

The 16 key trends to shape your future

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The 16 major trends that will shape tomorrow's world

A revolution is changing your life - and your world.

You are part of the first generation to live in a new age: an age that offers an unlimited choice of futures in an era where virtually all things are possible.

Your children's world will be like none other before. Their future, too, depends on the ability to grasp new concepts, make new choices, and go on learning and adapting throughout life.

Rich countries have already made the leap from an industrial society to an age of information: an age where human brainpower, knowledge and creativity will continue to replace machinery and buildings as the main capital in society.

Poor countries now have the enormous opportunity to telescope history: to leap over the industrial era and straight into the new age of networked intelligence.

But that new age also poses stark alternatives. For those with the new knowledge: a world of opportunity. For those without: the prospect of unemployment, poverty and despair as the old jobs disappear, the old systems crumble.

The main thrust of this book is that new methods of learning are urgently needed if most people are to benefit. And not just for a new generation, but for those who are already adults.

But learning can be fully effective only if it enables each of us to link directly to the needs of the new age. Of all the trends, we believe at least 16 main ones will dictate what and how we now need to learn:

History's landmarks

The world	4.5 billion years old
Life	3.5 billion years ago
Humans	2 million years ago ¹
'Modern' humans	35,000 to 50,000 years ago? ²
Farming	12,000 years ago
The plow	5,000 years ago
The wheel	5,000 years ago
Steam-power	250 years ago
Computers	40-50 years ago
And now	The age of instant communications

Communications

First brains	500 million years ago ³
Speech	35,000 to 50,000 years ago ⁴
Writing	6,000 years ago
Alphabet	4,000 years ago ¹
Printing	1040 AD in China, 1451 AD in Europe
Telephone	1876
Moving pictures	1894
Television	1926
Transistor	1948
Fiber optics	1988: 3,000 messages at once 1996: 1.5 million 2000: 10 million (prediction)

Main sources: *Reader's Digest Book of Facts*, *The Inventions That Changed The World* and *The World Book Encyclopedia*.

- Most anthropologists differentiate between *homo habilis* (*handy man*), dating back 1.5 to 2 million years, *homo sapiens* (*wise human beings*) and *homo sapiens sapiens*, our own species, whose earliest discovered remains have been dated to 35,000 years ago.
- Early "brains," of course, were very simple nervous systems.
- No one knows for certain when understandable speech developed. But the latest brain research has identified the parts of our brain that deal with speech, thought and reasoning: all are in our forebrains which are most fully developed in *homo sapiens sapiens*.
- The earliest alphabet emerged about 1700 B.C., but the more modern Greek version was not introduced into Europe until around 1000 B.C.

1. The age of instant communication

The world has developed an amazing ability to store information and make it available instantly in different forms to almost anyone. That ability is revolutionizing business, education, home life, employment, management and virtually everything else we take for granted.

Our homes will reemerge as vital centers of learning, work and entertainment. The impact of that sentence alone will transform our schools, our businesses, our shopping centers, our offices, our cities - in many ways our entire concept of work.

Our ability to communicate is one of our key human traits.

Most scientists say the world has existed for 4,500 million years,¹ that humans in somewhere near their present form have been here for maybe two million years, and as "modern humans" for 35,000 to 50,000 years. Yet our ancestors - whatever arguments exist over their origins - did not invent any form of writing until 6,000 years ago.

It took another 2,000 years before they created the first alphabet - the unique concept that eventually enabled all knowledge to be recorded by rearranging only 26 symbols. But not until the 11th century AD did the Chinese start printing books. And it was not until 1451 that German inventor Johannes Gutenberg printed the first European book: transforming our ability to store and communicate knowledge by making the printed word available to millions. "Before Gutenberg, there were only about 30,000 books on the entire continent of Europe. By 1500, there were more than 9 million."²

Not until the last hundred-odd years did we start to speed up the process: the first typewriter in 1872, the first telephone message in 1876, the first typesetting machine in 1884, silent movies in 1894, the first radio signals in 1895, talking movies in 1922, infant television in 1926 and the computer microprocessor and pocket calculator in 1971. Since then the communications revolution has exploded.

