The Lost Generation? The Lack of Competence in Using Information Technology amongst Postgraduate Students of English Entering Initial Teacher Education

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ABSTRACT This article analyses the lack of Information Technology (IT) competence in postgraduate students of English entering teacher training, by looking at IT provision in Scottish schools. Computers first appeared in Scottish Secondary schools between 1981 and 1983. It was considered a reasonable assumption that students entering teacher education, over a decade later, would be competent in IT. The results of this 3-year study show that this assumption was misplaced and considers possible reasons as to why the results were so disappointing. A questionnaire to graduates, who had attended school between 1987 and 1992 aimed to establish their exposure to IT in school and university and establish their confidence in using IT. The second phase of the study surveyed schools to establish whether or not the situation had changed since the policy recommendations made by Her Majesty's Inspectors (HMI) in 1987 and to consider the IT competence of English graduates who might train to be teachers in the year 2000.

Introduction

It is widely assumed that graduates entering initial teacher education in the 1990s will be competent in various applications of Information Technology (IT) and will be confident in using computers. The assumptions arise from the fact that huge sums have been invested in hardware and software in Scottish secondary schools. In United Kingdom (UK) universities, massive investment has been made in hardware, software and in staff development. The Computers and Teaching Initiative (CTI) was established by the Computer Board for the Universities and Research Councils in 1985. The first phase saw the establishment of 139 courseware developments at universities throughout the UK (LTDI, 1995). Funding for these projects ceased in 1989, but was followed up by 21 CTI centres, each subject specific,
to promote and support the effective use of computers in university teaching. (Editor’s note: There is no CTI for education as a subject). In 1996, four out of 22 CTI centres were situated in Scottish Universities. In 1992 the UK Universities Funding Council introduced two new types of project and invited institutions to bid for funding. A total of 43 teaching and learning technology projects (TLTP) were funded in phase one (1992/93). In March 1995, 15 out of the 76 currently funded TLTP initiatives, were based in Scottish Universities (LTDI, 1995).

However, personal experience suggested that this investment had not ensured that applicants for teacher training were competent with IT. At interview, many post graduates gave faltering replies to questions concerned with IT. Once they were on the course, many showed that they lacked an awareness of even the basic skills of inserting a disk into a disk drive, loading simple applications and saving documents. The media also expressed surprise and concern that students entering a postgraduate certificate in education in 1994 appeared to be ‘computer illiterate’ (The Times Educational Supplement Scotland, 1994).

Was the assumption that postgraduate students would be competent in the use of IT justified? To establish this, the policy guiding IT developments in the years when these students would have been at school was reviewed. In addition an account is given of the ways in which IT was introduced in Scottish schools during this implementation phase.

Policy 1972–1987

Policy on microcomputers in education in Scotland is based on the Bellis Report published in 1972 (Bellis, 1972). This report took the form of a set of recommendations rather than prescriptions. This remains the policy of the Scottish Office Education and Industry Department (SOEID) today. The Bellis report recommended:

- computer appreciation courses for all pupils;
- integration of educational computing across the curriculum;
- no examinable computing during the implementation stages;
- regional educational computing centres and a national computer education development centre;
- promotion of awareness and expertise amongst the inspectorate, advisorate and teaching profession.

From 1979 onwards it was felt that four main factors would influence the use of microcomputers in education:

- the supply of hardware;
- the provision of software;
- the training of large numbers of teachers;
- changes in curriculum content and methodology.
Hardware

In the 1979/80 session the Scottish Education Department (SED) began to encourage the supply of computers. The Scottish Microelectronics Development Programme (SMDP) was established in 1981. A £30,000 budget was allocated for the purchase of hardware for lending to interested parties in schools and colleges, in exchange for the development of software. The Department of Trade and Industry (DTI) organised microcomputer competitions, and offered 50% of the purchase price of a computer to every primary and secondary school in the UK. In 1984 the Technical and Vocational Education Initiative enabled participating schools to purchase a wide variety of hardware. Parent Teacher’s Associations, and even local supermarkets, contributed to schemes for the purchase of hardware.

