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Madden, A.D., Nunes, J.M.B., McPherson, M. et al. (3 more authors) (2005) A New Generation Gap? Some thoughts on the consequences of increasingly early ICT first contact. International Journal of Information and Communication Technology Education, 1 (2). pp. 19-33. ISSN 1550-1876

A New Generation Gap? Some thoughts on the consequences of increasingly early ICT first contact.

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Focus: Teaching and learning with technology

Format: Research synopsis.

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Abstract

One possible consequence of ICT's rapid rise will be a new '*generation gap*' arising from differing perceptions of the learning technologies. The nature, causes and consequences of this gap are of interest to educational practitioners and policymakers.

This paper uses data from an ongoing project together with a synopsis of research to describe the ICT-based generation gap that currently exists between students and their teachers and parents. It is argued that this gap may exist between students differing in age by as little as five years.

Results from a related project exploring Networked Information and Communication Literacy Skills (NICLS), are used to introduce a discussion on the nature of any skills gap that must be addressed in the light of this generation gap.

Introduction

Computing technologies have been heavily criticised by educationalists and educational philosophers as a vehicle to promote shallow learning, mindless copying and pasting, and decontextualised acquisition of definitions and facts. In short, a tool for

> *"jogging the memory, not for remembering…* [providing students] *with the appearance of intelligence, not real intelligence… they will seem to* [have] *wide knowledge, when they will usually be ignorant.."*.

The quotation above however, is not from a modern educationalist, mistrustful of new technology, but is adapted from Plato's 'Phaedrus' (p69), in which the author recalls Socrates' criticisms of writing. It is easy to forget that reading and writing are information and communications technologies and, like all technological innovations, would have been subject to reactions ranging from unquestioning enthusiasm to reactionary scepticism.

Reading and writing however, permeated society over hundreds of years, so systems could adapt gradually. ICT has had a much more sudden impact.

The purpose of this paper is threefold:

1. to serve as a reminder of just how recently ICT has become commonplace within education;
2. to present findings from ongoing research at the University of Sheffield concerning the views that teachers and parents have of ICT and its use by children;
3. to identify problems that may arise when using ICT in post-16 education, as a result of students having differing experiences with the technologies.

The paper draws on the following projects:

1. A three year project, entitled “Education for evidence-based citizenship: improving pupils' information seeking skills”, funded by the UK’s Arts and Humanities Research Board (AHRB). This collaboration between the Department of Information Studies and the City School in Sheffield, seeks to explore aspects of Internet usage in English schools.
2. A seven year action research process to design and develop a part-time Continuing Professional Distance Education (CPDE) leading to an MA in IT Management (MA ITM) (McPherson & Nunes, 2004). This MA is delivered via a combination of face-to-face and online learning materials.
3. Research (funded by the British Educational Communications and Technology Agency) on the teaching of ICT to students in transition from primary (age 5-11) to secondary (age 11-16) education in England. The research was carried out at The City School in Sheffield, and drew on the AHRB project referred to above.

The sudden rise of computers in the classroom

Douglas Adams (1999) observed that our attitude to technology is determined by the age at which we first encounter it:

> *1) everything that’s already in the world when you’re born is just normal;*
>
> *2) anything that gets invented between then and before you turn thirty is incredibly exciting and creative and with any luck you can make a career out of it;*
>
> *3) anything that gets invented after you’re thirty is against the natural order of things and the beginning of the end of civilisation as we know it until it’s been around for about ten years when it gradually turns out to be alright really.*

Madden et al (2004) looked at the development of various computer technologies in the light of this analysis. Adams, somewhat arbitrarily, selects thirty as the age above which

technological developments cease to be readily acceptable. It provides a useful starting point however, for contemplating the speed with which computers have impacted on society.

Thirty years ago: 1973 saw the first appearance in print of the term 'microcomputer'; Wang unveiled their 'word-processing' system; and IBM introduced the Winchester hard disk (Professional Software Systems, 2004). Thirty years ago, computers were expensive and delicate machines to which only highly trained personnel had access.