The world is becoming one gigantic information exchange. By 1988 a single fiber optic "cable" could carry 3,000 electronic messages at once. By 1996: 1.5 million. By 2000: 10 million.³

In a typical year the world produces over 800,000 different book-titles.⁴ If you read one a day, it would take you well over 2,000 years to complete them all. But what if you could automatically select only the information you want, when you want it, and have it fed to you through

**If products
such as cars
and cereal
followed the
same trend
as the PC,
a mid-size car
would cost \$27
and a box of
cereal a penny.**

BILL GATES

*Business @ The Speed Of Thought**

*Published by Warner Books, New York.

one of those 10 million messages that we will soon be able to transmit at the same time on one fiber optic "cable" at almost no cost? And what if you could reproduce that information at home in any form: on computer, videotape, compact disc or on your home printer? The technology is operating. And more and more you won't even need the fiber optics.

By early 1999 at least 250 million computers were in use. At least 100 million people had direct access to the Internet. Each one could directly contact 150 million others. Millions more had Internet access through their company or school. Between 2000 and 2005, many forecast that 500 millions to 1 billion individuals will be on the Net.

CD-ROMs and electronic games provide striking early examples of the shape of things to come.

When an earlier version of this book appeared in 1993 the electronic games business was already very big but CD-ROMs were mere infants. By 1995 more than 10,000 CD-ROM titles were on the market. Most were, in some form, educational. And since then the total has soared.

Several breakthroughs form typical success models:

□ In 1979, Californian school teacher Jan Davidson set up a small teaching centre in Rancho Palos Verdes, overlooking southern Los Angeles. She soon bought a \$3,000 Apple II computer, and with a friend began writing programs to drill students in vocabulary and mathematics. Her company grew modestly until 1991, when "edutainment put it into overdrive".⁶ Three years later she and her husband Bob floated Davidson & Associates as a public company, and in 1996 they sold it for almost \$1 billion.

Now you'll find the Davidson label, with that of toy giant Fisher-Price, on a major range of high-quality, well-researched interactive CD-ROM programs. They're turning millions of homes into preschool, elementary and high-school learning centers: *Kid Phonics*, *Kid Works*, *Kid Keys*, *Kid Kad*, and the *Math Blaster* and *Reading Blaster* series among the leaders from Davidsons, for youngsters from four to 12 years; and from Fisher-Price a series starting even younger.

□ In 1981 a 25-year-old American bought Q-DOS - the "Quick and Dirty Operating System" - for \$75,000,⁷ developed it, and turned it into the standard for the personal-computing world.

Today Microsoft head Bill Gates is the world's richest businessman. Gates' teenage dream was "a computer on every desk and in every home".⁸ Now he plans, too, for

You can
expect to have
on your wrist
tomorrow
what you have
on your desk
today, what
filled a room
yesterday.

NICHOLAS NEGROPONTE
*Being Digital**

* Published by Vintage Books, New York.

an age when people everywhere will be able to take the best courses, in any subject, taught by the world's best teachers - in their home.

His *Encarta* interactive encyclopedia shows another key aspect of the future: effectively given away free with millions of PCs to help establish Microsoft *Windows* as the world's leading computer system.

□ In 1982, an 18-year-old Texas university student began tinkering with PC technology. With some other off-the-shelf components, he started producing made-to-order personal computers. Later he pioneered the selling of made-to-order PCs by direct advertising - servicing them, and selling upgrades for them, by one of the world's best-trained telephone teams.

By 1995 Michael Dell's computer company was turning over \$5.3 billion and was one of the four largest PC companies in the world. And by the start of 1999, when Michael Dell was still only 34, annual sales had soared to \$18 billion.

□ In 1991 a company that formerly made simple playing cards outstripped the earnings of the massive Sony Corporation by \$400 million. In 1992 the same company generated \$5.5 billion in sales and \$1.3 billion in pretax profits from just 892 employees: more than \$6 million in sales per employee. Its name: Nintendo. Its product: electronic games. Its leadership dynamo: Hiroshi Yamauchi - the creator of the ultimate job description for the new century. When asked by his first designer: "What should I make?" Yamauchi replied: "Something great."⁹

Today Nintendo, Sega and Sony compete with a raft of others for the \$15-billion-a-year electronic games market.

