
CHILDREN AND YOUNG PEOPLE'S HOME USE OF ICT FOR EDUCATIONAL PURPOSES: THE IMPACT ON ATTAINMENT AT KEY STAGES 1-4

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The Study

This research project on behalf of the DfES examined the links between children's educational uses of Information and Communication Technologies (ICT) at home and their performance and attainment in key school subjects. It involved a pupil survey, and interviews with children, parents and teachers, during the summer term of 2004 in 12 English schools. Its main purpose was to investigate the types and amount of home and out-of-school use of ICT by children and young people at Key Stages 1-4, and to establish the relationship between this use and the pupils' assessed progress.

Key Findings

- Most pupils (89%) had access to home based ICT. However, libraries/internet cafes are not a substitute for a lack of access to hardware at home, because the children who do not use technology at home are also the group who use it least often in other locations.
- Parents and teachers believed that using ICT improved children's motivation and confidence. Pupils also regarded ICT as generally motivational, helping to make schoolwork more enjoyable and to improve achievement.
- Home use of ICT for educational purposes was linked statistically with a small improvement in children's attainment compared with expected targets in Maths at years 6 and 9. There was a modest but more extensive effect in English and Maths at year 11. The Maths results are difficult to interpret, since use for Maths is low. Thus in Year 9, the statistical association is derived from the 66% who used a home computer for school work, but only 23% of the year group had actually done so for Maths.
- Substantial use of ICT for leisure purposes was linked statistically with a sizeable decrease in attainment against expected targets. This effect was over twice as large an effect as the positive one of using ICT for educational purposes. In other words, it is not access to, or general use of, ICT *per se* that will affect attainment, but rather how the technology is used.
- There is a strong relationship between subject specific uses of ICT in lessons and children's home use of ICT for educational purposes.
- Girls in the study were more likely than boys to use home computers for schoolwork, reflecting their more conscientious attitude to study rather than a preference for ICT. Boys were the more intensive users for leisure purposes. This pattern has implications for the gender gap, given that high leisure use was a negative factor for progress in key subjects. But it also suggests that benefits could flow from redirecting some of boys' inherent interest in ICT.
- Teachers are deterred from explicitly setting homework using ICT because of concerns about a digital divide in children's access to technology out of school. Yet children with home computers take the implicit message to use them for homework, and so can potentially gain an educational advantage.
- Home-school ICT links were poorly developed but desired by parents.

Methodology

The research involved three stages:

- A self completion questionnaire survey of children and young people in years 6, 9 and 11 about their use of ICT, outside of school, across all curriculum subjects and for non-subject specific educational purposes. Questionnaires were sent home via primary schools for parents of year 2 children to complete.
- 111 children and their parents/carers (from diverse social backgrounds and with diverse patterns of ICT use), as well as both primary and secondary teachers, were recruited to take part in qualitative interviews. A log of computer-related activities was kept by 62 year 6, 9 and 11 pupils. 23 year 2 pupils kept logs over the period of one week.
- Analysis of the statistical relationship between children's use of ICT out of school and their attainment in national tests and GCSEs.

The Patterns of Home Use of ICT for Educational Purposes

Most pupils (89%) had access to home based ICT. Families in social classes AB were more likely to own 3 or more computers. Pupils in year 11 (41%) were more likely to have a PC in their own bedroom allowing them exclusive and independent access to the technology than younger pupils (year 9-34%, year 6-31% and year 2-6%). Libraries/internet cafes are not a substitute for lack of home access, because children who use technology at home are also the group who use it most frequently in other locations. Year 6 and 9 pupils are more likely than Y11 peers to use a computer everyday or at least once a week at a friend's house, at public libraries or in school outside of lesson time (e.g. in computer clubs). But only 4% of pupils use internet cafes regularly.

Variations in the level and types of children and young people's home use of ICT

The majority of children in years 6, 9 and 11 reported using a computer at home for schoolwork for 1 to 2 hours per week. For Year 2s, 65% of parents stated that their child used a computer at home every day or at least once a week. Home use for educational purposes intensified with age, reflecting the increasing requirements of coursework and exam preparation. The pattern was

reversed for leisure use, with only 14% of year 11 pupils reporting 10 hours or more of 'fun' computer time per week.

There is a clear relationship between pupils' experience or instruction at school and the use they make of computers at home. Children who use a computer everyday or at least once a week in a particular subject at school are more likely to use a computer in these subjects at home. Likewise, those who never use a school computer in certain subjects are more likely to report never using a computer out-of-school for those subjects.

Girls were more likely to use home computers for schoolwork than boys. However, boys (61%) were more likely to report using a computer for games everyday or at least once a week than girls (44%). The gendered pattern of ICT use - girls using it for educational purposes and boys for 'fun' - was established as early as year 2.

English is the subject in which computers were used most often for schoolwork outside of school by year 6, 9 and 11 pupils. In Maths and Science, computers were more likely to be used by Year 6 pupils than other age groups; for Geography and History it was Year 9s. The year 6 and 9 groups made more use of exploratory technologies e.g. CD Roms and DVDs, whereas older pupils (Y11) reported greater emphasis on specific packages such as word processing and spreadsheets.