Twenty years ago: In 1983, Time magazine nominated the IBM PC (released in 1981) as its "man of the year"; Microsoft released Word 1.0; and the first IBM PC-based graphics program, PC-Draw, was introduced (Professional Software Systems, 2004). Twenty years ago, ten million computers were in use in the USA: they were beginning to appear on desktops in the workplace. Few people would have had access to them however until they began work or entered Higher Education. The youngest of today's teachers were three years old.

Ten years ago: By the end of January 1993 there were fifty World Wide Web servers known to exist. Later in the year, Mosaic, the first graphic browser (on which Netscape came to be based) was introduced; and the Pentium processor was released (Professional Software Systems, 2004). Ten years ago, PCs were familiar sights in universities and offices around the country. They were beginning to become commonplace in schools, but access was restricted. In 1993-4 the average secondary school in England had one microcomputer per ten students. Only 30% of these were capable of supporting a Graphic User Interface (GUI) (Department for Education,1995). Use of computers in schools was limited to specific lessons in subjects such as science and maths. Although the National Curriculum (which required the incorporation of ICT) had been in place for five years,

limitations in ICT usability and availability severely restricted the use to which computers could be put across the curriculum (Opie & Katsu, 2000). For most lessons therefore, the educational technologies used to teach students ten years ago were the same as those that had been used for teaching their parents.

Since 1993: In the intervening ten years, the learning landscape has changed markedly. GUIs, such as Windows, have become standard; so computer technology has become more intuitive, making it easier for schools to adopt ICT across the curriculum; a factor which has presumably contributed to the rapid growth in computer numbers shown in Table 1 (DFES, 2002a). These figures are somewhat misleading since many of the computers in the early 1990s could not have supported GUIs; but this proviso makes the growth in primary schools all the more noteworthy. Even more remarkable though, has been the rate at which schools have been gaining access to the Internet.

A practical educational technology

The brief history above provides a reminder that, for most teachers, the idea of using ICT in their teaching would have been impractical until very recently. Furthermore, they could not have used their own childhood experience of school as a model to guide them.

Secondary school teachers have had a little longer than primary school teachers to become accustomed to the incursion of computers into the classroom. In 1999, Selwyn (p163) predicted that

> *'Smaller schools catering for younger learners… are probably going to attract less… funding per learner."*

Statistics from the DfES (2002b) (Table 2) confirm the accuracy of this prediction. On average, secondary schools in England have 4.2 times as many full time students as

primary schools. In 1998, shortly before Selwyn published his prediction, average expenditure on ICT in secondary schools was over 11 times greater than expenditure in primary schools. Since then however, ICT spending in primary schools has risen far faster than in secondary schools. The gap has now closed; and in 2002, secondary schools spent five times as much on ICT as primary schools.

More powerful computers

The impact of increased expenditure is even more remarkable when Moore's Law is taken into consideration. In 1965, G.E.Moore, co-founder of Intel, observed that:

> *"The complexity for minimum component costs has increased at a rate of roughly a factor of two per year…" p115.*

In practical terms, this means that a computer designed in 2003 will have twice the processing power of a computer designed in 2002; four times the power of those designed in 2001, etc. Assuming that the cost of a new computer remains constant, then, if a school has as much to spend on ICT this year as it did last year, that same sum of money can buy approximately twice as much computing power. In other words, according to the data in Table 2, secondary schools in 2002 could afford 31 times as much computing power as they could in 1998 and primary schools could afford 68 times as much.

This rise in processing power has played a large part in making the PC a practical tool in the classroom. It has allowed GUIs to become universal, making PCs easier to use;
It has accelerated performance, thereby decreasing user frustration, and reducing the risk of students repeatedly pressing buttons on the grounds that "it didn't work last time";
It has allowed drawing packages to become ubiquitous.