□ In 1993 a 22-year-old American student working for \$6 an hour created the first-ever Internet "browser". Two years later his company had still never turned a profit. Yet when it "went public" in August 1995 it created the biggest investment explosion in history. By the end of the first day's trading, shares bought for \$28 were being traded for \$71. By the end of 1995 24-year-old Mark Andreessen's personal shareholding was worth \$137 million. And those of his senior venture capital partner Jim Clark were worth \$1.3 billion.¹⁰

The company's name: Netscape Communications. Market worth by mid-1996: \$3.1 billion. Its product: the Netscape *Navigator*. If the product's benefit was brilliantly simple, its marketing concept turned

Models for the new information age

Your child's video game

has 10,000 times the capacity of the world's first 1947 ENIAC computer.

Today's greeting card

that sings "Happy Birthday" contains more computer power than existed on earth before 1950.

Most home video cameras

contain a more powerful chip than the huge IBM system 360 computer: the giant that filled hundreds of sq. ft. of air-conditioned space in the 1960s.

Genesis offers a game

with a computer more powerful than a multimillion-dollar 1976 Cray supercomputer.

Sony has a videogame

with a 200 MIPs (millions of instructions per second) processor that not so long ago would have cost about \$3 million in mainframe form.

Internet ²

will soon connect more than 100 universities at 600 million bits per second—enough to transmit a 30-volume encyclopedia in less than 1 second.

DON TAPSCOTT*

* Condensed from *The Digital Economy*, and the book edited by him, *Blueprint To The Digital Economy*, both published by McGraw-Hill, 11 West 19th Street, New York, NY 1001, USA.

business wisdom upside down: give the product away - free - to become the world-wide industry standard, and make money by selling the add-ons.

By September 1996 40 million people around the world were using the *Navigator's* simple point-and-click tools to surf the Internet, to find graphics, text and video from vast information databases.

Chief Executive Officer Jim Barksdale was predicting 500 million users by early in the new century,¹¹ and Bill Gates' team, with its new Internet *Explorer*, was racing to dominate the same market. By early 1999 Netscape was being merged into an even bigger concept, as part of America Online, which was by then the world's biggest Internet provider.

Writes Ray Hammond in *Digital Business*: "What was particularly important about the feeding frenzy for Netscape stock was that the market suddenly grasped the concept of the Internet as a permanent new communications channel, one which will be bigger than all the others put together, a channel which will be, at one and the same time, global, personal, interactive, low cost and forever-growing. However, even these words undersell what the Internet and its successors will become and the impact it will have on business and social structures."

On its own, says Hammond, a personal computer is fairly dumb. But place it on a network, where it joins millions of others, and "the solitary PC becomes part of a neural network of intelligence which, collectively, has stunning power". Says Nicholas Negroponte, the Founding Director of the Media Lab at the Massachusetts Institute of Technology: "Thomas Jefferson advanced the concept of libraries and the right to check out a book free of charge. But this great forefather never considered the likelihood that 20 million people might access a digital library electronically and withdraw its contents at no cost."¹²

A CD used as read-only memory (CD-ROM) has a storage capacity of 5 billion bits. That's the equivalent of about 500 classic books "or five years' reading, even for those who read two novels a week".¹³ Yet by early in the new century, says Negroponte, a typical CD-ROM will be able to hold ten times as much information: the equivalent of 5,000 books.

A CD-ROM can be mass-produced now for about \$1 a disc in the United States and well under 50 cents in China. That's 50 cents for 500 interactive books, soon to be 5,000! And virtually every personal computer is now being delivered with the capacity to play CD-ROMs. Perhaps more importantly, there is now no need even to buy many CD-ROMs themselves. Their interactive contents can be downloaded in-

Financial model for tomorrow's learning world



GORDON DRYDEN*

* Presentation to British Telecommunications' Think Tank on "Building the Communications Society", London, England, September 1996.

instantly from the Internet by millions of people around the world, at any time they wish. That means the more complex software programs, which tend to overload home computers, can be stored at one central point, and Internet users can plug into any program they want. The process makes a home computer almost as easy to use as a TV set. *Prime time* becomes *any time* - but you run the programs.

