration be given to developing the national ICT strategy, to increase greatly the focus on raising standards both in ICT itself and across the curriculum through ICT use.

- 'weight' of government expectations

The government is keen to see quick results to their agenda to raise standards, but the benefits of better use of ICT to improve teaching and learning is likely to be seen in the longer term.

The Learning Schools Programme is aware of the potential pitfalls and has instituted an extensive system of monitoring visits to evaluate the work being done by different contributors to the programme: School Organisers, School Advisers and Teacher Advisers. Any teacher will have to show progress in order to have been deemed to complete the programme and, with so many people involved and checks in place, it is unlikely that anyone will be able to be 'signed off' too soon.

The total initiative to train every teacher in the country has been described as the largest peacetime training programme. The Open University sees this as a golden opportunity to evaluate the effectiveness of such a programme and to look at how teaching and learning is being changed by the better use of ICT.

We hope that many design and technology teachers will agree with their colleague who said

**"ICT has transformed the nature of designing and making in the world outside schools, which should in turn transform what is taught in schools"**

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