

Teaching and Learning

RESEARCH BRIEFING

Number 15

Supporting learning with ICT in pre-school settings

The introduction of ICT (information and communication technologies) to the playroom can present challenges. How can practitioners respond to changes and create opportunities for learning with ICT? Practitioners and researchers worked together in the project *Interplay* to address these questions. They reflected on ways in which children's encounters with ICT could be enhanced. They used the concept of guided interaction to initiate small projects which explored different approaches to supporting learning in different settings, and shared their findings with each other.

Children's encounters with ICT are enhanced when practitioners use guided interaction.



Professional development can help practitioners to find ways of enhancing the value of encounters with ICT whilst balancing child-initiated and adult-led activities.

Encounters with ICT accompanied by guided interaction can enhance three key areas of learning: dispositions to learn, knowledge of the world and operational skills.



Maximising the learning benefits of ICT requires a responsive, reflective pedagogy which values pleasure and engagement as well as operational skills.

Providing a broad range of ICTs promotes more opportunities for learning.



Nurseries should broaden their focus from computers to other forms of ICT, including digital still and video cameras, mobile phones, and electronic keyboards and toys.

The research

Background

Learning through play and child-initiated activity is central to pre-school education for children aged 3 and 4. But the introduction of ICT can present challenges for practitioners. A pilot study showed that activities are often focused on computers, that other technologies in the playroom are not recognised as ICT and that choosing the computer as a free play activity can lead to unproductive interactions. For example, children aged 3 and 4 are usually unable to follow written instructions and can encounter operational difficulties if they do not have adult support.



Practitioners are expert at providing tailored responses to children, but this did not always extend to children's play with ICT. Opportunities for learning could be missed because children rarely asked for help, while supervision of computer play was limited and competed with other duties. The aims of this study were to explore with practitioners how guided interaction can fit into a pre-school culture of child-initiated learning through play, whilst acknowledging practitioners' many other responsibilities in the playroom.

How can practitioners support children's learning with ICT?

Guided interaction as a means of creating opportunities for learning was at the core of this project. Direct guided interaction takes place in a face-to-face situation involving adults and children and may happen through gesture, touch, language or emotional support. It can include an adult placing their hand over a child's hand on the mouse, demonstrating enjoyment at using a digital camera, directing a child's attention with conversation and questions, or sequencing and breaking down activities. Indirect guided interaction refers to the ways in which practitioners prepare for and think about events in the playroom. It includes activities such as planning, making resources available and recording children's progress with ICT.

Practitioners developed ways of actively guiding and extending children's learning through questioning, modelling, praising and acting as a supportive presence. In some cases the facilitating role of the adult was not only to demonstrate, explain or give physical guidance but also to plan a child's return to the activity and to continue monitoring their interactions. Thinking about guided interaction helped practitioners to question the purpose of ICT and to articulate, reflect on and legitimise changes in pedagogy. This prompted changes in the provision of resources, planning, assessment and nursery-wide policy. Practitioners

became more innovative, expanding their definition of ICT as well as using existing resources differently, and began to plan for, observe and record children's engagement with ICT in new ways.

What types of learning can be promoted with ICT?

Children's learning with ICT goes beyond developing skills such as using a mouse or developing hand-eye co-ordination. When their encounters with ICT are supported by guided interaction there is potential to promote three main areas of learning.

ICT can help to develop children's *dispositions to learn* by increasing self-esteem and confidence, or by supporting independence and persistence in the face of initial difficulties. It also has potential for promoting pleasure in learning by enhancing engagement, motivation and the desire to learn.

Knowledge of the world includes learning in areas such as mathematics, language, and knowledge of living things and places. In addition, exploring the role of ICT in leisure, work and play is an opportunity to recognise the competences and experiences children encounter at home and elsewhere, and to develop their ability to harness ICT for social and cultural purposes, such as communication, self-expression or entertainment.



ICT also develops *operational skills*. This includes understanding the functions of items such as the keyboard and on/off switches as well as the ability to operate them. Using ICT also develops children's concepts of technological interactivity, by showing that taking an action can produce a response.

What kind of ICT is best suited to this sector?

