ISSUES AND FINDINGS FROM OECD STUDIES ON THE DIGITAL DIVIDE[1] AND EDUCATION

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Introduction

This paper has three main sections each addressing a different question. First, what are some of the main results from general work carried out within the OECD about the nature and extent of the digital divide? Second, what are some of the main elements of this divide as it relates to education and learning in particular? Third, what do the more general conclusions of the broader CERI/OECD analysis on ICT and the quality of schooling indicate about the educational digital divide? Finally, on the basis of this discussion, the paper concludes with some reflections on the existence and nature of the learning digital divide.

This paper is based on work carried out within the OECD. As such, it is limited to its sources and analyses as well as its Member countries.[2] Within the educational section of the OECD, the CERI conducted a project on ICT and education between 1998 and 2001, which included as one outcome a December 1999 conference on learning and the digital divide in Philadelphia in co-operation with the National Center on Adult Literacy (NCAL), University of Pennsylvania[3]. The CERI project focused most specifically on schooling, as it was part of a larger programme "Schooling for Tomorrow", and this is reflected in this paper. Since this CERI work has been completed, a new project has been launched within the sister section to CERI - the Education and Training Policy Division. This new project will focus on three specific areas - resourcing issues, teachers and teacher training, and the institutional, organisational and regulatory frameworks of education and their relationship to ICT - but it will also have equity as a fourth transversal theme cross-cutting these three. There will thus be new OECD analysis of relevance to the digital divide, but this is as yet unavailable.

[1] To avoid clutter, the term "digital divide" is used without quotation marks; this is not to assume that it is a single or well-understood phenomenon.

[2] There are now 30 member countries: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

[3] The subsequent publication is: *Learning to Bridge the Digital Divide*, OECD: Paris, 2000.

The Digital Divide

What are some of the main conclusions concerning the patterns defining the digital divide in general within OECD countries? A chapter in its annual publication - 'The OECD Information Outlook' - permits some of the general features to be discerned.[4]

Infrastructure readiness

Most OECD countries have a similar number of fixed telecommunication access lines (traditional access and ISDN lines) per population, with an average of around 60 per 100 of the population. Fixed networks in countries that began the 1990s with low telecommunication penetration rates also grew significantly since then - among OECD countries this includes the Czech Republic, Hungary, Poland and Turkey. In the 1990s, the rise in wireless communication users far exceeded that for fixed network subscribers. Taken together, the total number of fixed and mobile access paths in OECD countries surpassed 1 billion in 2000.

The United States has by far the largest number of Internet hosts, with more than 75 million in July 2001, two-thirds of all hosts in the OECD region. Other OECD countries with more than a million hosts at this time included Canada (5.6 million), the United Kingdom and Germany (4.1 million), Italy (2.3 million), France and Sweden (1.6 million), and Spain (1 million). 'Hosts per 000 population' gives a better indication than total numbers of the relative density of infrastructure in different countries. On this indicator, the US is still well out ahead with over 270 in July 2001, with Canada and the Nordic countries of Finland, Iceland and Sweden next with approximately 100 per 000 fewer. The OECD average stands at around 100, but the EU average is nearly half that. In a number of OECD countries, the level is well under half that again (Hungary, Greece, Czech Republic, Poland, Portugal, Korea, Slovak Republic, Mexico, and Turkey).

ICT penetration

While rates of ICT access and penetration and use are among the most informative indicators, data differences and wide variations in kinds of use make international comparisons hazardous. Nevertheless, access to a PC has more than doubled in OECD countries in the short period since the mid-1990s and in most of them half or more of households have PC access. In Europe, the Nordic countries are ahead of the Mediterranean countries and France. Year 2000 data showing 60% or more of households with PC access in Sweden, Korea, Denmark and Norway contrast with less than 30% in Italy and France and nearer to 10% in Turkey. Internet access has lagged behind that for PCs, but uptake has been rapidly and regularly growing since the mid-1990s whether in countries with high or low Internet access.

Patterns of household and individual access and use

[4] The chapter "ICT Diffusion and the Digital Divide", in *OECD Information Technology Outlook: ICTs and the Information Economy,* OECD: Paris, 2002.

While access means the technology is available, actual use will always be lower than rate of access. In the US, in October 2000 Dept. of Commerce figures suggested that only three-quarters with Internet access at home used it, and frequency of use differs markedly as well with occasional rather than daily use in general still much higher.