Software

In 1981 the forerunner of SCET (The Scottish Council for Educational Technology) was set up by the Scottish Office with three priorities:

- the development of software;
- research and development;
- the establishment of an information centre.

In 1983 the Microelectronics in Education Committee (MEC) was set up with SCET as its executive arm. Many curricular packages were developed in collaboration with teachers and distributed free to local computing centres. Thereafter, they were distributed to schools (at no charge). Many national working groups were set up with Department of Trade and Industry (DTI) funding to devise cross curricular software.

Local education authorities were encouraged to negotiate regional licences and special prices to enable the cheaper distribution of software produced commercially. The Consultative Council on the Curriculum (CCC), an advisory committee to MEC also supported and facilitated curriculum based software.

Staff Development

Staff development was provided by local authority advisory staff and by colleges of education. In 1984 policy was to recruit extra staffing in computing studies to cope with increasing demand for staff development. In 1984 a feature of the Technical and Vocational Education Initiative (TVEI) was to fund courses, many of them focusing on the new technology.
Curriculum Content

Original policy was to support the development of cross curricular methodology and the integration of computing skills within subject areas so that pupils learned about the technology, by using it in a context. HMI (1987) outlined the new applications of microcomputers as:

- electronic blackboard
- presentation
- simulation
- interfacing
- information processing
- text, sound and graphics processing.

The recommended ‘idealised framework’ produced by Odor & Entwhistle (1982) identified the following priorities:

- hardware appropriate to specific, defined purposes;
- a range of well documented software;
- ready access to equipment, housed in appropriate conditions and effective school-based inservice arrangements to share developing expertise;
- time to develop programs and documentation, and to carry out systematic evaluation, where appropriate software was not already available;
- provision of adequate technical advice and support for software development and curriculum applications;
- opportunities for attending inservice courses not just in technical skills, but in educational usage and classroom management of the innovation.

Conclusion on Policy

All regional authorities and schools were encouraged by the SED to develop policies concerning the use of the new technologies in education. The emphasis of policy in education in Scotland was to encourage and facilitate local developments, rather than to dictate and make legal requirements. The focus of that policy was to encourage integration of IT into all areas of the curriculum and not to focus expertise and resources within computing departments in the support of national examinations. The development of IT competence was therefore expected for all students in schools rather than a narrow focus on computing.

Practice

However, the practice, which would have affected the graduate of 1992/3, was somewhat different from the policy encouraged by the Scottish Office. The following review has not been recorded in academic literature but is based on the writer’s experience as a user of IT to support the curriculum; a
developer of software, a principal teacher of English; a member of the educational development service and a lecturer in teacher education. It includes wide consultation with others in the field.

Policy statements for IT were not produced by all authorities, although there had been a recommendation of the Bellis Report. Those who did produce policy statements, communicated them, or not, in a variety of ways. In some authorities, staff tutors and advisers were appointed, and they added their own interpretation to authority policy. A great deal of the development in the area of IT was carried out by those with computing as a subject specialism and dissemination depended on whether or not they felt they had a responsibility to develop cross curricular awareness. There was no formal system for evaluating and monitoring policy implementation in any authority's management structure. As a result, practice was patchy with a variable amount of policy to provide a scaffolding for what developed. It is important to remember that there are significant differences between the Scottish and English Curriculum which have been well documented by McDonald & Davies (1995). There has always been one curriculum in Scotland and one examining body. The fragmented, haphazard approach to the introduction of IT was a departure from the norm in terms of curriculum development, which was usually arrived at by consultation and consensus.

**Hardware**

In 1979 there were twenty machines in Scottish secondary schools. By 1987, this number had increased to 8000 (HMI, 1987). This was quite an achievement, considering the cost of the machines. In 1984 when the Apple Mac was introduced, the cost of one personal computer was £2400. A laser printer was priced at £7000. At this time a small family car was about £4500. In 1987 HMI reported that “the majority of our schools (secondary) have at least 15 machines – some have many more”. Today’s graduate, who would have been attending school at this time, would have had very little exposure to IT, as there was very little of it about and it was very unevenly spread.