This last point is significant because many primary school students are still coming to terms with reading and writing; so any text-based activity on the PC will have difficulties associated with it that have nothing to do with the technology. It is not surprising therefore, that drawing is the preferred activity on computers amongst primary school students (Selwyn & Bullon, 2000, BECTa, 2001a).

Younger users

Because of the rise in expenditure on ICT in education, the age at which students have routinely come into contact with ICT has dropped rapidly over the last ten years. As was stated earlier, ten years ago, students were unlikely to make regular use of ICT until they went to work or college. One of the much publicized aims of the UK Labour Party when it entered government in 1997 was the promotion of ICT in schools. On coming into office, it announced that it was going to make available £700 million to upgrade ICT resources in schools and to connect schools in a National Grid for Learning (NGfL). A further £230 million (New Opportunities Fund) was provided to train teachers to use the new technology.

The figures in Table 2 show that secondary schools were the first to benefit from this initiative. Where ICT was used in primary schools, it often served the function of a 'pacifier', used to provide an activity for students who finished a task before their peers (Selwyn & Bullon, 2000). Students arrived from primary school to find substantially better ICT resources than they had previously encountered; and in most cases teachers could confidently treat them as ICT beginners. Increasingly however, this is changing, and students arrive at secondary school with ever greater ICT skills (Madden *et al*, 2004a), resulting in teachers feeling more and more left behind.

The skills gap between teachers and students

For the AHRB project referred to above, eighteen semi-structured interviews were carried out in January and February 2002 with staff at the City School (Madden *et al*, 2003). The City School was selected for the project because of the excellence of its ICT facilities and the experience of its staff in using ICT in their teaching. Nevertheless, many interviewees commented on the fact that their ICT skills were more limited than those of their students. One head of department confessed to having supervised classes of students using the Internet, despite never having used it himself. Others recognised its value, but were conscious of being less competent users than their students. Examples of the type of comments made by interviewees are as follows:

> *"The kids are ahead of me [in using ICT]…. I wish I was better at using it."*
>
> *"I haven't experienced [problems with students lacking technical skills]… I think it's the opposite, I think it's the staff sometimes that don't have the technical skills..."*
>
> *"I have learnt a lot from kids in the past about what to do [on the computer]…"*
>
> *"I always say at the beginning 'Look - I'm an old teacher - I don't know as much about computers as you - I know how they can be used, I know how they're useful, I know how important they are."*

These interviews were used to generate a questionnaire that was sent to the heads of department in all the state funded secondary schools in Sheffield (Madden *et al*, 2004b). The questionnaire comprised a series of statements with Likert scales of 1 – 5. Two of the statements were as follows:

1. I am confident in my ability to use the Internet.
2. Students know more than I do about the Internet.

A Spearman's Rank Correlation showed responses to these two variables to be significantly negatively correlated ($p=0.01$); suggesting that the more confidence teachers have in their ability to use the Internet, the less likely they are to feel that students know more about the Internet than they do. This finding is much as would have been expected. Despite the correlation however, most teachers (52.9%) still feel that students know more about the Internet than they do (Fig 1), including a large minority (29.6%) who feel confident in their own abilities (Table 3).

The skills gap between parents and children

As part of the research carried out by Sheffield University and The City School, in September 2002 a questionnaire was circulated amongst parents of students newly arrived from primary school. Amongst other things, parents were asked to assess their own ICT skills and those of their children on a five point Likert scale. Shortly afterwards, students were given an online test designed by a member of the school's ICT department to assess their ICT skills. Two measures of student ICT ability were therefore available:

1. Assessment based on parental observation and understanding of ICT skills;
2. Assessment based on results of a test developed by the school's ICT department.

The school's ICT test correlates significantly with measures of performance in Maths, English and Science taken at the students' primary schools (Table 4); and with parents' assessment of their own ICT skills. Parental assessment of their children's ICT ability is unrelated to the schools' measures, but is significantly correlated to the child's sex ($p<0.05$: boys are considered more skilled) and with the perceived standard of primary school resources ($p<0.001$) and teaching ($p<0.01$). It seems reasonable to assume

therefore, that the parents surveyed were not in a position to assess the ICT skills of their children.

