Secondary school students’ use of computers at home

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Abstract
This article presents the results from a survey of students in Year 9 in secondary schools in England (ie, aged about 14 years) which investigated access to computers at home, frequency and duration of use, the applications used and students’ reasons for using a computer at home. Responses showed that the majority of students had access to a computer, although few had one for their sole use. The most widely used applications were games/adventures and word processors. There were significant gender differences in access to computers at home, frequency of using computers and the applications that students spent most time using.

Introduction
Over the last few years there has been increasing penetration of computer sales into the home market. Factors such as the relative reduction in cost, the advent of user-friendly graphical user interfaces (GUIs) such as Microsoft Windows and the latest multimedia technology with the increased availability of educational software (especially on CD-ROMs) have led to increasing numbers of families owning a personal computer. Surveys such as the statistical bulletins issued by the Department for Education and Employment (DfEE, 1997) have shown that secondary schools have moved away from the Acorn platform in favour of increasing numbers of IBM PC compatible machines. This means that, today more than ever, it is possible for a substantial number of students to have access at home to a personal computer that will use the same operating system and software as the computers they use at school. However, at the same time there has been an increase in the sophistication of systems designed solely for games use, such as Sega, Nintendo, and Gameboy. It may be the case, therefore, that despite the availability at home of personal computers with “tool” software, such as word processors and spreadsheets, students prefer to use computers for games. With this in mind, a small-scale study was set up to investigate the following questions:

• how many students have access to a personal computer at home?
• how many students have a personal computer for their own sole use?
• how much time do students spend using personal computers at home?
• what sort of applications do students use at home?
• why do students choose to use a computer at home?
• are there any gender differences in terms of access to and use of computers at home?

The sample
The sample consisted of 450 Year 9 students in secondary schools in England: nine students in each of 50 schools. This sample had been randomly selected to participate in an optional component of a major international study: the Performance Assessment component of the Third International Mathematics and Science Study (TIMSS), which involved students who had previously completed written tests in attempting practical tasks in mathematics and science. Students were selected from across the whole year group (ie, not from only one or two sets/bands/streans/teaching groups) on the basis of day of birth. The sample had to conform to guidelines drawn up by the international coordinators of TIMSS so as to ensure the sample was representative of the population of students. (More detailed information about the samples of students can be found in Keys et al., 1996.)

Methodology
Data regarding students’ use of computers at home were collected by means of a questionnaire. The sample of 450 students was originally selected to participate in the TIMSS Performance Assessment: this involved sending trained administrators to each of the 50 schools selected to supervise the students who attempted the practical tasks in spring 1995 (see Harris et al., 1997 for further national details of the Performance Assessment). With the approval of the headteachers, the visiting administrators handed out the questionnaires to the students at the end of the practical activity session.

The completed questionnaires were manually coded and the data were analysed using SPSS. Throughout this article, the data are presented to show percentages for boys and girls separately, and the overall percentages. Statistical significance (as calculated in terms of the likelihood ratio relating to the chi-square) is also shown where appropriate: results which are significant at the 5% level or less (p \( < \) 0.05) are generally accepted as evidence of a real difference ie, it is unlikely that such a difference would have occurred by chance.

Results
In all, 429 completed questionnaires were returned, representing a response rate of 95%. Fifty-one per cent of respondents were male and 49% were female.

Access to computers
The majority of students had access to a personal computer at home, as shown in Figure 1. It should be noted that the questionnaire instructed students not to include games computers (such as Sega, Nintendo and Gameboy) when answering this question, so responses indicate the availability of computers with the potential to be used
for a range of purposes, rather than games-only machines. There were no significant gender differences in the number of computers at home.

So as to ensure that the data from subsequent questions were based only on the responses from students who had access to a personal computer at home, all respondents who had indicated that they had no access to a personal computer at home were excluded from further analysis, with the exception of the final question (which invited comments or additional information from the students). This meant that the number of potential respondents for all but one of the remaining questions was 328: 171 boys and 157 girls.

Responses to a question asking students to select one of three options which most closely indicated their own level of access to a computer at home are shown in Table 1. Gender differences in terms of access to computers were particularly marked and highly significant, with boys reporting better access than girls.

Amount of computer use
Two questions addressed the issue of the amount of computer use: one focused on frequency of computer use, and the other asked how long students spent using a home
There was some evidence to support the popular belief that substantial numbers of adolescent students spend considerable amounts of time using computers: 33% indicated that they used a computer at home once a day (or more) (see Table 2). However, there was a significant gender difference in the frequency of use, with higher percentages of boys reporting themselves to be frequent users, and, conversely, higher percentages of girls reporting themselves to be only occasional users.