A further difficulty has always been the bewildering variety of hardware platforms available. In the lending scheme operated by SMDP 24 different types of computer were available; the most common being the Apple II, the Cromemco and the Commodore Pet. As the hardware continued to develop, schools ‘progressed’ to the Acorn BBC, Research Machines 480Z, Acorn Archimedes, IBM compatible or Apple Macintosh.

In Scotland a large part of the Rate Support Grant was, and until recently, given straight to local authorities, notionally for spending on microelectronics developments in education. As a result, local education authorities developed their own initiatives, based largely on which system was preferred by the local education adviser in computing. Most regions tried to standardise on one machine for which they were prepared to
provide software and technical support. Schools largely followed regional advice on this matter, although, on occasion, they retained their own autonomy and bought, or had provided, different machines often with funding from parents’ groups. This meant that it was extremely difficult to provide expertise in terms of technical support for a wide variety of platforms. Consequently, it was not unusual to find a mixture of platforms in the same school. Only the teacher who was very enthusiastic about technology would persevere in this environment, and these enthusiasts were usually to be found in the mathematics and science departments and that is where the equipment also ended up – concentrated in pockets in schools rather than being equitably dispersed.

The Supply of Software

There were some successes in this area. SMDP and SCET, along with colleges of education, produced many software packages, which supported the developments within the Scottish curriculum. However, the distribution of these was more problematic. Schools did not have a central budget for purchasing software and often it was the enthusiast, who was sufficiently motivated, who pursued the appropriate funding. When this person left the school, the expertise tended to go with him or her. It was difficult to disseminate information about relevant, often free, software. As a result, good packages were unused and schools frequently bought several copies of the same software. It was not unusual to find four different word processing packages in use in the one school (HMI, 1987). In addition, much of the curricular specific software was not particularly relevant to the Scottish syllabus.

Staff Development

Staff development in the 1970s and 1980s tended to focus on programming or computer awareness rather than on the integration of IT into learning and teaching. Again practice deviated from policy, and whereas there were successes in some schools, this was largely due to the personal intervention of an enthusiastic member of staff, than to a well thought out school policy.

There was also no national policy on the allocation of technician time to support developments in the use of IT. As a result, no time was officially given for this purpose and heavy pressures were placed on the enthusiast who, in addition to their normal teaching load, provided basic support for colleagues, wrote programs and acted as the main, unpaid, resident consultant. From 1976–1986 there was a great deal of work involved in the development of new courses for the 14–16–year–olds in the Standard Grade programme. The increased workload led to an embargo being placed on all inservice courses and curriculum development by the teachers’ unions in the
mid seventies and eighties. This seriously affected curriculum development in all areas including information technology.

*Curriculum Content*

Although national guidelines recommended permeation and integration of IT within subject areas, this was not what happened. Throughout the 1970s and early 1980s staff development frequently concentrated on programming courses. In 1983 decontextualised computer awareness courses were the norm for most pupils. These were probably 2-week inserts on keyboarding skills and a very basic introduction to word processing. Although the Bellis Report had made a recommendation that there should be no examinations in computing at this stage of implementation, this was in fact what happened, with the introduction of an ‘O’ Grade computing pilot course in 1982. National Certificate modules in computing and Higher Grade computing were launched shortly after this and the hardware necessary to support these examinations was sited in the Business Studies and Computing Departments. Not only the equipment, but also the expertise was locked into these particular curricular areas which, in Scotland, tend to be taken by the less academic pupil. Access to IT would have been very limited for pupils who were not studying either of these subjects, as would have been the case for pupils who might go on to graduate with degrees in English.

*Conclusion*

It would not be surprising to find that graduates who had been in the system during this time had little expertise in IT. First, in the early 1980s there was very little of it about. Secondly, contrary to policy, much of the resourcing and expertise was focused on computing departments in support of national examinations. Pupils who became graduates in English were likely to lack confidence in their use of IT because they had had very little exposure to IT at school.