The skills gap amongst ICT-literate adults

In the process of developing the MA ITM referred to above, it became apparent that technical skills on their own are not sufficient for a student to make successful use of ICT in learning: a range of social and information skills is also required.

The MA ITM course is a distance-learning programme designed for professionals in the Information Technology (IT) sector. Initially it was assumed that, because of the students' technological background, no particular training was required to use the online facilities provided for those on the course (Nunes *et al*, 2000a). However, studies of the usage of these facilities revealed a number of problems. Early intakes of students did not make full use of the available resources; and where use was made, it was often inappropriate. Many students for example, showed behaviours that were incompatible with the purpose for which the system was designed (e.g. flaming and lurking).

By contrast, according to teachers at The City School, their students are enthusiastic users of online communication:

> *"I can go into a room and see youngsters who are supposedly getting information from the Internet – you find them on the Chat line."*

This is despite the fact that they have received no formal training:

> *"… we've never taught Chat in school. We've never taught them to log into Chat rooms, or anything else, but ultimately, if you gave them five minutes, then you find them on Music Channel Chat room…"*

It is also in opposition to the wishes of teachers:

"I don't like them going in there so I keep them out of there, but that's another way of communication which gets them on to a computer and once they see that, that excites them."

Discussion

The impact of ICT on learning

In the survey of Sheffield teachers referred to above, heads of department were asked to respond to the following statement:

I am under no pressure to use the Internet in my teaching

Fifty two percent (n=169) did not agree with the statement. The majority of teachers therefore, either disagreed (25%), or were ambivalent (27%). Clearly therefore, many teachers not only feel that that they may be under pressure to use the Internet, but they also believe that their students know more about it than they do. Such a combination of circumstances could result in educationalists failing to recognise the potential of ICT within the learning environment, leading to under-usage and inappropriate usage.

Old teaching and new technology

Teachers often use new technologies as though they were something old and familiar. That way, they can satisfy any requirement to use the technology without needing to amend their teaching methods. An example of such use is the numerous Computer Assisted Learning programs that are little more than electronic books.

Such superficiality in the use of ICT has long been criticised. In 1971, a two-day symposium was organised by the Science Research Council and the Social Science Research Council. At the symposium, CAL was criticised on the grounds that

> *"using computers for pre-stored material, that is computerised programmed learning, combined inordinate expense with a very superficial philosophy of learning."* (Annett, 1976)

Similar concerns were voiced twenty five years later in the report on the evaluation of the Teaching and Learning Technology Programme (Coopers & Lybrand, 1996), where it was felt that the projects would have benefited from

> *"a more serious and helpful attempt to encourage projects to engage with pedagogic issues".* (para 283).

More recently, in a report on the use of interactive whiteboards (IW) in teaching, students are reported as expressing

> *"disappointment and frustration with some approaches to using the IW, particularly whey they consider that its capabilities are being under-exploited. For example: 'if teachers are going to use them* [as a traditional whiteboard] *then I wouldn't bother wasting all that money'" p17* (Levy, 2002).

Students therefore, may be better able to appreciate the affordances of ICT than their teachers.

Networked Literacy

Such usage of ICT in teaching neglects not only the 'added value' that new educational technologies can bring, but it also ignores the fact that, to obtain that value, students need to acquire new skills.

As was learned from the experience with the MA ITM, technical knowledge, though necessary, is not sufficient. Many other skills are required by students learning online, using computer mediated technologies. Nunes *et al* (2000a) have described such skills as Networked Information and Communication Literacy Skills (NICLS).

Networked literacy complements traditional basic skills with a new set of information and communication literacy skills. Information literacy requires students to recognise their information needs; to identify ways of addressing gaps in their knowledge; to construct strategies for locating information; to locate and access information; to compare and evaluate information; to organise, apply and synthesise information (Webber & Johnston, 2000).