Tim Berners-Lee, creator of the Web, says the new "information appliance" might even come inside a cereal box. "My kids could rummage around for the free gift," he says, "take out a tube, unroll it to something flat, flexible and magnetic, stick it to the refrigerator and start navigating the Web."¹⁴

Says *Business Week*: "The great information-appliance race is on. The goal: to create electronic gadgets that are as simple as the TV but can instantly make the connection to the digital world."

Tie those concepts in with hire-purchase selling and you'll probably have the next big breakthrough in consumer electronics - with tremendous potential for education and learning. When a telephone, electricity or cable company can offer you instant access to the Internet and World Wide Web through a fiber-optic phone line and a combined TV-personal computer - and give you a payment choice of, say, \$300 in cash or no deposit and \$1.50 a week on your bill - every home will have cheap access to everyone else.

Wired magazine's executive editor Kevin Kelly calls the new economy a "tectonic upheaval". And he writes: "The irony of our times is that the era of computers is over. All the major consequences of stand-alone computers have already taken place. All the most promising technologies making their debut now are chiefly due to communication between computers - that is, connections rather than computations."¹⁵

Kelly says the network economy is "fed by the resonance of two stellar bangs: the collapsing microcosm of chips and the exploding telecosm of connections. These sudden shifts are tearing the old laws of wealth apart and preparing territory for the emerging economy.

"As the size of silicon chips shrinks to the microscopic, their costs shrink to the microscopic as well. They become cheap and tiny enough to slip into every - and the key word here is *every* - object we make."

While the total world population of personal computers is expected to reach 500 million by 2002, "the number of noncomputer chips now

**With interactive
multimedia
systems,
management in
developing
countries
can bypass
the industrial
revolution.**

STAN SHIH

*Chief Executive Officer, The Acer Group**

pulsating in the world is 6 billion", and Kelly forecasts there'll be 10 billion by 2005 and a trillion not long after. "As we implant a billion specks of our thought into everything we make," he says, "we are also connecting them up." And it is the explosion of low-cost - sometimes free - connections that is fuelling the new economy.

"When you go to Office Depot to buy a fax machine," says Kelly, "you are not just buying a \$200 box. You are purchasing for \$200 the entire network of all other fax machines and the connections between them - a value far greater than the cost of all the separate machines."¹⁶

Or, as Larry Downes and Chunka Mui put it in *Unleashing The Killer App*: "If you and I can call only each other . . . a phone is of little value. But if we can call nearly everyone else in the world, it becomes irresistible."

One of Asia's outstanding business leaders, the Taiwan-based Acer Group's Chief Executive Stan Shih, for instance, forecasts that low-cost, interactive, electronic multimedia systems will allow management in developing countries to bypass the industrial revolution - jumping directly into the Information Age.¹⁷

2. A world without economic borders

We are also moving inevitably to a world where most commerce will be virtually as unrestricted as the Internet. Ignore the short-term moves to protect some countries' farming incomes. The genie is out of the bottle: the instant transfer of money around the globe - at least \$1.3-trillion dollars a day¹⁸ - has altered the very nature of trade and world commerce.

Megatrends 2000 co-author John Naisbitt lists a global economy as one of his main predictions. "That's the undoubted direction the world is going - towards a single-market world economy. Sure, we have the counter-trends of protectionism along the way, but the main over-arching trend is to move to a world where there's free trade among all countries."¹⁹

And President Clinton's first Secretary of Labor, Robert B. Reich, writes at the start of *The Work Of Nations - preparing ourselves for the twenty first century*: "We are living through a transformation that will rearrange the politics and economies of the coming century. There will be no national products or technologies, no national corporations, no national industries. There will no longer be national economies, at least as we have come to understand that concept. All that will remain rooted within national borders are the people who comprise a nation. Each

We are
clothing
the
globe
with a
network
society.

KEVIN KELLY

*New Rules For The New Economy**

* Published by Viking-Penguin, New York.

nation's primary assets will be its citizens' skills."

And those will depend above all else on the ability of a nation's population to learn those new skills, particularly in defining problems, creating new solutions and adding new values.