*IT in Graduates of English Training to be Secondary Teachers*

Several recent studies have considered the competence in IT of today’s graduates entering initial teacher education. Mellar & Jackson (1994) pointed to a significant increase in the level of competence between 1992 and 1994 and stated that the use of computers in schools was having an increasingly important effect on students under the age of twenty five. However, McDonald & Davis (1995) were more cautious when they pointed out that, although much has been done in this area, many PGCE students lacked confidence and were unconvinced of the educational benefits of IT.
Both of these studies concentrated on primary and secondary students across the curriculum. This study focused only on graduates in English, training to be teachers of English in the secondary sector in Scotland and explored the competence in IT of the above students, over a three year period from 1993–1996. The aim was to find out about their use of IT when at school and university and to establish whether they did lack confidence in using IT as the anecdotal evidence seemed to suggest.

**Methodology**

In order to test the assumption of competence in IT, a questionnaire was issued to the complete intake of English graduates to the PGCE (Post-graduate Certificate in Education) at the Faculty of Education of the University of Strathclyde in the years 1993/4, 1994/5 and again in 1995/6. The questionnaire dealt with the following areas:

- **Age**: the age bands were 20–25; 26–30; 31–40 and 40+. Students over 30 were disregarded as they would not have been at school in the period in question.
- **School and university attended**: the Faculty of Education receives students from the UK and overseas, in particular Canada. All non Scottish students were excluded from the analysis, as they would not have been part of the education system in the study.
- **Details of their usage of computers at school and university**: students were asked whether they had used a computer in any subject in school and then in the English department in particular. University usage of computers was explored by again asking if they had used IT in any subject and also in their English studies.
- **An indication of their confidence in their own competence with IT on a 1 (low) to 4 (high) scale.**

**Results**

1993/4. The intake of 110 postgraduate students who were training to be English teachers were asked to complete the above questionnaire. Responses were received from 70 students (64% return) at the beginning of session 1993/4. Only the students under 30 years old who had been to school in Scotland were considered. This gave a sample of 42 who would have been affected by the practice and policies in place at that time.

1994/5. On this occasion, completed questionnaires were received from ninety four students (94% response). A sample of 51 students for session 1994/5 were Scottish and under 30 years old.

In 1995/6. The total sample was 54 students (60.67% response). Of these, 42 had attended Scottish universities, but only 28 fell into the appropriate
age band of 20–30 years old. Although this was a much smaller sample, it was decided that analysis would be valuable to see if any trend was revealed.

**Usage at School by Subject**

In 1993/4, 69% of students in the sample had not used a computer in any subject in school. Of the 31% who had used a computer, 69.2% had done so in Computing Studies. The other numbers were very small: one person indicated that they had used a computer once in a mathematics lesson; the experience of one student was within geography and three indicated that they had used a computer for word processing within the English department.

In 1994/5, 66.7% of the total sample had not used a computer in any subject area while at school. Of the 33.3% of students who had indicated that they had used a computer at school, 88.2% of these said that they had done so in maths (23.5%) or in computing (64.7%). The experience of 17.6% had been word processing and 11.8% in social subjects. No other examples of usage were quoted.

Figure 1. The percentage of students using computers at school, by year of intake (n=42, 51 and 28, respectively).

In 1995/6, 71.4% of students entering initial teacher education as graduates in English had not used a computer at all in school. Only 28.6% of students had used a computer at school. Five of these students indicated that they had gained their computer experience by doing word processing and two by
using CD Roms in English. In Modern Languages one student had used graphics or sound and one used word processing. In Science one was involved in graphics and sound handling and, similarly, one in Social Science had also used a graphics or sound processing package.

Figure 1 shows that there was no increase in usage of computers over the 3-year period. The results from the two earlier years appears to support that use of computers was concentrated in computing and mathematics departments. In 1995, although there was no significant increase in the numbers of pupils using computers, there was a wider variety of usage and a large percentage (87.5%) reported that their main use of IT was in word processing. No-one in this year said that they had used a computer in computing studies. This would suggest that the influence of IT had extended beyond computing studies.