In addition, if successful communication is to take place online, learners must change their behaviour. The skills required when communicating online form what can be considered communication literacy. Networked Information and Communication Literacy Skills (Nunes *et al* 2000b) include information literacy skills (as described above), and online collaboration and co-operation skills. These latter comprise:

- *Technical Aspects*, including the skills needed to use Computer Mediated Communications (CMC) in an online learning situation, and
- *Social Aspects* needed to compensate for the unavailability of social cues traditionally delivered by auditory and visual channels.

The technical aspects of NICLS are relatively easy to address, but the social aspects have often been overlooked (Nunes *et al*, 2000b, Hara, 2000, McDowell & Pickard, 2000). As a result, experiences such as those in the MA ITM course described above are common:

communications are misinterpreted, causing unintended offence and provoking inappropriate hostility. Students therefore need to be aware of crucial social issues involved in using CMC technologies (Webber & Johnston, 2000).

NICLS at school

Another relevant statement in the AHRB survey of school teachers is as follows:

> *My Internet skills were acquired informally (e.g., self-taught, learned from friends/colleagues etc.), rather than on a taught course.*

Eighty five percent of respondents (n=188) agreed with this statement: 67% agreed strongly. As can be seen in Figure 2, for teachers under 60, age seems to make little difference. The youngest respondent was 24: she agreed with the statement.

As was stated above, the technical aspects of NICLS are relatively easy to address. However, of the teachers who responded to the survey, over 95% never used chatrooms: the importance of the social aspects of NICLS are therefore likely to be unrecognized amongst them. Email was used, at least occasionally, by 70% of responding teachers; but as is the case with interactive whiteboards, email can be related to an existing technology (mail) with which the teachers are already familiar. Two interesting questions therefore emerge:

1. What, if any, online social skills are evolving amongst school children who appear to be enthusiastic users of chat rooms? Are there misunderstandings similar to those encountered on the MA ITM, and if so, how are they dealt with?
2. Does the age at which email skills are acquired affect the nature of emails? In particular, do students who learned to write letters before they learned to write emails produce more formal, and more carefully worded emails?

NICLS post-1997

The statistics cited in tables 1 and 2 show how recently ICT resources became widely available in schools. It could reasonably be argued therefore that, prior to 1997, it was not practical to teach many of the Networked Information and Communication Literacy Skills identified by Nunes *et al* (2000a), until students moved to further or higher education. As a result, the nature and range of information sources to which today's students have access is markedly different from those used by students finishing school prior to 1997.

Another significant development takes place in the academic year 2003-4. The Department for Education and Skills (DfES, 2003) is introducing amendments to the teaching of ICT in English schools. The new ICT course is designed to emphasise the relevance of ICT to all national curriculum subjects. If successful, many more students will leave school with Networked Information and Communication Literacy Skills. In all probability however, for reasons discussed above, they will have been taught the technical aspects of NICLS, but will have evolved the social aspects by experimentation with their peers.

ICT generations and the resulting gaps

The title of this paper refers to a new generation gap: in fact there may be several, arising not only from the introduction of technology, but also from the successful incorporation of NICLS. The rapidly changing ICT environment within the class will lead to different generations of students having very different experiences at school, as follows:

pre 1997: ICT resources, where available, are just used for the teaching of subjects relating to maths, science and technology. Teaching and learning are

largely unaffected otherwise. Some students acquire technical skills, but there is little opportunity to use computers as a tool for communication.

1997 – 2003: ICT resources become widely available. Pockets of expertise in the application of ICT to teaching begin to develop, but most teachers apply the technology cautiously, if at all. Students increasingly make use of ICT (particularly the Internet) as a learning resource. Many teachers (and parents) regard such usage with suspicion. NICLS are acquired rather than taught.