Certainly a nation's education system can no longer be based simply on remembering a limited core of information.

3. Four leaps to a one-world economy

While international finance has spurred the growth of the one-world economy, there are four main stepping stones to that prosperous future:

1. The continued leadership of America in the vital field of electronic innovation, and now in the new world of "convergence".
2. The rebirth of Europe as a single economic entity, as a model for integrated communities.
3. The rise of dynamic "Tiger economies" as models for small countries.
4. The resurgence of China, the world's most populous country, as a model for the large population-blocs in the underdeveloped world.

The first stepping stone: the American flair for quickly turning high-tech research into breakthrough products. As the world moves into the new century, the amazing resilience of the American economy remains the base for continued world growth, particularly in the new digital age.

And nowhere does the future beckon more than in the Californian area known as Silicon Valley. Even 50 years ago the area south of San Francisco Bay was a county of orange groves and vineyards. Now it has given birth to 240 publicly-listed technology companies with a market worth of \$500 billion, annual sales of \$170 billion and 377,000 employees - plus at least 4,000 small non-public companies.²⁰

But its lesson for the future is probably even more important: a unique series of university-business partnerships. Today's half of Silicon Valley's revenues come from companies seeded by Stanford University.

But America's emerging new catalyst is the way several of its ground-breaking industries are now converging: computers, television, entertainment and instant communications.

That convergence, too, has tremendous implications for education: and the potential to bypass the school system if that system stays locked into an outdated model.

What's needed to match Silicon Valley?

1. Major research institution

Like Stanford, Cambridge, M.I.T.

2. One megasuccess story

Like Microsoft, Nokia, Lotus, Acer

3. High-tech talent

And the ability to attract it

4. Venture capital

Israel, Taiwan now showing the way

5. Infrastructure

Singapore the Government model

6. The right attitude

Risk-taking confidence

STEVEN LEVY*

Newsweek cover story, The Hot New Tech Cities
(November 9, 1998).

The second stepping stone into a one-world economy is undoubtedly the European Union. It links 15 countries and 370 million people. Long in the shadow of the United States, Europe is once again re-emerging as the second global anchor for prosperity and stability. Europe's new single currency, the Euro, consolidates 11 different markets. And, despite rising unemployment in its stagnant traditional manufacturing industries, Europe's software and telecom companies have been pumping out jobs. Germany's newly-deregulated telecom companies alone created 40,000 jobs in 1998. And even in smaller European countries, Finland's Nokia, Sweden's Ericsson, and Britain's Vodafone have shown how the new technologies can revitalize the new century's economies when backed by equally dynamic educational policies.

The ancient British university town of Cambridge typifies the turnaround. It's now headquarters for an area with 1,159 high-tech firms, spearheaded by Acorn, Cambridge Display Tech and Pipex. Sir Alex Broers, Cambridge University's vice chancellor, "dreams of transforming the entire eastern region of the United Kingdom into a digital hotbed. The masterplan, hatched by officials of town and gown, is laid out in an optimistic document labelled *Cambridge 2020*."²¹ It outlines a future where the town remains a tourist-packed beehive of chapels, halls and sprawling lawns - surrounded by rings of industrial parks and chip plants.

The third stepping stone is the new model of the internationally-targeted small country, particularly such states as Taiwan, Ireland, Finland and Singapore, with pockets elsewhere such as Bangalore in India, and Tel Aviv in Israel.

When co-author Dryden first visited Taipei in 1964, the capital of Taiwan had only one set of traffic lights: turned on only when a visiting dignitary entered town. Now Taiwan, with 21 million people, boasts 14,000 electronic companies with total sales of \$75 billion, mostly exported, including 120 high-tech public companies, with a market worth of \$100 billion, sales of \$27 billion and 72,000 employees. It also graduates 10,000 engineers and scientists a year and has an active policy to attract back thousands of others who have succeeded in places such as Silicon Valley.²²

Ireland, with under four million people, is an equally dramatic example. Twenty-five years ago it was a poor farming country. Now it is the world's second largest software exporter, after the United States. It

The single
most
commercially
minded
country in the
world today is
the People's
Republic
of China.