The Effects and Drivers of Home Use of ICT for Educational Purposes

Impact on Attainment

Home use of ICT for educational purposes, of whatever level or type, was linked statistically to a small improvement in children's attainment against expected targets in Maths at years 6 and 9. There was a modest but more extensive effect on their progress in English and Maths at year 11. These analyses take account of some background factors, including gender and indicators of cultural capital. Using a home computer for educational purposes at year 2 produced little discernible impact on pupil attainment. Parents of year 2 children did, however, describe less measurable outcomes such as children learning words or to type more quickly.

Use of ICT at home to support learning

The benefits of ICT reported by children were mainly the ability to:

- find new sources of information
- enhance the presentation of their work
- use more opportunities for revision/consolidation of learning
- save time on mundane tasks such as editing, and
- increase motivation.

Primary and secondary teachers reported that ICT raised the self esteem and confidence of low achievers and enabled those with special needs or high achievers to demonstrate their abilities. But a minority of parents and teachers suggested that ICT had educational disbenefits, chiefly undermining children's need to learn to spell or use grammar, and encouraging them to cut and paste information without understanding or reflection. Despite the fact that Year 2 children's use of ICT was predominantly recreational, the majority of their parents (84%) agreed with the statement 'using a computer helps my child to learn useful things'.

The drivers of ICT use for educational purposes out of school lessons

Pupils had positive orientations to technology because of its motivational qualities (e.g. it made work more enjoyable, and they perceived it improved their grades) rather than because they were told to use ICT by teachers or parents. The subjects in which pupils (in years 6, 9 and 11) most used home computers for schoolwork (at least once a week) were the same subjects in which they believed that using a computer improved grades.

The barriers to using ICT for educational purposes out of school lessons

A wide range of barriers were reported in interviews with children, ranging from a lack of explicit instruction to do so by teachers, through low self-confidence in using the technology to a fundamental lack of interest in particular school subjects, whatever the medium. Access and technical capacity were also issues: almost all children with home broadband used the Internet compared to only two thirds of pupils with dial-up access; and there were criticisms of the booking systems, poor specifications and inflexibility of school equipment available out of lesson time. Amongst those interviewed, school computer clubs had limited appeal.

The Nature and Effects of Home Use of ICT for Leisure Purposes

The Impact on attainment of high leisure use

Among Year 11 pupils, extensive use of ICT for leisure purposes was related statistically to lower progress towards expected attainment targets. This effect was over twice as large an effect as the positive effect of using ICT for educational purposes. Time is clearly an issue: the more time pupils spend playing computer games (or indeed other leisure pursuits) the less they have available for study. A minority of parents argued that console games and non educational computer games developed particular skills, such as making them think, or building factual knowledge. But this study was not designed to assess any such gains.

Patterns of leisure uses of ICT outside of school

Year 2 children's preferred computer activities were playing games and drawing/art packages. Year 6 pupils were the most likely to play games and write personal stories, and were the highest users of CD Roms and DVDs. Use of the internet to search for information for 'fun' was strikingly similar across years 6-11 (18-19%). Year 11 pupils were the most likely group to use email or download files, whilst regular (daily) chat room use was around 8% across the Y6,9 and 11 groups.

Use of ICT to Support Home-School Links

Interviews with children, parents and teachers suggests that ICT based home school links (e.g. use of school Intranet/websites, email, advice and support from schools on home ICT use) were generally poorly developed. Children were often not aware whether their school had an intranet or not; were unable to access it because they had misplaced instructions or passwords; or found the sites dull and not useful. The majority of pupils did not email teachers for help with schoolwork.

The implications of the digital divide for homework

Teachers were reluctant to set home work that explicitly required ICT because of concerns about the digital divide between pupils with and without home access. However, because the pupils interviewed appeared to pick up the implicit message to use ICT at home if they could, the unevenness of educational opportunities is reinforced. The children least likely to use computers outside of school for study are less than

half as confident at using a computer as those using computers extensively outside school.

ICT based home-school links

Children were more likely to turn to parents for help with computer-related homework than to a teacher, yet parental ability to help varied widely. Pupils with only low levels of home support with computers were the ones most likely to never use a computer for homework in some subjects (English, History and Science). Parental interviews suggest that they want better electronic (email) links with schools, and help from schools to support them with their child(ren)'s use of ICT, including finding suitable websites. Teachers reported that they only provide guidance about ICT use to parents who specifically approached them for help. Schools therefore need to address, rather than implicitly reproduce, divides in home support and parents' ICT competencies.

The role of teachers in establishing stronger ICT-based home-school links

Teachers have a lack of understanding about what stronger links might involve, and appeared fearful about the potential impact on their time of links such as email contact with pupils or parents. None of the teachers interviewed had had relevant training, and some had concerns about security issues.

Additional Information

Copies of the full report (RR672) - priced £4.95 - are available by writing to DfES Publications, PO Box 5050, Sherwood Park, Annesley, Nottingham NG15 0DJ.

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