**Usage at University**

Students in the sample had come from a wide variety of universities in Scotland, England, Wales, Northern Ireland and overseas. However, only students attending Scottish universities were included in this part of the analysis. Figure 2 provides an overview of IT usage.

Students were asked if they had used a computer in any subject area at university.

In 1993/4, 57.1% of the sample had used a computer at university. Most students in this category (37.5%) had used computers to word process essays and assignments but did not specify in which subject area. 29.2% had used IT to analyse statistics in psychology. An interesting use of IT was at Glasgow University where 20.8% of those who had used computing while at university used a computer application to analyse the metric pattern in ancient Icelandic poetry and to study constructs in old English grammar. Other examples of usage were in history (two students), modern languages (one student), the library (two students) and two students had undertaken a postgraduate diploma in Information Technology.

The pattern was similar in 1994/5 when 60.8% of students sampled indicated that they had used a computer in their undergraduate studies. Of these 38.7% had used the application for the textual analysis of Icelandic poetry, 12.9% had used statistical packages within psychology and word processing for essays and assignments had been used by 22.6%; in the library 9.7% had used IT and 9.7% in History. Other examples of usage cited were in Information Technology Post-graduate Diplomas (two students), modern languages (one student) and Scottish literature (one student).

In 1995/6, 71.4% of students had used a computer in their undergraduate studies. 40% of those who had used IT had been involved in word processing; 20% had used CD-Roms; two students had used IT in psychology. Only 28.6% had not used IT in their undergraduate studies. This figure looks
more encouraging. However, this sample was very small and were being
strongly influenced by the use of the textual analysis programme within
Glasgow University. Thirteen (46.4%) of the students in the sample of twenty
eight had gone to Glasgow University. Ten (76.9%) of these students
indicated that they had used this particular package. Although a very
interesting use of IT, this is a very specialised use of the computer and may
not indicate widespread integration of IT skills in the undergraduate
population of the universities.

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Figure 2. The percentage of students using computers at university, by year of intake
(n=42, 51 and 28, respectively).

It would appear that universities are being more successful in encouraging
students to use IT in their undergraduate studies. However, 42.9% of all
students sampled in session 1993/4, 39.2% of students in the sample in
1994/5 and 28.6% in 1995/6 had not used a computer in any area in their
undergraduate years. These findings tend to support the view of McDonald
& Davies that, although there is some improvement, more needs to be done.

Self-assessment of IT Competence

Students were asked to rate their own competence with IT. They were asked
to rate their own computing expertise on a 1-4 scale, one being expert and
four being total beginner. Although the instrument of measurement was
very crude it does give an indication of students’ perception of their
competence in IT.

In 1993/4, 81% of post-graduates rated their expertise as average to
total beginner. In 1994/5, 86.3% said they had average to no expertise.
These figures give cause for concern as only 19% of students considered themselves to be expert or confident in 1993/4 and 13.7% in 1994/5.

An attempt was made to clarify expertise in 1995/6. Seven questions were asked about very low level IT skills e.g. loading and running a computer; using a keyboard; saving and loading work; storing, sorting and retrieving information, and using a word processor. A further five questions were asked about the production of charts and graphs; manipulation of images; sending and receiving messages; accessing the World Wide Web and information retrieval, e.g. CD-Rom. In each case, they were asked to rate their own competence on a scale of 1 (low) to 5 (high). In the lower level skills, 42.8% put themselves into bands 1 or 2, whereas 50% rated their skills as 4 or 5. In the newer IT skills 78.5% rated themselves as 1 or 2 and only 14% put themselves in band 4 or 5.

**Conclusion**

These surveys of graduates of English entering initial teacher education in 1993 and in 1994 show that they had had little exposure to IT at school but slightly more at university. More importantly, they had little confidence in their IT skills. Although the sample was very small, the trend seemed to be continuing in 1995. The concerns that post graduate students, embarking on a career in teaching in the mid 1990s, would not all be competent in IT was supported by the research.