LAURENCE J. BRAHM
*China As No. 1**

*Published by Butterworth-Heinemann Asia
1 Temasek Avenue, Singapore 039192

has attracted 1,100 international companies to start up in the republic, and these now have 107,000 employees. The country's annual exports: \$25 billion, with a trade surplus each year of \$11 billion. Like Taiwan, Ireland's tax incentives to attract high-tech companies are matched by extensive policies to develop the skilled people to man them.²³

Finland has even a more amazing story to tell - and in many ways it is the story of one company: Nokia. Back in the 1980s, Finland's major industry was paper and pulp. Helsinki-based Nokia, the country's largest company, was known more for its rubber boots than tiny phones. "But when the economy took a nosedive in the early 1990s, Finland turned to high tech for salvation. The Government decided to put 2.9 percent of the gross domestic product into technology research and development. Companies turned to international partners to start electronic ventures, and Nokia discovered a seemingly endless market for cellphones."²⁴ Soon Nokia was pulling in \$32 billion a year from this new phenomenon, and its success fuelled Finland's technology boom. As the company grew, it also invested in science parks at universities around the country, which were funded by government-venture capital groups. Today Finland has 400 high-tech firms. It has only five million people, but nearly 2.5 million of them carry cellphones. And the land of lakes and saunas also boasts the highest number of Internet connections in Europe.

The tiny Asian island state of Singapore provides equally important lessons. Forty years ago it was a poverty-stricken island. Twenty years ago the Government began a campaign to attract high-tech multinationals - with tax incentives, a well-educated workforce, and an amazing infrastructure program. Fired by an enormous Government-investment policy from compulsory superannuation savings, the island state's latest infrastructure project, *Singapore One* - worth hundreds of millions of dollars - will connect every household, school and office to the Internet by the end of 1999. And Singapore is probably doing more than any other nation to spend heavily on information technology in schools.

But the biggest sleeping giant of all is China. After the stagnating years of Mao's cultural revolution, since 1979 it has released more people from poverty than any other society in history. In the past 20 years it has increased its economy more than 400 percent. But in many of the coastal "special economic areas" the economy has been soaring at an even higher rate. Sure the country still has big problems, but it is now racing to apply the lessons of Singapore, Hong Kong and Taiwan.

China-led model for new century

- ❑ China in 1999 had only three million homes on the Internet, but 310 million homes with TV sets.
- ❑ Now Hong Kong's richest family and Intel are linking for a giant new television/Internet venture.
- ❑ This will turn millions of TV sets into low-cost network computers.
- ❑ Thus hundreds of millions of Asians, even in poor homes, will have access to email, the World Wide Web and distance learning.
- ❑ The project will include voicemail for the majority of Asians who cannot type because they write in ideograms or phonograms.

DOUGLAS C. MCGILL
*Wired magazine**

* *Empire of the Son* in May, 1999, issue, on "Richard Li's Intel deal that could crack the Great Firewall of China". McGill quotes Avram Miller, Intel's business-development chief, as saying: "The scale of this will be bigger than anything else that exists in the world."

China, too, has an extra 'secret weapon': the 51 million Chinese who live outside its borders. Collectively they own liquid assets worth two trillion dollars.²⁵ Their over-riding ethic is educational achievement. Most of their historic family links are with major areas of growth along China's eastern seafront. With their investment in those areas, and the country's own internal growth policies, the Chinese economy is set to become the world's largest no later than the 2030s, maybe earlier.²⁶

Take just one project: the brainchild of Richard Li, Californian-educated second son of Hong Kong's richest man, Li Ka-shing, and one of the two main heirs to the Li family's \$10 billion fortune. In the mid-1990s Richard Li sold his Star TV satellite television network to Rupert Murdoch for \$950 million. Now he's prepared to invest that and more to provide a unique television-Internet service to hundreds of millions of Chinese and other Asian families. Fewer than 3 percent of Asian families currently have a telephone, but 65 percent have TV. And Richard Li, in a joint venture with Intel, is to provide these families with a cheap set-top box that will turn their television sets into emailing, Web-surfing computers. Each will even be voice-activated for hundreds of millions of Asians who cannot type. Li knows full well that, with 1.3 billion people, China has an official policy to encourage one-child families. Those children could become the world's most educated. And Li's new Pacific Convergence Corporation intends to provide them with a full range of interactive services, including distance learning and Internet shopping.