In contrast, there were no significant gender differences in the length of time usually spent using a computer on each occasion of use (see Figure 2).

**Applications used**

In order to determine what sort of applications were widely used, students were given a list of seven different applications (which were deliberately related to the strands of information technology capability described in the non-statutory guidance for IT (NCC, 1990)) and asked to indicate firstly, which ones they used at home; and secondly, which one application they spent most time using at home.

As shown in Table 3, students’ responses suggested that patterns of use across applications were similar for boys and girls. In addition to the applications listed, students were also given the opportunity to list up to two further applications which they used.

Only 13% of students listed other types of software; those most frequently mentioned were:

- schoolwork/educational programs
- electronic communications (eg. modem, Internet)
- programming (including writing games)
- specific (named) applications (eg. speedtyping; natural wildlife disk; “sorting my rock-climbing performance”)

Of the other uses indicated by respondents, the single application most frequently cited was for homework/educational use.

The two applications which students indicated they spent most time using were games/adventures and word processing. However, there was evidence of a substantially higher percentage of boys spending the majority of their time using games/adventures, whereas the percentage of girls predominantly using a word processor was twice as
many as the boys. The highly significant gender difference ($p < 0.01$) is a reflection of the differences in the use of these two applications.

**Reasons for using a computer at home**

One question focused on the students’ motivation for using a computer at home. This was presented to students as a question (Why do you use a computer at home?) followed by four statements which students were asked to tick if the reason applied to them. The statements listed were:

- Because I enjoy playing computer games
- To help me generally with school work
- Because I like using it
- To help me with homework for school.

In addition, students were invited to list any other reasons they had for using a computer at home.

Responses suggested that for both boys and girls, the option to use a home computer for playing games was the strongest motivator (71% of boys and 59% of girls; 65% overall), although the remaining reasons listed were also selected by substantial numbers of respondents (approximately 40–50% in each case). Interestingly, the responses of boys and girls were similar, with the attraction of computer games being the most powerful motivator for both genders, and assistance with school homework being the least powerful motivator.

Relatively few students (14%) offered their own reasons for using a computer at home. The additional reasons cited were grouped into categories as follows (in descending order

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Table 3: Percentages of students using different types of software at home

<table>
<thead>
<tr>
<th>Type of software</th>
<th>Boys %</th>
<th>Girls %</th>
<th>Overall $^1$ %</th>
<th>Boys %</th>
<th>Girls %</th>
<th>Overall $^1$ %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Games/adventures</td>
<td>85.4</td>
<td>83.4</td>
<td><strong>84.5</strong></td>
<td>63.4</td>
<td>52.1</td>
<td><strong>58.1</strong></td>
</tr>
<tr>
<td>Word processing</td>
<td>64.3</td>
<td>68.2</td>
<td><strong>66.2</strong></td>
<td>16.1</td>
<td>33.1</td>
<td><strong>24.1</strong></td>
</tr>
<tr>
<td>Creative arts (eg, music, graphics)</td>
<td>43.3</td>
<td>43.3</td>
<td><strong>43.3</strong></td>
<td>7.5</td>
<td>3.5</td>
<td><strong>5.6</strong></td>
</tr>
<tr>
<td>Spreadsheets</td>
<td>31.6</td>
<td>20.4</td>
<td><strong>26.2</strong></td>
<td>–</td>
<td>2.1</td>
<td><strong>1.0</strong></td>
</tr>
<tr>
<td>Desktop publishing</td>
<td>28.1</td>
<td>21.0</td>
<td><strong>24.7</strong></td>
<td>1.9</td>
<td>0.7</td>
<td><strong>1.3</strong></td>
</tr>
<tr>
<td>Information handling (databases)</td>
<td>29.2</td>
<td>19.7</td>
<td><strong>24.7</strong></td>
<td>0.6</td>
<td>1.4</td>
<td><strong>1.0</strong></td>
</tr>
<tr>
<td>CD-ROMs</td>
<td>22.8</td>
<td>17.8</td>
<td><strong>20.4</strong></td>
<td>4.3</td>
<td>3.5</td>
<td><strong>4.0</strong></td>
</tr>
<tr>
<td>Other</td>
<td>16.4</td>
<td>8.9</td>
<td><strong>12.8</strong></td>
<td>6.2</td>
<td>3.5</td>
<td><strong>5.0</strong></td>
</tr>
</tbody>
</table>

$^1$ Percentages do not sum to 100 as respondents could tick more than one application.
• educational: “revision before exams”; “it helps my dislecic” [sic]
• recreational: “pleasure and to relax”; “draw pictures for fun”
• technological: “understanding how computers work”; “talking on the Internet”
• social/business: “to write letters”; “I help in the family business”.