**Second study**

Similar assumptions are made daily by the media in 1997 and claims are made about the power and influence of IT in education. The second part of the study sought to establish whether the conditions in Scottish schools had changed or were the deficits still there. Again personal experience and anecdote indicated that access to computing facilities might still be very limited for pupils following an academic route in the late 1990s. If this was the case, then the post graduate student of English, entering Initial Teacher Education (ITE) in the year 2000 might not be any better prepared for using IT in teaching and learning. There would be considerable cause for concern considering the investments of time and money over the past ten years. The focus of English was chosen because of current developments of Information Technology, in particular the concept of an ‘Information Superhighway’ (DFEE, 1995).

The nature of English teaching is changing. In the past pupils were taught to read a text: this text would usually have been a book or some other print and paper based text. They may have listened to a teacher talking about the text and in some cases were encouraged to talk about the text themselves. The final outcome was usually a piece of writing, based in some way on the text under discussion. The writing would also probably
have been done by hand, using paper and pencil. However, more and more information is being stored and manipulated electronically (Marcus, 1993). As a result, children will need to be taught how to access this information, in order to learn and to make their way in the world after they leave school. They need to be taught to write both using the technology (Van der Geest, 1991), for example, when using a word processor, and for the technology, when they use email, create web pages and produce multi-media presentations. Many of the communication skills required by pupils in an electronic era, are skills which have traditionally been taught by English teachers: skills of reading and listening, where pupils are taught how to decode texts, and talking and writing where they are encouraged to think of audience, purpose and appropriate form. The Scottish 5–14 curriculum guidelines for Language (SOEID, 1992) encourage the integration of IT into the English curriculum and the proposals for the new post-16 curriculum have IT as a core skill (SED, 1992). Against this backdrop, it would be desirable for English teachers to feel comfortable with and have a competence in IT skills.


As before, current practice and policy was reviewed and this was followed by a questionnaire to establish whether these fears were justified.

The policy of the Scottish Office Education and Industry Department (SOEID) is still based largely on evaluation and monitoring of developments rather than on the imposition of ‘solutions’. The majority of funding and implementation of any policy decisions still rests with local authorities. This has led to some notable developments where IT has been given priority treatment because it can provide local solutions to particular problems, for example in the Highlands and Islands, where communication between small schools and teachers’ centres is particularly difficult. In Argyll and Bute, video conferencing is being piloted and evaluated as a solution for linking remote one teacher schools with larger schools, the teachers’ centre and each other (NCET, 1997).

Deregionalisation

Local government has recently been reorganised in Scotland and the original 12 regions have been replaced by 35 smaller, unitary authorities. This will pose problems for all areas of educational administration, especially during the changeover period, but IT is particularly vulnerable as it is expensive to resource and to support. The smaller units may not be able to afford to continue to finance an advisory support service to teachers. Strathclyde Region, which contained half of the population of Scotland, has been particularly severely affected by the reorganisation and, over the past 5 years, staffing in the educational development service has been considerably
reduced. In the past, each of the five divisions of Strathclyde had its own Computer Resource Centre where teachers could receive support and training. The smaller units are unable to afford a similar resource and most of these have been closed and the resources and expertise have been disseminated. As there will be no large, central body making policy decisions and providing support and guidance and, as the Scottish Office Education and Industry Department continue only to monitor and evaluate, the patchy provision for IT may continue.

Curriculum Development

Curriculum innovation and change has continued into the 1990s. The new guidelines for all curricular areas in primary and secondary have been phased in since early 1990. Consultation on the curriculum for 16+ called Higher Still, began in 1994 (SOEID, 1995). As a result, both finance and effort has been going into these areas, and, even though the documents give IT a high priority, teachers may feel their attention has to go on other areas. The educational superhighway looks like being a very bumpy road indeed.

The School Study

Data had already been collected in 1994 for a different study, into the use and extent of word processing in Scottish primary and secondary schools. The focus of this study was word processing which is a very limited use of IT, but it was felt that this was the most commonly perceived use of IT for teachers who wished to integrate IT into the curricular area of communication skills.