Income is a strong determinant of household PC and Internet access in all countries for which there is information. In Australia in 2000[5], for example, households in the highest income bracket had PC and Internet penetration rates of 85% and 69% respectively, while for the lowest income bracket the corresponding figures are 24 and 10. Lower rates of Internet access and larger relative differences between income groups suggest that in the early stages of IT diffusion income distribution is a particularly important determinant of diffusion. The different categories used in different countries rule out precise cross-national comparisons. Nevertheless, in seven OECD countries - Australia, Canada, Denmark, Finland, Turkey, UK, and US - there are data relating to income quartiles for year 2000, which allow calculation of inequality indices such as Gini coefficients. Canada and the US have the most equally dispersed use of computers and the Internet, while France and the United Kingdom have relatively greater differences.

Level of an individual's *educational attainment* is another important factor influencing use, over and above income level. There are large differences in PC use between those with tertiary-level education and those at the lowest levels. These differences vary from a factor of two in the Netherlands to approximately a factor of six in the United States. On Internet use, the gap between those with tertiary-level education and the lowest group (without a high school diploma or equivalent) are, if anything, even larger. While these differences are robust and persistent, access and use of PCs by the lower educated groups does appear to be growing more rapidly as the computers become more widely diffused.

PC penetration appears to be clearly related to *household size*, it is higher and growing faster in large households. Families with children have the highest PC and Internet access among households. Married couples with children under age 18 are clearly more likely to have such access than those headed by one parent or with no children.

On *age*, in general older people have lower rates of access to PCs and the Internet than younger and middle-aged groups. This broad finding seems common across the countries for which survey data are available. In France, for instance, 9 out of 10 people aged 65 or more do not expect to be connected in the future, either because they perceive no need, or do not have a computer, or believe the Internet to be too complex.[6]

Whereas the age gaps appear to show consistency across countries, the *gender* gap varies while being inter-related with age. In Japan, Internet access and use from home

[5] The OECD ICT data base: highest bracket - more than AUD 100,000; lowest bracket - less than AUD 25,000.

[6] SESSI (2001), "L'Internet: les Français se hâtent lentement", *Les 4 pages des statistiques industrielles,* no. 152, ministère de l'Economie, des Finances et de l'Industrie, France.

by men is approximately double that for women for all Internet-related activities, although there is some signs that it is closing. In the UK, there appears to be a clear gap as there is in Norway, but in the latter case the male lead is narrowed substantially if the older age group is omitted from the calculation. In the United States, differences in the use of ICTs by gender appear to be small or negligible, but there are some persistent differences by age group. Women aged 20-50 are more likely to use the Internet than men of similar age, but over the age of 60 the pattern is reversed. Similarly in Iceland, women are ahead of or equal to men except in the oldest age groups.

Analysis by *geographical location* continues to show some wide differences. Internet access in urban areas is everywhere greater than in rural localities, especially marked as regards major cities and highly industrialised regions. Nevertheless, recent data from the US suggest that the rural areas are rapidly closing the gap. It may also be that the centres of cities, associated with lower personal income and education levels as well as possibly fewer IT-intensive businesses and organisations, have lower access than moderately urbanised environments.

As regards *employment status*, the employed have the highest rates of access, followed by those in the workforce but not currently in a job, with those outside the labour force with far lower rates. A recent US study shows that ICT use is strongly affected by its use by individuals in the workplace.[7] Not only are individuals who work in certain occupational sectors more likely to use computers and the Internet, but exposure in the workplace makes people much more likely to use them at home. Double the percentage of households (78%) with at least one family member using a computer at work have one at home compared with when no-one works with a computer, though again income and education effects are likely to be at work in these patterns as well.