4: Internet commerce and learning

Link all these first four trends to all aspects of commerce and education and you get an even more astonishing view of tomorrow's world. As Li's project shows, not only can people communicate instantly around the globe, but they can *trade* instantly and *learn* instantly.

By mid-1997, Dell was selling computers through the Internet at a rate of \$1 million a day. By early 1999: \$18 million a day. By then its customers were paying \$18 billion a year for Dell computers which the users themselves were largely configuring on the Internet, selecting from individual components. The completed orders were then transferred electronically to Federal Express depots around the world, and delivered overnight.

The same pattern is revolutionizing commerce in other fields.

- ❑ Open up www.amazon.com on the World Wide Web and you'll join at least 540,000 customers who each day gain instant access to 2.5 million

**Every
company
will
become an
'education'
company
or it
will fail.**

DON TAPSCOTT

*Blueprint to the Digital Economy**

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11 West 19th Street, New York, NY 10011.

books. Amazon does not own a shop, but its 1998 Internet sales reached \$610 million. Still to turn a profit by the start of 1999, it had already assembled the world's biggest personal database of readers' book preferences.

❑ Contact www.ImagineRadio.com on the Web, select your favorite music styles and artists, and Imagine Radio will create your own private on-line radio station, with programs personalized for your taste. It will keep updating your own personalized radio station from the newest hits selected to suit your profile.

❑ Select www.CDnow.com and, from your listed preferences, it will provide you with a personalized selection from around 375,000 different music tracks and songs: a separate music service for each of its 600,000 customers.

❑ Select www.garden.com and Garden Escape provides an on-line nursery just for you. File your zip code and flower preferences, and it will tell you exactly when to plant what. You can even use its on-line software to landscape your home.

❑ www.autoweb.com arranges sales of 30,000 cars a month, totalling \$660 million a year, by matching sellers with specific buyers.

Some estimates are forecasting that revenue from Internet sales will reach \$327 billion by 2002. And the trend will affect education as much as business. It is creating new forms of organization that will transform both.

5. The new service society

Peter Drucker, John Naisbitt, Kenichi Ohmae, Robert Reich, and many other forecasters all agree the next trend: the move from an industrial to a service society.²⁷ Naisbitt again: "When I got out of college in the fifties, 65 percent of the workforce in America was blue-collar. Now it's down to about 13 percent, and its falling. That doesn't mean we're producing less. In fact, around 24 percent of America's gross national product is in manufacturing, about the same as it has been every year for 40 years. The difference is that 40 years ago 65 percent of the workforce was manufacturing these products, and today only 13 percent. Now obviously that 24 percent represents many more products as our economy has grown tremendously. The big change is: we're now manufacturing with information, rather than people - with computers,

Be
good,
get rich
but
stay
small.

CHARLES HANDY
*Beyond Certainty**

* Published by Hutchinson (Random House UK),
20 Vauxhall Bridge Road, London SW1 2SA, England.

automation and robots instead of workers. And that industrial workforce will continue to shrink, just as the agricultural base has shrunk. A couple of hundred years ago 90 percent of the people in North America were farmers.

As recently as a dozen years ago it was about three and a half percent. Now it's way below that."

Both Naisbitt and Drucker predict that by early in the new century only ten percent of the workforce in affluent developed countries like America will be working in direct manufacturing. And the figures back them up. Almost half of all routine American jobs in steelmaking disappeared between 1974 and 1988 - from 480,000 to 260,000. General Motors alone wiped out 150,000 U.S. production jobs in the 1980s.

So if all a developed country's manufacturing can be done with ten percent of its workers, and all its farm products produced by another two percent, what will the other 88 percent of us do?

Some are calling our future "the new service economy". But the very terms "manufacturing" and "service" are becoming obsolete. More and more, manufacturing will be combined with service: customized for individuals - in the same way that computer hardware now represents a very small part of the total service supplied by a computer company. By far the biggest part is in specialist consulting: customized software systems and training.

