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## Summary

ICT makes available a range of tools which may be used to support CPD for teachers. These may be used in Initial Teacher Training (ITT) where they have the potential to provide teachers of the future with the confidence and know-how to integrate ICT in their teaching. Likewise, under the right circumstances, using ICT as part of in-service training can equip classroom teachers with the skills to incorporate technology in their lessons.

Key benefits of using ICT in CPD include:

- enhanced collaboration between teachers
- creation of digital records (portfolios) of personal progress
- development of ICT capabilities amongst student teachers
- opportunities for teachers to integrate ICT in teaching and learning
- enhanced effectiveness of CPD courses.

# What the research says about ICT and continuing professional development (CPD) for teachers

This report is based on an analysis of available research about the use of ICT to support teachers' continuing professional development and education. It summarises the key findings and suggests resources for further reading.

## What is CPD for teachers?

Continuing Professional Development is the process by which teachers acquire and develop the skills and know-how to become effective in the classroom. It is ongoing and enduring, in response to an environment which is changing.

This report encompasses literature on both the use of ICT to deliver CPD for teachers, and on providing effective CPD in using ICT in the classroom. Topics which have been reviewed include:

- the use of discussion groups and other forms of computer-mediated communication (CMC) to support professional development
- the impact of ICT on initial teacher training (ITT)
- electronic portfolios and how they may be used to record experiences and achievements
- using ICT to deliver CPD
- whether CPD helps teachers learn about integrating ICT in teaching processes.

# Key research evidence about ICT and CPD

On the basis of Becta's analysis, ICT can have positive effects on CPD in the areas outlined below (there are references for further reading supplied alongside most of the findings).

## General benefits

- The collaboration enabled by computer-mediated communication such as email and discussion groups supports professional development
- Good practice in the use of ICT in ITT institutions is steadily becoming disseminated through new teachers and embedded in the teaching community.

## Benefits for student teachers

- Electronic conferencing leads students to engage with ICT and acquire associated skills in computer use (Kyriakidou, 1999)
- CMC enhances professional development by promoting reflective discussion on educational issues (Kyriakidou, 1999)
- Discussion groups have the potential to enable mutual support amongst student teachers based in schools where there is adequate access to ICT. However, it may be necessary for them to be closed to tutors in the interests of fostering frank discussion (Moody, 2000)
- As a result of an emphasis on the use of ICT, newly qualified teachers are now more likely to accept ICT as an integral part of their professional life (Ofsted, 2002).

## About Becta's 'What the Research Says...' series

This series of briefing papers is designed in particular for teachers, ICT co-ordinators and school managers, in order to provide an initial idea of the available research evidence for the use of Information and Communications Technology (ICT) in schools and colleges. We welcome feedback and suggestions for further titles in the series (contact details can be found at the end of this briefing).

## Benefits for teachers

- Involvement in developing a personal digital portfolio can lead some teachers to move swiftly from a position of non-user to mentor of others (Kankaanranta, 2001)
- Publishing digital portfolios on the Web enables a sharing of pedagogical expertise and practice (Kankaanranta, 2001)
- The electronic portfolio development process contributes to teachers' professional development and students' lifelong learning (Barrett, 2000)
- Membership of a mailing list can reduce feelings of professional isolation (Parker & Bowell, 1998)
- CMC can provide a forum for expert debate and access to information otherwise unavailable (Parker and Bowell, 1998)
- Sharing problems and success via a discussion group can give members the confidence to reflect on practice in their own institutions (Parker and Bowell, 1998)
- CMC has the potential to enable a quick transfer of information prior to meetings (Parker and Bowell, 1998).

## Supporting the effective use of CMC

- Students are more likely to participate openly in discussion groups if it is clear that they are not being assessed for their contributions (Moody, 2000)
- Moderation with a very light touch is more likely to result in free contributions than is an interventionist approach (Hawkes, 2000)
- The focus of discussion needs to be pedagogy rather than technology (Hawkes, 2000)
- A forum's membership should be determined with regard to its purpose – if it is established to solicit information then a broad diversity of participants is desirable, but a forum set up to develop a product will function most effectively where the team members are narrowly defined and can collaborate constructively (Hawkes, 2000)

- Allowing participants to remain anonymous can help to prevent considerations of rank and experience from affecting postings (Hawkes, 2000)
- Having access to discussion groups from home allows teachers to make contributions when in a reflective frame of mind, away from the pressures of the teaching environment (Hawkes, 2000)
- Participants need to have the technical skills necessary for using CMC, and training should be available where necessary (Hawkes, 2000).