The broad conclusion drawn by the OECD Information Outlook is as follows:

> "This study finds that there are particularly striking differences in PC and Internet access by household income and education. The digital divide could be said to be growing as the access gap between those with the highest and lowest levels of ICT access increases. Conversely, the digital divide could also be said to be shrinking, as rates of growth are faster for lagging groups." (p.216)

Schooling and the Digital Divide

The importance of ICT to both economic and social development is reason enough why the need to bridge the digital divide has become a priority issue. A danger lies, however, in the assumption that the phenomenon and its solutions must be narrowly technological, rather than essentially about people, skills, education, and learning. Sophisticated ICT is useless without the competence to exploit them so that any gaps

[7] US Dept. of Commerce (2002), *A Nation Online: How Americans are Expanding their Use of the Internet*, Washington DC.

defining the "learning digital divide" become as important as the more obvious gaps in access to the technology itself. Acknowledging the existence of the digital divide does not mean that the causes are themselves narrowly “technological”, as one speaker at the OECD/NCAL 1999 conference maintained:

> With the remarkable advancements in information and telecommunication technologies (ICT), there is now a genuine concern about the "digital divide", the gap between the ICT "haves" and the ICT "have-nots." There is a good justification for this concern and the figures show it at every level. But narrowing the divide - publishing a newspaper in every village, placing a radio and TV in every household, putting a computer in every classroom, and wiring every building to the Internet - does not automatically solve the problem. The most serious divide is in the *extent and quality of human knowledge and learning*. It is not digital; it is educational. (*Wadi D. Haddad*)

Even in relation to learning, there is not a single digital divide there are a series of overlapping gaps, that separate individuals, segments of society, organisations as well as whole nations. A further danger therefore is that such a range of dimensions, combined with the fact that the digital divide is as much an expression as the cause of inequality, could lead to the term becoming devalued and eventually discredited through imprecision. However useful is the term for the purpose of focusing political attention, it is one that calls for clarification and precision to avoid such a devaluation.

The OECD educational work on ICT has focused particularly on schools. However, any more comprehensive perspective would need to complement this by a focus on various forms of tertiary and adult education, workplace training, as well as media- and home-based informal learning.

Investment in ICT educational infrastructure

Perhaps the most obvious manifestation of the learning “digital divide” are the ICT gaps that exist within formal education, between one school or school system and another, in terms of the equipment, materials, connectivity, and the integration of ICT within the teaching/learning environment. These might be described as the "input" divides. Although investment in hardware, software and telecommunication links in families and educational institutions has been growing fast in all OECD countries, resources remain unevenly distributed across countries. An earlier summary, now rather dated, described the situation thus:

> The figures show wide variations at both levels, but the greatest range in primary. Where figures over two years are available, the rise in computer intensity is marked; at the extreme, Ireland has halved the number of student per computer in a single year. The most ICT-intensive countries in education are the US, Finland, New Zealand and Sweden. They have 7 pupils or fewer per computer in secondary education and 13 in primary education. The United Kingdom, Denmark, Ireland and Norway have good access to ICT… the age and quality of computers in schools are crucial: only if they have sound cards and CD-ROM drives, for example, can students use up-to-date and efficient including access to the Internet. Data on the proportion that have this

> multimedia capacity are only available in some countries, but show that despite rapid progress, a large number are out of date in this sense. [8]

The speed of change is one reason why any data in this field risk being out-of-date by the time they are gathered, analysed, published and digested. The more recent OECD "Information Outlook" chapter includes a table on numbers of PCs in schools, comparing 1992 and 1999 and they confirm the scale of the change. In 1992, in only one country - Sweden - were there more than 10 PCs per hundred full-time school students, and in only 8 others was the figure over 5. By 1999, the OECD average itself had risen to well over the 10 level at around 12 per 100, with in excess of 10 in Sweden, United States, the Netherlands, New Zealand, Australia, Finland, Norway, Canada, UK, Switzerland, and Denmark.

As one manifestation of the international educational digital divide, there are several countries, however, where this figure remains less than 5 (in some cases well below). Of those with data available, these were: the Czech Republic, Greece, Hungary, Spain, Poland, Mexico and Turkey. Yet, it should not be assumed that such an indicator translates in any simple fashion into educational quality or student outcomes. Korea, for example, is well down on this indicator and yet has recently excelled in the international comparisons of student achievement conducted through the OECD PISA study. [9]

Beyond these OECD-country disparities and those of socio-demographic and geographical origin as described in the previous section, there are those much larger international divides: between the richer countries of the world to which these data relate, and other countries with much lower income levels and technology infrastructure. ICT developments have been an integral part of the globalisation process that in turn contributes to exacerbate these international digital divides, including between the North and South. Cultural arguments are also relevant of course, with many worried about the homogenising impact of globalisation and the risk this poses to cultural diversity, especially given the software and Internet dominance of English.