Desktop computers were originally designed for adults to use individually in the workplace. They are not ergonomically suited to very young children because of their size, position and fixed location. Their reliance on text as a means of input and output and the fine motor control required to use the mouse can make them difficult to use without adult help. Extending the definition of ICT to include digital still and video cameras, mobile phones, electronic keyboards and toys that simulate technologies such as laptops and barcode readers has a number of advantages. These technologies can provide better support for mobility and collaborative use, are easier to integrate into play activities and are more fun to use. This broader range of technologies also increases practitioners' confidence, supports learning in all areas of the curriculum, is more affordable for nurseries and gives children the opportunity to build on competences and knowledge that they may develop in the home.



Major implications

There should be no presumption about the place of ICT in the pre-school curriculum. Policy-makers, parents and practitioners need to engage in debate about its role and value and make decisions based on clear principles and evidence.

Policy

Our emphasis is not on what children can learn about ICT, but on how their interactions can be supported by adults to enhance learning. This requires promoting sustained, mindful engagement and encouraging positive dispositions to learn. Policy needs to take account of the three different dimensions of learning and the value of ICT within a framework of play. A checklist approach to assessing children's learning with ICT does not capture this richness and the instructional model associated with the use of ICT in schools is inappropriate. Enhancing learning includes providing support not just for operational skills but also for less measurable positive dispositions towards learning such as persistence, engagement and pleasure. A broad concept of ICT is central to achieving this.

Professional development

Practitioners have a rich repertoire of pedagogical actions to support learning, but need help to extend this expertise to enhance children's encounters with ICT in ways that are compatible with the dominant role of play in young children's learning. Professional development opportunities should enable practitioners to share knowledge and experiences with practitioners from other nurseries and build on and value their existing competences.

A focus on guided interaction makes a difference. It is effective for thinking about ways of supporting learning with ICT, both in terms of adult-child interactions and of addressing the implications for planning and recording. By focusing on

what children were actually doing rather than making assumptions about their skills or engagement, practitioners identified areas where they had previously over- or under-estimated children's capabilities. They also started to use ICT as a tool for assessment, describing how tracking software, photography and video were used to document children's development. This has the added benefit of enabling children to see adults making use of ICT.

The project used cluster sessions in which researchers and practitioners communicated their knowledge and experience as a key part of its design. Practitioners found these an invaluable means of sharing ideas and developing new approaches to ICT. They may be a more effective approach to implementing change than a cascade model of professional development or one which focuses on skills training. Encouraging all practitioners to develop their own confidence with ICT will avoid nurseries relying on one or two colleagues who are labelled 'ICT experts' to organise activities and troubleshoot problems.

Nurseries

Our expanded definition of ICT has implications for providing resources in nurseries. Practitioners were able to look again at existing technologies, such as the listening centre or toy telephones, and think about integrating them into the resources on offer in different ways. They also made new purchases, including a computer microscope, a karaoke machine, disposable cameras, walkie-talkies, a dance mat and an electronic music keyboard.

Including ICT in nursery development plans will help to ensure that it is perceived as central to learning rather than as the province of one or two members of staff. Nurseries also need to increase awareness of children's developing competence with ICT at home, and to liaise with the first years of primary school to ensure children's progression with ICT.

Further information

A book, *Guided Interaction: Supporting learning with technology in early childhood education*, is in preparation. Journal articles and other reports will be made available on the project website (see below). The report of a related study, *Already at a Disadvantage? ICT in the home and children's preparation for primary school*, is available from that website.

The following publications pre-date this study but relate to the research that informed its design.

Plowman, L. and Stephen, C. (2005) Children, play and computers in pre-school education. *British Journal of Educational Technology* 36 (2) pp. 145–157.

Plowman, L. and Stephen, C. (2003) A 'benign addition'? Research on ICT and pre-school children. *Journal of Computer-Assisted Learning* 19 (2) pp. 149–164.

Entering e-Society: Young children's development of e-literacies is a related research study that investigates pre-school children's experiences with ICT in their homes. Information is available at <http://www.ioe.stir.ac.uk/Research/e-Society>.