2003 - 2008: ICT is increasingly embedded within the national curriculum. Teachers need to demonstrate their usage of it, but often it is employed as though it were an extension of existing technologies (eg, electronic book) and it is under-used. Students begin to learn ICT in primary school, along with reading and writing. More systematic teaching of NICLS begins.

post 2008: Schools begin to employ newly qualified teachers who grew up with ICT. It was a natural part of their learning environment, so they have no qualms about their students using it. Formalised instruction in the social aspects of NICLS begins.

Consequences of the ICT generation gap

The versatility of ICT and its potential value as an educational technology make it probable that, in future, it will be ubiquitous at all levels of education. Adult learners must therefore acquire NICLS if they are successfully to complete any course of which online learning forms a significant component. Failure to do so will result in much frustration for the students, and eventually to lower levels of success (Hara & Kling, 1999).

Such frustrations are unlikely to be experienced, or even understood, by students who became familiar with online learning environments during their formative years. Zafeirou *et al* (2001) provide an example of a divide based on varying levels of NICLS, when they describe the problems some students encountered due to lack of typing skills. When using a VLE (Virtual Learning Environment), they experienced what amounted to a virtual speech defect, which severely hampered their efforts to communicate with their fellow students.

Further inequities could arise where teachers fail to appreciate the potential of a technology. When home computers first became affordable, teachers were often impressed by well-presented, word-processed assignments. They quickly came to recognise the signs of 'cut and paste' essays; but before they did so, many students received high marks for work that owed more to their ICT skills than their understanding of the subject material.

Social impact

The consequences referred to above are fairly obvious. Other, more subtle and more profound consequences may also arise, which may be as great as the impact of literacy on education in Ancient Greece. It is hard to appreciate exactly what this might have been, because records of educational methods amongst pre-literate Ancient Greeks are textual and were therefore made by practitioners of the new technology. Nevertheless, in his 'Preface to Plato', Havelock (1963) identifies numerous profound changes arising from the development of writing. According to Havelock, the orally based educational regime of pre-literate Greece was based on rote learning of rhythmically structured patterns which were recited and repeated without analysis (somewhat ironic, given Socrates' criticism of writing). Their role was, arguably, to stamp on learners the world view of their community. Then,

> *"at some time towards the end of the fifth century before Christ, it became possible for a few Greeks to talk about their 'souls' as though they had selves or personalities which were autonomous and not fragments of the atmosphere nor of a cosmic life force, but what we might call entities or real substances"* (p197).

The change is attributed to the spread of writing. In due course, this made it possible for learning to transcend the immediate community. Groups of people, making

> *"parallel use of texts, both to structure the internal behaviour of the groups' members and to provide solidarity against the outside world"*

are described as 'textual communities' (Stock, 1983).

The spread of reading and writing therefore, affected individuals, communities, and, indeed, the evolution of world culture (Madden, 2004) in ways that would probably have been inconceivable to Socrates and his contemporaries.

Conclusions

It took hundreds of years for literacy to become commonplace. Its effects could therefore permeate through communities and cultures over many generations. By contrast, ICT has the potential to change education radically in a fraction of a generation.

Some issues arising from the use of ICT in learning and teaching may be subtle and far-reaching. If writing made it possible for Ancient Greeks to begin thinking of themselves as individuals, what could be the impact of increasingly sophisticated virtual learning zones?

Questions such as this are impossible to answer without greater experience and additional research, but many consequences of the ICT generation gap discussed in this paper can be foreseen. As the 'new' literacies discussed above cease to be new but become

incorporated into the educational system, the generation that has already passed through that system may be excluded from an increasingly important sector of the education market. Planning is therefore necessary in order to ensure that their needs can be addressed by lifelong learning and Continuing Professional Development programmes.