Educational Use

While we need a more robust understanding of gaps in ICT investments in education systems, the OECD/NCAL conference stressed that the equipment indicators sometimes adopted to show the existence of a "divide", while the most measurable, may also be quite misleading. What matters acutely is the *use* actually made of ICT in education. One might go so far as to maintain that it is not the ICT itself that makes the difference but how it is used. Such a formulation, however, can easily confuse the necessary and the sufficient conditions of change given that learning through ICT is impossible in the *absence* of computers, CD-ROMS, emails, connectivity etc. The relevant questions concern not just whether ICT is regularly used in educational settings but how it is used. Research from New Zealand mentioned at the

[8] OECD (1999) "Technology in Education: trends, investment, access and use", *Education Policy Analysis*, Paris; pp. 47-64.
[9] *Knowledge and Skills for Life: First results from PISA 2000,* OECD: Paris, 2001.

OECD/NCAL conference, for instance, suggested that even when ICT is used by teachers and students in class, high socio-economic status schools tend to do so for advanced applications and thinking. The contrast was made with other schools are more likely to focus their application on basic skills development or even for diversionary activities such as computer games.

The existence of divides/gaps in ICT use gets immediately to issues about teachers and their preparedness for, and integration of, technologies in the classroom. It will be important to gain a clearer picture of how these factors are distributed at present. Which teachers in which schools already use ICT on a regular basis, and for which tasks? Which teachers never do? On all these questions, there is a dearth of good information, and it is hoped that the new OECD activity will begin to synthesise such information as does exist. Up until now, a general finding seems to be that ICT has tended to be used much more as an alternative means to existing practice, than for opening up new practices altogether that really exploit ICT's strengths and potential. Some of these issues are discussed in more detail in the next section.

The home and the school

The view was expressed during the OECD/NCAL conference that too much research interest is directed at the technology and not enough at the attitudes and experiences of the groups themselves - attitudes and values, accumulated human and social capital, material circumstances and prospects. This requires a broader view than just education, but education in context - the broader environment in which it takes place. Part of this understanding relates to how home and school factors interact.

In the period from 1993 to 1997, there was an increase in the 1st to 8th graders who use computers at school, and especially in the percentage of students who use computers at home and at home for schoolwork.[10] There was almost no difference in 1997 between how many girls and boys use computers at these ages, although these data do not show how much time is spent using them. Furthermore, there was only a minor variation in the use of computers at school between different ethnic and socio-economic groups, with White children and those from higher-income families using computers slightly more often than children from other backgrounds, and the gap narrowing over the 1993-97 period. In contrast, use of computers by white children and children from higher-income families in homes and for school work at home is much higher than for Black and Hispanic children or children from low-income families. There has been little or no narrowing in use at home, either for personal interests or for school work over the same period. Even if schools do not necessarily provide poorer students and ethnic groups with equal access to ICT, they may contribute to lessening the inequality in access that exists at home

There is thus a role for schools and other educational institutions to play of seeking to ensure equality of access to ICT, and through its use to raise “technological literacy” throughout the student population as one of the system’s basic learning aims. Many

[10] NTIA (National Telecommunications and Information Administration), *Falling through the Net: Defining the digital divide*, US Dept. of Commerce, 1999.

aspects of the "digital divide" are determined by ICT access and use outside the formal system. Far from undermining the case for active ICT educational investment and access policies, the opposite is the case precisely so as to compensate for these home-based inequalities. It serves again to emphasise that many aspects of the divide as they are manifest in education systems are not specifically "technological" but profoundly educational and social.

Different viewpoints were expressed at the 1999 OECD/NCAL conference relating to home/school relationships, and which among them turn out to be the more accurate has a bearing on the nature of the "divide". As regards student learning, one relatively cynical view put forward was that most student home computer use is devoted to game-playing of little wider consequence; on this view, it might even be an advantage in the long run to be under-equipped at home! This contrasts with the view that many relatively privileged students are already actively operating in webs of out-of school electronic networks to further their education and hence their advantage. To the extent that this is taking place, there is clearly a need to address the home-related inequalities.

ICT and the Quality of School Learning - a further digital divide?