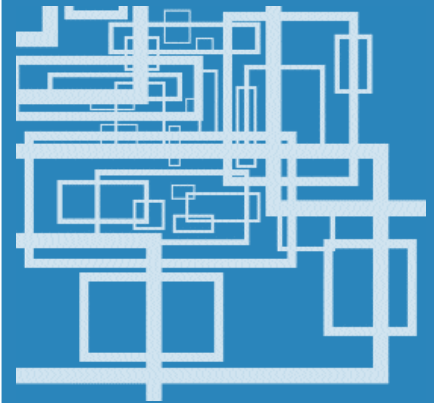
The warrant

Although this is a small-scale study, confidence in our conclusions can be based on the process of testing and refining our findings through user validation and endorsement involving practitioners, managers of provision and policy-makers. The study was based in eight pre-school settings which represented a range of types of provision and served a broad socioeconomic range of families. Two practitioners from each setting were the key contacts, at least one of whom had little or no previous experience with technologies in the playroom.

Researchers visited each nursery seven times and produced baseline information, a technology audit, field notes, focused observations and video recordings. Each of the two cluster groups also met researchers four times in the course of the 2003–2004 school year to share observations based on video recordings and to identify ways in which practitioners could offer guided interaction to support children using ICT. During this period, each nursery used a cycle of planning, action and review to identify two interventions for implementation and evaluation, one involving computers and one involving an alternative form of ICT. This process of guided enquiry was collaborative, with the research team providing the stimulus for practitioners' identification of the issues that were important to them and ensuring that the range of strategies to support learning with ICT was rooted in the dynamics and constraints of authentic pre-school settings. The definition of guided interaction developed iteratively as a result of our own analysis combined with the practitioners' experiences and observations.

Our main sources of evidence are the testimony of practitioners regarding the changes in their practice. We gathered this evidence through reflections on the interventions at the cluster meetings, individual interviews on how they conceptualised their practice before and after the interventions, practitioner-generated data, and a questionnaire on competence and attitudes distributed to all 40 practitioners in these settings. This data has been cross-referenced with many hours of video recordings taken in the playroom and supplemented by a survey of the views of over 200 parents of pre-school children as well as case studies of 16 children which explored their exposure to, and developing competences with, technologies in the home as well as in the nursery.

Teaching and Learning Research Programme



TLRP is the largest education research programme in the UK, and benefits from research teams and funding contributions from England, Northern Ireland, Scotland and Wales. Projects began in 2000 and will continue with dissemination and impact work extending through 2008/9.

Learning: TLRP's overarching aim is to improve outcomes for learners of all ages in teaching and learning contexts within the UK.

Outcomes: TLRP studies a broad range of learning outcomes. These include both the acquisition of skill, understanding, knowledge and qualifications and the development of attitudes, values and identities relevant to a learning society.

Lifecourse: TLRP supports research projects and related activities at many ages and stages in education, training and lifelong learning.

Enrichment: TLRP commits to user engagement at all stages of research. The Programme promotes research across disciplines, methodologies and sectors, and supports various forms of national and international co-operation and comparison.

Expertise: TLRP works to enhance capacity for all forms of research on teaching and learning, and for research-informed policy and practice.

Improvement: TLRP develops the knowledge base on teaching and learning and collaborates with users to transform this into effective policy and practice in the UK.

TLRP is managed by the Economic and Social Research Council research mission is to advance knowledge and to promote its use to enhance the quality of life, develop policy and practice and strengthen economic competitiveness. ESRC is guided by principles of quality, relevance and independence.

TLRP Directors' Team

Professor Andrew Pollard ■ London
Professor Mary James ■ London
Professor Alan Brown ■ Warwick
John Siraj-Blatchford ■ Cambridge
Professor Miriam David ■ London
Professor Stephen Baron ■ Strathclyde

TLRP Programme Office

Sarah Douglas ■ s.douglas@ioe.ac.uk
James O'Toole ■ j.o'toole@ioe.ac.uk

TLRP

Institute of Education
20 Bedford Way
London WC1H 0AL

Tel: +44 (0)20 7911 5577
Fax: +44 (0)20 7911 5579



Project website

The website for *Interplay: Play, learning and ICT in pre-school education* is at www.ioe.stir.ac.uk/Interplay/

Project team

Dr Lydia Plowman, Dr Christine Stephen, Susan Downey, Dr Daniela Sime

Project contact

Dr Lydia Plowman
Institute of Education, University of Stirling, Stirling, FK9 4LA

lydia.plowman@stir.ac.uk
+44 (0)1786 467619

ISBN 0- 85473-736- 7



9 780854 737369

February 2006