This existing data was used to consider whether pupils were still being hampered by a lack of access to appropriate hardware. Although access to machines does not necessarily imply increased competence in IT, it is very difficult to develop IT skills in English, particularly in word processing, without an adequate number of computers. It was therefore decided to use this as an indicator of the integration of IT into English teaching.

Methodology

Access to computers was looked at both in secondary and primary schools. A questionnaire was issued to one in ten primary and secondary schools in Scotland. In secondary schools the questionnaire was sent to principal teachers of English in the secondary school to identify whether IT was being integrated into the English curriculum. It was also sent to IT co-ordinators in the primary school. As they are generally smaller establishments, it was felt that the IT co-ordinators, who had special responsibility for IT would be better placed to have an overview of the use of IT in the language curriculum of the school.
The questionnaire focused on:
- the hardware and software which was available for word processing;
- whether or not schools had an IT policy; and
- the attitudes of Scottish teachers towards IT.

In total, 328 schools were sampled and 44.5% of schools were in the then Strathclyde Region of Scotland. This is representative of the distribution of school population nationally.

**Variety of Hardware to Support Word Processing**

Schools were asked both about the amount and kind of hardware they had available, to establish whether pupils had easy access to quality hardware. In spite of the considerable improvements in the hardware produced, the reduction in cost and the introduction of the much easier to use graphical interface computers, the BBC computer was still the most commonly available hardware platform, especially in primary schools. Of the 328 respondents, 250 (76%) had access to BBC computers. Of primary schools, 70.7% still used BBC computers for word processing. Of the total sample, 44.4% had access to a maximum of three BBC computers. At the other end of the scale, one school had 75 BBC machines available for word processing. Although there was clearly access to hardware, that access was not to quality, modern facilities for 1994.

Acorn Archimedes. The pattern was repeated with Acorn Archimedes machines in that 79.8% of the 134 respondents, who used this kind of machine, had access to no more than 3 machines, whereas one school had 80.

Apple Macintosh. 71.3% of the 254 schools, who used Apple Macintoshes for word processing, had access to no more than 3 machines. However, one school had access to 93 machines. 6.0% of respondents had access to 20 or more machines.

IBM PC. Only 53 of the 328 respondents used PC for word processing. Of these 79.3% had access to no more than 3 machines, but again one school had access to 40 machines.

PC Clone. 66% of the 25 respondents had no more than 3 machines, but in this case one school had 30 machines, one 35 machines and one 43 machines. This may indicate a connection with a local computer company who had supplied their own machines.

Other Machines. 53 respondents indicated that they had used machines outside these categories. However, the pattern was again repeated that 52.8% have access to no more than 3 machines and single schools indicated access to 20 and 40 machines.

Although there were some exceptions, in most cases, the majority of schools had access to a maximum of 3 machines to use for word processing. The
maximum class size for 12- and 13-year-old pupils in Scotland is 33. It would appear that access to hardware was still an issue. However this assumption could only be made if teachers indicated that access to hardware was an issue.

**Teacher Attitudes**

Teachers were asked what affected their feelings about using IT and were given a range of statements to choose from. These covered issues concerning difficulty of setting up systems; motivation of pupils; access to hardware; time taken by pupils to type and time taken to learn how to use IT. Of the teachers who responded, 59.5% stated that there were insufficient machines available to them. Insufficient time for pupils to type work was highlighted as problematic by 67.6%, while 33.6% indicated that there had been insufficient training. On the other hand, positive comments about increased pupil motivation were made by 69.1% and problems of handwriting being overcome was important for 72.2%. Teachers were asked about the value of word processing for their own use and 74.5% of 326 respondents rated it as being very valuable, 20.9% as quite valuable and only 3.6% felt it was relatively unimportant.

For their pupils, 71.6% felt that it was very valuable, 26.4% responded that it was quite valuable and only 1.5% indicated that it was relatively unimportant. A total of 86.5% indicated that they felt word processing was important because it was part of the real world and 86.2% commented on how word processing enabled pupils to edit text.