The OECD published a further study from its CERI project on ICT and education towards the end of 2001. This study - "Learning to Change - ICT in Schools" - focused both on how ICT is being used in schools and how it might be under ideal or future circumstances. Its different chapters included: policy priorities for ICT in schools; the curriculum and the learner; educational software and digital content; schools and the internet; the practice and professional development of teachers; and school organisation and contacts with homes. It should be emphasised that this is not based on a comprehensive international survey, rather a series of country papers, expert contributions and events organised during the course of the project. In the first "policy priorities" chapter, the study lists a number of key messages to emerge. These are reproduced below. They are, of course, statements of a particular viewpoint on the way ahead, rather than principles written in stone.

Radical curriculum change is needed in the Internet age: Powerful tensions exist between traditional curricula – based on well-defined content and rules for students to learn and be able to reproduce – and the open, skills-based, student-centred approaches supported by ICT. Dominant curricular and organisational patterns in school were not designed for the Internet age, and often inhibit its effective use. ICT offers some gains for traditional curriculum delivery, but its full educational potential cannot be realised without radical changes in school structures and methodologies. As ICT gains acceptance in schools, it may become both the driver and the facilitator of the necessary curriculum change.

Student assessment must be compatible with ICT-enriched learning: The promotion of advanced skills and competences will fall short in assessment regimes that are overwhelmingly based on achievement in single subjects, by means of conventional written examinations. What is assessed schools and how the assessment is performed exercises a tenacious influence on the delivered curriculum. To continue with existing

patterns of student assessment will act as a brake on the imaginative use of ICT. The pervasive adoption of ICT not only *requires* different assessment procedures but *provides* a variety of means.

Digital literacy is now a fundamental learning objective for all: Just as "conventional" literacy is more than basic ability to read a sequence of words, digital literacy is more than ability to use a computer in simple ways, and both are fundamentally important. It implies a sophisticated set of competences pervading workplace, community and social life, including information-handling skills, and the capacity to make judgements about relevance and reliability when searching on the internet. Digital literacy is a vital part of the foundations for lifelong learning and must have a high priority within the curriculum.

Schools must be fully equipped and supported for using ICT: Effective use of the technology requires suitable levels of equipment, for use on demand within each classroom, and readily available to students out of lesson time. Internet access has increased dramatically, but more work-stations and higher bandwidth are needed, to promote extended and sophisticated use. Exceptional grants for the initial installation of ICT have to be followed by regular funding for maintenance, technical support, and the cost of being on-line – that can be a severe deterrent to Internet use. An on-going re-equipment programme will be needed over time to sustain quality use.

Schools need plentiful educational software of quality and easily-accessed information on it: Teachers need a comprehensive supply of quality educational software to be readily available, with easily-accessed on-line information about it, concerning subject coverage, intellectual level and ease of use. It is particularly informative to include judgements by teachers on actual classroom use. Sustained dialogue is needed between ICT suppliers and the education service, including teachers, to improve the range of software and digital content. Often it will be for governments to promote such dialogue and share some of the risks of new development.

ICT in schools requires an extended professional role for teachers: Teachers face a more demanding professional role as managers of the ICT-enhanced learning environment. They must have a range of technical and pedagogical skills, with continuous updating to match advances in the technology and modes of use. Much will be achieved through electronic networking with colleagues in other schools, universities and elsewhere, ICT becoming both the object of professional growth and the medium through which it is achieved. Without adequate investment in teacher professional development and enhanced professional activities, effective technology integration into schools cannot succeed.

School leadership and management must be fully committed to adopting ICT: Visionary school leadership is needed to bring about and sustain the dramatic changes enabled by ICT, to persuade and give confidence to all involved – teachers and learners, parents and others in the school and community. The school must be re-organised so that working with ICT becomes integral and unexceptional, with a move away from the traditional individualistic and isolated modes of teaching, and emphasis on digital literacy for all. Schools are often resistant to radical change, but

ICT could be a "Trojan Horse" – the means through which change is delivered being also the way that resistance is overcome.

School, home and community have new opportunities for partnership: ICT encourages – and ultimately requires – a rapprochement between formal education and the learning that takes place outside school. It brings impressive channels of communication between students, teachers, parents and the wider community, that must be purposefully developed and actively sustained. The most effective learning environment is one based on a dynamic partnership between home and school, formal and informal, teacher and taught. This underscores the seriousness of the situation for students who have inadequate home facilities, who are on the wrong side of the "digital divide".