## Factors for effective use of ICT in CPD

- There is an effective audit of needs (Ofsted, 2002)
- Training opportunities are tailored to subject-specific requirements (Ofsted, 2002)
- The focus is on pedagogical skills in a subject context (Selinger, 1998)
- Training facilitates development and evaluation of teaching approaches (Selinger, 1998)
- Use of ICT-based materials is adequately backed up by online support (Selinger, 1998)
- Action plans include further CPD in the future (Selinger, 1998)
- Teachers work in teams when engaged in professional development activities (Sandholtz, 2001).

## Workplace factors which support the long-term aims of CPD

- There is extensive technical support for teachers in the use of ICT (Kankaanranta, 2001 and Pianfetti, 2001)
- Teachers have adequate access to computers (Selinger, 1998)
- There is sufficient time for teachers to learn new skills and explore their integration in the curriculum (Pianfetti, 2001)
- Teachers can participate in a community of peers working with technology (Pianfetti, 2001)
- There is support by senior management (Ofsted, 2002).

## ICT supporting CPD in practice

The SENCO-Forum mailing list, aimed at special educational needs co-ordinators (SENCOs) was set up in 1995, and membership had grown to 728 by 1998. SENCOs came to see advantages in using the mailing list regularly, and topics discussed often developed into detailed debates. Enquiries posted to the list frequently solicited helpful suggestions, and both successes and problems have commonly been shared. It has also provided the Government with a means of dynamic consultation with those directly affected by legislative proposals; for example the then DfEE used the Forum for

consultation on the Government paper 'Excellence for all Children' in 1997. The nature of CMC – independent of time and place – is highly appropriate for communication between SENCOs – more so than the telephone. SENCOs are not unique in their situation, and the evaluation concluded that CMC could offer all educators the opportunity to develop effective teaching and learning strategies in a wider forum than could be supported by traditional methods (Parker and Bowell, 1998).

A later study published in 2002 confirmed that the SENCO-Forum list was still seen as an important source of professional knowledge and support (Lewis and Ogilvie, 2002).

# Explanation of findings

As with ICT more generally, direct causal effects are not always easily identifiable. Drawing clear conclusions on the effects of ICT from the range of research evidence and reports available can be problematic.

There are a number of factors that limit effective comparisons, such as differences in sample sizes, methodologies and effects, and the extent and purpose of ICT use involved. When considering the professional development of teachers the problem is even greater, with two more factors coming into play:

- The quality of the CPD programme scheme
- The resulting change in teacher behaviour.

It is also necessary for changes in teachers' practice to stimulate students' behaviour and achievement in a way that can be measured, if we are to see the influence of CPD on teaching and learning (Lesgold, 2000).

## Assessing the impact of NOF ICT training

The chief vehicle for providing CPD in ICT for teachers in England has been New Opportunities Fund (NOF) training, and evidence is beginning to emerge as to its effectiveness. A study based on a single school focused on the level of use of ICT, and its link with NOF training. As was hypothesised, a steady increase was found, particularly in use of the internet. Teachers reported having learnt both how to use the computer to save time, and how to use ICT to enrich their lessons (Gray, 2002).

Ofsted has examined the effects of NOF training, and found mixed results. They reported that teachers have improved their ICT skills, and that the use of ICT in schools has risen, especially in the primary sector. Overall, however, Ofsted reported that NOF training was unsatisfactory in its effect – they found that training in 60% of secondary schools and 50% of primary schools was inadequate (Ofsted, 2002). A study by Manchester Metropolitan University (MMU) of teachers' CPD involved a questionnaire survey and the compilation of case studies (Hustler, 2003). Teachers themselves rated their ICT training relatively poorly compared to other forms of CPD. Negative feelings were particularly associated with CPD provision which was seen as being of a standardised 'one size fits all' type; this included much NOF training. Other comments from teachers on NOF included a lack of guidance being offered during training and a shortage of time in which to build on lessons learnt. As problems emerged, modifications were made, and training providers were advised to be more adaptable to local conditions. An evaluation conducted by MirandaNet for

the TTA suggests that the changes have been largely successful (Preston, 2004). It also points to the effectiveness of senior management support in schools where NOF training has flourished.