In the UK, perhaps one of the most significant developments in the use of computers as an educational technology has been the adoption of the acronym ICT in place of IT. The emphasis on communication as well as information is an indication of the growing awareness of the new technology's role in facilitating exchanges and discussions, thereby addressing the shortcomings that Socrates noted arising from use of the (then) new technology of writing. Properly used, ICT allows students to move from being "hearers of many things" to being active processors of their readings and discussers of many things. In other words, ICT has the potential to enrich the learning process, facilitating an education based on interaction and social negotiation of meanings. Had Socrates been able to use ICT, he could still have subjected students to his methods.

Acknowledgements

The authors would like to thank the Arts and Humanities Research Board, the British Educational Communications and Technology Agency, and Merlin (a project funded under the EU's Leonardo da Vinci programme) for supporting this research.

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Tables and Figures

	Mean no. of students per computer		Percentage of schools connected to the Internet	
	Primary	Secondary	Primary	Secondary
1994	23.0	10.0		
1996	19.0	9.0	5	47
1998	17.6	8.7	17	83
1999	13.4	8.4	62	93
2000	12.6	7.9	86	98
2001	11.8	7.1	96	99
2002	9.7	6.0	99	99

Table 1: Statistics relating to primary and secondary schools in England (DFES, 2002a).

	Average expenditure/school (£)					Increase in computing power between 1998 & 2002 (by Moore's Law)
	1998	1999	2000	2001	2002	
Primary	3600	7000	8300	10300	15400	68.444
Secondary	40100	45400	50100	60300	76900	30.683
Ratio	11.139	6.486	6.036	5.854	4.994	

Table 2: ICT expenditure in English schools (DFES: Survey of Information and Communications Technology in Schools 2002).

		Students know more than I do about the Internet. (Likert score)		
I am confident in my ability to use the Internet.		**4**	**5**	**Total**
(Likert score)	**4**	8.5	6.9	15.3
	5	9.0	5.3	14.3
	Total	17.5	12.2	29.6

Table 3: Percentages of teachers agreeing with both statements.

Student skills (as assessed by parent) correlate with:	
Student gender (boy's skills rated higher than girl's).	1% significance, n=65
Perceived standard of primary school resources.	1% significance, n=65
Perceived standard of primary school teaching.	1% significance, n=63
English Key Stage 2.	1% significance, n=57

Student skills (as assessed by school's ICT test) correlate with:	
Parents' perception of their own ICT skills.	1% significance, n=65
Level of ICT concern.	(Negative correlation) 1% significance, n=65
English Key Stage 2.	0.1% significance, n=57
Maths Key Stage 2.	0.1% significance, n=58
Science Key Stage 2.	0.1% significance, n=57

Table 4: Factors significantly correlated with assessments of students' ICT skills