In spite of the limitations of policy and practice outlined in the earlier part of this study, which have not made it easy for teachers of language to develop skills in IT for themselves or in their pupils, the attitudes of the teachers surveyed remained positive to what they perceived were the beneficial effects of IT.

The popular assumption is that technology is the province of the young and particularly of the young male. Ann Beer (1994) points out that computers seem to reflect back to many women a learned sense of technical incompetence. However, this study did not reveal a feminine resistance to technology.

As would be expected, the majority of respondents in primary school were female, 74.2% as opposed to 25.8% male. The questionnaire was targeted at IT co-ordinators and not at language co-ordinators. It would appear that the majority of those who were responsible for integrating IT into the curriculum and who were pushing forward IT developments in Scottish primary schools were women. Even when primary schools and secondary schools are put together the balance is still weighted towards female (64.5%) compared with 33.5% male. This study shows that technology is being carried forward by women who are traditionally perceived as being
resistant to technology. Only 3.1% of a sample of 328 indicated that they had a fear of the technology.

Figure 3. The percentage of Scottish teachers in each age group (n=328).

In addition to this respondents were asked to indicate their age in bands 21–30, 31–40, 41–50 and over 50. If popular assumptions are to be believed, we would expect that IT was being used largely by younger teachers. The age profile shows that 46.9% of the total sample were in the 41–50 age group and a further 20.9% were over 50. Only 5.6% were aged 21–30 and 26.6% were 31–40. It could be argued that the figures were being influenced by the fact that the target group in secondary schools had been principal teachers. However, the primary statistics support the view that technology is being pushed forward by middle aged women. Of the primary sample of IT co-ordinators, 79.8% were aged 41 and over 21% were over 50 years of age.

The picture was further confirmed by looking at the years of teaching experience of those who responded. Results were again most startling in the primary sector, where 57.3% of the IT co-ordinators indicated that they had more than 20 years of teaching experience. No-one fell into the 1–2 years of experience and only 4.8% indicated they had 3–10 years experience. Further study into the reasons for this could provide interesting results, for example consideration of whether Initial Teacher Education is failing students in training, or to establish whether beginning teachers lack confidence or experience in class room management in order that they become IT co-ordinators early in their career. The suspicion is that they may have too many other things to cope with in the early years of teaching. The SOEID has recently commissioned substantial research into this area.
A major thrust of the HMI report in 1987 was that regions and schools should have an IT policy. In this sample of Scottish schools 50.3% of the 316 respondents indicated that their school did not have an IT policy. Of those who did have a policy, 83% stated that they had found it to be useful in developing IT skills.

**Conclusion**

The second survey revealed that the majority of schools have no more than three machines, although a few schools indicated that they have unrestricted access to significant numbers of machines. This is most obvious for the Apple Macintosh computer platform. One surprising result was that the BBC computer was still so widely used. This is unlikely to give pupils a quality experience of the potential of technology in a modern world. The national picture for Scotland shows that teachers, whose main concern is the development of communication skills, still have very limited access to IT. Current research would indicate that schools have massively increased their investment in technology since this study was carried out in 1994.

**The Lost Generation?**

The findings of this study indicate that it is unreasonable to assume that the graduate of 1993 will have a competence in IT, as there was very little access to IT in schools and universities at that time. In addition, the results
for 1994 and 1995 do not show a significant upward trend as might have been expected considering the developments and investment in hardware, software and staff development. Do we have a ‘lost generation’ who were too early to benefit from the developments in IT when they were at school and who now lack confidence in their own competence to use IT and as a result will be very reluctant to integrate it into their teaching and learning? Will using IT to support the curriculum remain the province of the older and more experienced teacher?

In the years from 1990 considerable sums of money have been spent in making more hardware available. However, there has been no policy decision to make this hardware more available to teachers of English who teach core skills in communication to all pupils of school age. Resources continue to be concentrated on Computing and Business Studies Departments to support national examinations. The implications may be two fold. First the English graduate of 2000 may still be unlikely to have adequate skills in information technology. Secondly, teachers, who have traditionally been trained to develop communication skills, may not feel confident in using, and teaching children to use, the most powerful communications tool of the future.

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References

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