What light do these messages shed on the digital divide? They can be taken as one statement of a divide - more accurately a set of divides - that exists in the way that ICT is being used in schools and school systems. They serve to define a scale of ICT penetration and innovative educational use, from schools and systems where most or all these points apply in good measure, through situations where they only apply more patchily, through to those which are far removed from any of these guidelines. The divide in this case is between the high quality, imaginative and innovative use of ICT to expand the horizons of education, on the one hand, and the reluctant and scarce realisation of its potential in the educational context, on the other.

It should be stressed that the absence of curriculum change or of assessment practices to incorporate ICT, or poor teacher development or leadership commitment to do so, or poorly-equipped schools will not necessarily disadvantage students, teachers or schools in a particular traditional system if these are not regarded as desirable. It may be that the exemplary use of ICT by students for multi-disciplinary research and problem-solving is essentially an inductive process, and as such it may run sharply up against the deductive and rule-driven assumptions of many education systems, and of certain schools in particular. It may threaten traditional notions of school knowledge and teacher wisdom. Hence, the "divide" described in this section may not closely correlate with the conventional distribution of educational rewards, particularly in traditional and hierarchical school systems. Moreover, the underlying assumption of the above conclusions is that many countries are investing heavily in ICT in schools, and that as much as possible should be done to make this investment bear fruit. Were this investment to cease, such an assumption would become untenable.

These caveats notwithstanding, the underlying message of the above conclusions is that for school systems pursuing these directions or not may be becoming less and less a matter of choice. The intensive and imaginative use of ICT may well come increasingly to define the advanced forms of teaching and learning and accepted notions of quality education, permitting a broader access to knowledge, networking among teachers and students, more diverse organisational possibilities, and closer preparation for life and employment. Between systems, the highly traditional approaches to school learning may become increasingly untenable in the globalised world of the 21st century.

Concluding Remarks - elaborating the dimensions of the educational digital divide

From these different dimensions of what might be described as learning's "digital divide" a basic question remains as to whether it exists or not. On one side, it can be maintained that ICT simply gives another expression to the profound, longstanding divisions of social class, ethnicity, gender and geography that have always been a feature of educational life. On the other, there is the view that ICT is so important in the society and economy of today and tomorrow, that low technological literacy has come to represent a new, important form of exclusion. Both viewpoints have a basic validity.

There is a value in elaborating the different distinctions and features at stake that risk being swallowed up together through indiscriminate use of the single term "the digital divide". Without maintaining a sharp focus, the relevant policy questions may get blurred or lost. At least the following distinctions have been in play in this paper.

- The term "digital divide" is an arresting term that usefully focuses attention but it may suggest that there is a simple or single dimension at stake. This is very far from the case.
- Many refer to the "digital divide" as essentially a technological issue of investing in equipment and equalising infrastructure, but it is critically about the knowledge of people and their competences to use the ICT effectively.
- Partly the digital divide is international, especially those inequalities dividing the rich and poor countries. Yet many features of the divide are found within countries, including the richest and best-resourced.
- The most common indicators used to illustrate the educational digital divide relate to investment in ICT in schools; yet as an educational example of the above point what is much more telling is how this is used and the actual competences and skills that are developed among students. Even on the "input" indicators, there is a diversity of measures and targets.
- Those with higher levels of educational attainment tend to enjoy greater use of ICT at work and at home. This may well be more a reflection of longstanding social and educational advantage than anything specifically "digital".
- Teachers and their skills are clearly important, especially in how they incorporate ICT to improve their teaching and network with their students and other teachers. But change is about much more than the individual attitudes and skills of teachers. It is critically about the basic assumptions and valued aspects of whole systems.
- Greater, even exemplary, use of ICT in education will not automatically result in improved educational results, conventionally measured. It will only do so if the core values of those systems change to embrace the digital age.
- Schools are only one part of the whole learning infrastructure, and not necessarily the most important part as regards the overall issues concerning the digital divide. They may, however, perform an important equalising function in high unequal social situations.
- Any comprehensive focus on learning and the digital divide must include tertiary and adult education, and enterprise training. The less formal learning that takes

place in homes and workplaces are perhaps the most important of all. They may also be the furthest from any direct policy intervention.