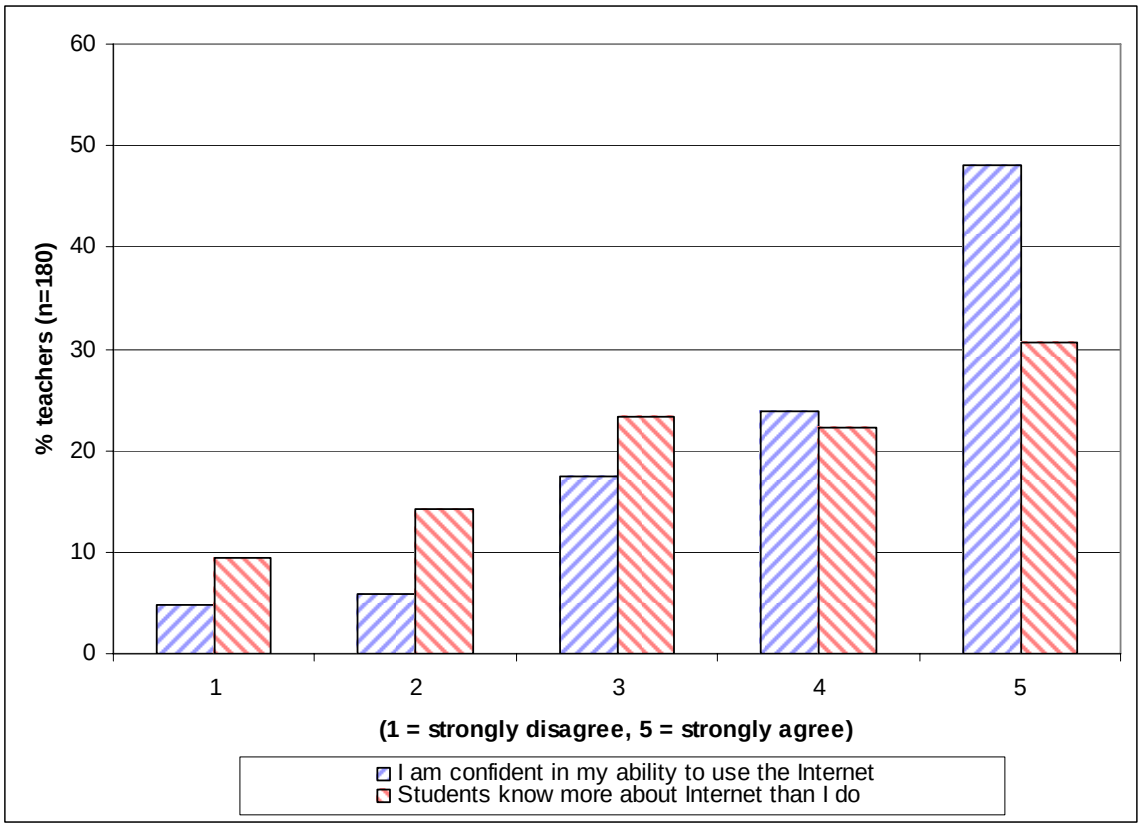

Fig 1: Teacher's responses to questionnaire statements.

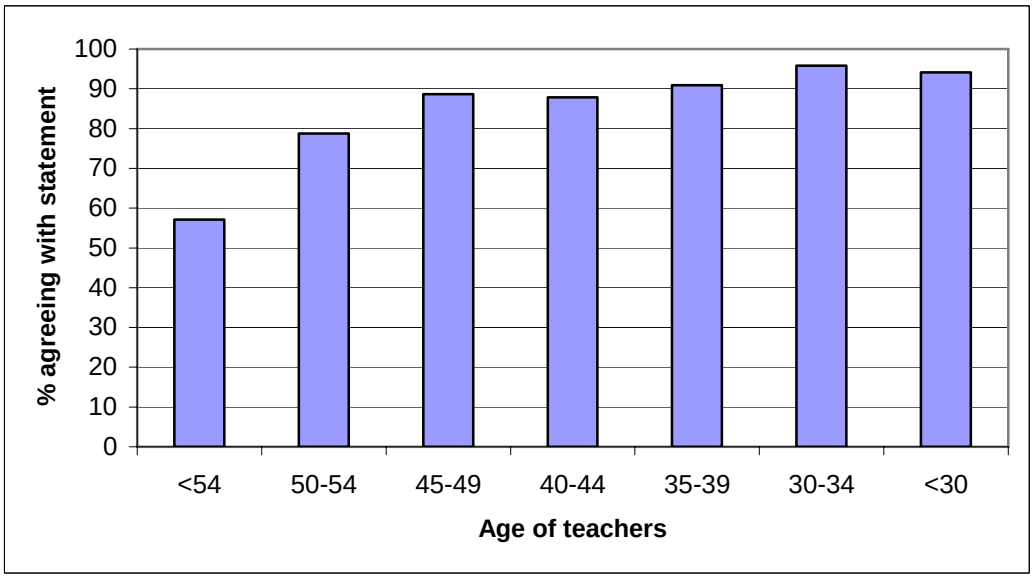

Fig 2: Percentage of teachers of differing ages agreeing with the statement: '*My Internet skills were acquired informally (e.g., self-taught, learned from friends/colleagues etc.), rather than on a taught course.*'