## What makes for successful CPD in ICT?

School infrastructure, and broadband connectivity in particular, play a part in the success of training, and Ofsted have stressed the importance of senior management taking an active interest in teachers' progress (Ofsted, 2002). They also emphasise the importance of teachers receiving effective peer support, and maintaining this by meeting up – as also identified by research conducted into the use of CMC (see above). These informal links between teachers can be very influential. In a study by Granger (2002), teachers overwhelmingly perceived informal learning such as on-the-job discussions and collaboration with peers as more useful than formal ICT training. Collaborative relationships among teachers may develop into a professional community which is supportive of the use of ICT. A reciprocal relationship has been found to exist between the effective use of technology and these professional communities (Dexter, 2002): technology makes collaboration easier, and collaborative activity encourages an increased interest in using ICT.

Peer support alone is not sufficient, though. There have to be opportunities for teachers to seek ICT training, and then to have time available to explore what they have learnt. In addition they need to have modern computers at their disposal, and access to appropriate technical support (Granger, 2002).

## Key areas for further research

The link between teacher training in ICT and student attainment is of key interest. However, the variables involved make such research complex – factors involved are the nature of the CPD; school infrastructure; teacher implementation of changed practice; the link between ICT and student attainment. Thus the cause of changes in student outcomes is difficult to ascertain. However, there are other, more quantifiable areas which require investigation, such as:

- what makes for an effective ICT training programme
- which ICT tools can provide the most effective support for professional development
- how to measure teacher outcomes resulting from training with ICT.

## About the research literature

A large quantity of literature has been published in recent years which reflects an extensive interest in the efficacy of CPD programmes for teachers, and their success in developing ICT skills. This includes a body of evidence from the USA and Canada which follows a similar agenda to that within the UK. Most of the studies conducted are small scale, however, and of these many are focused on the use of discussion groups and other forms of CMC. There is a lack of investigation into the effectiveness of innovative programmes based on ICT tools other than CMC.

## Current research

During 2002 DfES funded a pilot project which involved teachers using online materials developed for use in subject teaching. This pilot has since been extended, and in addition, a fresh project began in 2003 which focuses on other subjects. Findings from the pilot reports provide the first post-NOF insight into how teachers may benefit from training in ICT. The importance of support for teachers comes through most strongly – this encompasses access to online tutors during training, the provision of hardware such as portables and projectors, availability of appropriate subject hardware and access to technical support. The main message is that it is possible to train teachers successfully to use ICT in subject teaching, given the provision of suitable resources and facilities. This research is still at an early stage, however, and the findings from the larger scale studies and those in other subjects will provide a better understanding of what makes for effective CPD. Materials are due to be published nationally from January 2004 and further details are available from the Project Manager, Jenny Mundy [Jenny.MUNDY@dfes.gsi.gov.uk].

### Key questions for schools

- Do you need to conduct a skills audit of staff before making CPD plans?
- Could the school infrastructure support an increased use of ICT in the classroom?
- How will you monitor the impact of CPD?

# Bibliography and further reading

The research referred to in this briefing represents a selection from the rapidly growing field of research related to ICT and CPD, and should not be regarded as a definitive list of the 'most important' research in this area.

**BARRETT, H., 2000.** *Electronic teaching portfolios: multimedia skills + portfolio development = powerful professional development.* Paper presented at the Annual conference of the Society for Information Technology and Teacher Education (SITE), San Diego, California. <http://helenbarrett.com/portfolios/site2000.html>

**DEXTER, S., et al., 2002.** Contributions of professional community to exemplary use of ICT. *Journal of Computer Assisted Learning*, 18 (4), pp. 489-497.