Discussion
The responses to this survey suggest that the majority of lower secondary school students have access to a personal computer at home (77% of respondents) although relatively few students have their own computer (one in five of those who had access to a computer at home). Amongst those students with access to a computer at home, the responses suggested that they used a computer several times a week, but spent less than two hours on each occasion of use.

The most widely used applications were games/adventures and word processing. It seems likely that these two applications respectively represent leisure- and school-related activities. Some students’ own comments in the final question focused on their enthusiasm for at least one of these applications: “I think computers are great things to use whether for playing games or for providing information, or helping you with school work.” Even respondents who did not have access to a computer at home expressed the same interest in games: “If we had a computer … I would do my homework on it, but I would also play games on it.”

The pattern of home computer use by lower secondary school students indicated by the responses to this survey suggests extensive use of two applications which are relatively easy to use and widely available. The survey did not ask students which applications were available for them to use at home, and it is likely that, for at least some respondents, some applications were not available. Relevant factors in this context include:

• the type of hardware
• software which was “bundled” with the computer at the time of purchase, if any: in recent years integrated packages such as Claris Works, Microsoft Works and Microsoft Office have made it possible for home computer users to have access to several different applications (eg, word processor, database and spreadsheet) at a relatively low cost
• the general level of computer literacy or interest within the household, and the willingness, or possibly even confidence, to purchase software for home use.

In addition, some respondents’ use of some software applications on computers at home may have been influenced by the types of software they used at school. Comments made by some students emphasised the relevance of the hardware and software used: “I have a PC but if I do some work on the computers at school I can’t do it at home on my PC because the Acorn and PC aren’t compatible”; “Programmes at home are different from school” and “Sometimes my parents help me with the computer for [sic] schoolwork, but I am fairly familiar with computers from school”.

Whilst the option to use a computer at home for educational purposes was of some importance to many respondents (approximately 40% of those respondents with access to a home computer), the facility to play computer games was a strong motivator for more students (65%).

**Gender differences**

There were significant gender differences in terms of access to computers at home, frequency of using computers and the applications students spent most time using. More than twice as many boys as girls reported that they had a computer at home “just for myself”, and where students shared the use of a computer, boys were again in the more favourable situation: more boys stated that they were the main user, whereas nearly two-thirds of girls reported that other people in the household used the computer more than they did.

Responses suggested that boys were frequent users of computers at home but girls used them only occasionally: 46% of boys used a computer about once a day, but 51% of girls used a computer once or twice a month or less. Interestingly, however, there were no significant differences in the length of time spent using a computer on each occasion of use.

Responses to the question that asked students to indicate which one application they spent most time using revealed that the most popular application for both boys and girls was games/adventures, and the second most popular for both genders was word processing. However, the pattern of responses was interesting: for boys, the popularity of games was four times greater than that of word processing, whereas for girls the situation was somewhat different—girls who spent most time on games outnumbered those favouring word processing by only one and a half times.

It is worth considering the reasons for the gender differences mentioned above. Is it the case that parents are more likely to purchase a personal computer for sons than for daughters, and if so, why? Schools make considerable efforts to ensure that there is equality of opportunity for both boys and girls to use computers, and at least in some cases try to provide female students with appropriate role models of female staff confidently using computers. Other research (see, for example, Durndell et al., 1995) has referred to the “We can but I can’t” paradox, in which girls believe that as a whole, their gender is as capable of using computers as males, yet at the same time perceive themselves as lacking skill and competence in this area. If girls are disadvantaged in terms of access to computers at home and perceive themselves as less competent in using them at school than boys, the outlook seems particularly inequitable, and may reach a point at which it becomes self-perpetuating.

**Conclusion**

The pace of development within the field of information technology means that the findings described above represent only a snapshot in time, conveying the situation at the time of the survey.
However, the results of the survey show that the majority of lower secondary school students have a computer at home, but more than half of these students spend most of their time playing computer games, although word processors are also frequently used. For some students, issues of incompatibility between systems used at school and those used at home act as a disincentive to students who want to follow up school work at home.

The survey found evidence of gender differences in access to and use of computers, with boys significantly more likely to have their own computer, or be the main user of a shared computer.

**Acknowledgement**
I would like to thank David Malvern of the University of Reading for providing helpful comments on a draft of this article.

**References**