**GRANGER, C. A. et al., 2002.** Factors contributing to teachers' successful implementation of IT. *Journal of Computer Assisted Learning*, 18 (4), pp. 480-488.

**GRAY, L., 2002.** The impact of NOF on the use of computers in the classroom. *Computer Education*, June (101), pp.15-18.

**HAWKES, M., 2000.** Structuring computer-mediated communication for collaborative teacher development. *Journal of Research and Development in Education*, 33 (4), pp.268-277.

**KANKAANRANTA, M., 2001.** Constructing digital portfolios: teachers evolving capabilities in the use of information and communications technology. *Teacher Development*, 2 (5), pp.259-275.

**KYRIAKIDOU, M., 1999.** *Electronic-conferencing: promoting a collaborative community with learning opportunities for developing teachers.* Paper presented at the British Educational Research Association Annual Conference. University of Sussex at Brighton. <http://www.leeds.ac.uk/educol/documents/00001374.htm>

This briefing and others in the 'What the Research Says' series can be found on the Becta Research website at [www.becta.org.uk/research](http://www.becta.org.uk/research).

Becta's ICT Advice site provides further information, services and tools for those who use, implement and manage ICT in schools: [www.ictadvice.org.uk](http://www.ictadvice.org.uk).

**LESGOLD, A., 2000.** *Determining the effects of technology in complex school environments.* SRI International for the US Department of State.

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**PIANFETTI, E.S., 2001.** Teachers and technology: digital literacy through professional development. *Language Arts*, 78 (3), pp.255-262.

**PRESTON, C., (2004).** *Learning to use ICT in classrooms: Teachers' and trainers' perspectives. Part one: A summary of the evaluation of English NOF ICT teacher training programme 1999 - 2003.* MirandaNet. <http://www.mirandanet.ac.uk/tta/>

**SANDHOLTZ, J.H., 2001.** Learning to teach with technology: a comparison of teacher development programs. *Journal of Technology and Teacher Education*, 9 (3), pp.349-374.

**SELINGER, M., 1998.** In HARRIS, S., 1999. *INSET for IT: a review of the literature relating to preparation for and use of IT in schools.* NFER, p.14

## Becta's ICT Research Network

If you're interested in research on the use of ICT in education, you can join Becta's ICT Research Network.

The ICT Research Network seeks to encourage the exchange of information in order to inform the national agenda and professional practice.

Membership is free and is open to:

- teachers
- ICT co-ordinators
- ICT advisors
- school managers
- researchers
- policy makers
- research sponsors
- industry.

The Network provides them with an opportunity to:

- exchange information on current research
- develop partnerships
- discuss priorities for further investigation
- focus research on issues of importance to practitioners and policy makers.

They can do this via:

- an email discussion list
- publications
- conferences and events.

More information on Becta's ICT Research Network can be found at [www.becta.org.uk/research/ictrn](http://www.becta.org.uk/research/ictrn)

Alternatively, email:

[ictrn@becta.org.uk](mailto:ictrn@becta.org.uk) or write to:  
Michael Harris, ICT Research Network, Becta, Millburn Hill Road, Science Park, Coventry CV4 7JJ

# [www.becta.org.uk/research](http://www.becta.org.uk/research)

### About Becta

Becta is the Government's lead agency for information and communications technology (ICT) in education and supports UK Government, national organisations, schools and colleges in the use and development of ICT in education to raise standards, widen access, improve skills and encourage effective management.

### About the ICT in Schools Programme

The ICT in Schools Programme is the Government's key initiative to stimulate and support the use of information and communications technology (ICT) to improve standards and to encourage new ways of teaching and learning. The enormous potential of ICT means that for the first time it is becoming possible for each child to be educated in a way and at a pace which suits them, recognising that each is different, with different abilities, interests and needs. The challenge over the next four years will be to successfully embed ICT in every facet of teaching and learning where it can directly impact on raising standards of attainment. A vision for the future of ICT in schools can be found in the paper *Fulfilling the Potential – Transforming Teaching and Learning through ICT in Schools*, available on the DfES ICT in Schools website [<http://www.dfes.gov.uk/ictinschools/publications/>].

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