Everyone now has to become a self-acting manager of one's own future. But much education still resembles the declining industrial method of production: a standard assembly-line curriculum divided into subjects, taught in units, arranged by grade, and controlled by standardized tests. This no longer reflects the world we live in. And traditional educational systems can no longer cope with the new realities.

6. The marriage of big and small

In the traditional industrial economy, bigness ruled. GM, Ford and Chrysler dominated world car production for almost half a century; IBM towered over computers; and so on in dozens of different industries.

Even 25 years ago only big companies could afford the giant computers that were then the peak of electronic achievement. That technology helped spur the ride to centralized bureaucracy, takeovers, acquisitions and mergers. Today many of those giant computers are obsolete. The world of the mini has arrived. Sure, many big companies are still there. Many of them, such as GE, are booming. Giant mergers are reported

**When Amway
begins selling
on the Web on
Sept. 1, 1999,
two great
20th-century
marketing forces
will collide:
multilevel
marketing and
e-commerce.**

WIRED MAGAZINE*

* May, 1999.

almost every day as different industries converge. And new giants such as Microsoft, Acer, Sun and Oracle have emerged. But the earlier vast air-conditioned computer rooms lie empty or transformed.

And organizational structures are changing fast. Where the giant companies are still prospering, they have generally been split into dozens of small project teams, each self-acting and self-managing, cutting through the old specialization, the old business pyramid-style hierarchies, the old army-style management.

Tom Peters gives dozens of examples in his 834-page book *Liberation Management*. To cite just one: Zurich-based ABB Asea Brown Boveri is now one of Europe's giant companies, with revenues of \$33 billion in 1995.²⁸ It now operates as 36 independent businesses with hundreds of autonomous profit centres. Most of these are split into ten-person, multifunction teams. And it has slashed its "head office" staff by 95 percent.

Japan's Toyota has pioneered "just-in-time" production systems, buying thousands of products from small production units - often family firms - delivered exactly when they are needed.

And in other fields - notably retailing - franchising and computerization make it possible for small distribution outlets to link with major international systems-suppliers, from McDonald's to computer and software manufacturers.

Some analysts²⁹ say that by early in the new century 50 percent of all retailing will be through franchises (mostly self-operating small units linked to giant systems) and direct-marketing networks (mainly individuals linked to world suppliers).

Again the examples are startling:

- Franchising in America involves \$250 billion in annual sales.
- The fastest-growing franchise is Subway Sandwiches, with 7,000 outlets worldwide.
- Many of McDonald's 23,000 franchises around the world are run by husband-and-wife teams, but all are linked to the one central system.
- More than 20 million Americans are now making money from home-based industries. Over 60 percent of them are women.
- By far the biggest is Amway, started by Richard DeVos and Jay Van Andel, in the basement of a Michigan home in 1959. By 1996 the

**90 percent
of new
jobs
are in
companies
with
under
50 people.**

JOHN NAISBITT
co-author of *Megatrends 2000**

company had 2.5 million people selling 5,000 Amway products in 76 countries, with global sales of \$6.3 billion.

□ Japan is the world's biggest direct-selling market, involving 1.2 million women distributors and a turnover exceeding \$20 billion a year.³⁰

□ In 1963 Mary Kay Ash founded Mary Kay Cosmetics with a mission of promoting business opportunities for women and teaching women how to care for their skin. Today its 275,000 beauty consultants turn over \$1 billion.

But the biggest growing network by far is the Internet, with its thousands of individual networks, and the opportunity for anyone to sell his or her niche products to customers around the planet.

For employment, in particular, the small companies are vital. Says John Naisbitt: "It's the young entrepreneurial companies that are creating nearly all the new jobs in the United States. In the 1980s America created 22 million brand-new jobs; there were that many more people in paid employment at the end of the eighties. And 90 percent of those 22 million jobs were in companies of 50 or fewer employees. That is the new economy. That is what's creating the new wealth-creating capacity. So if you want to see what the new company looks like, you look at the young companies, not the old household-word companies that are shrinking and are very slow to change."³¹

In many of these companies, the educational need is for thinking and conceptual skills, risk-taking, experimenting, and an openness to change and opportunity. How much of that is taught at schools?

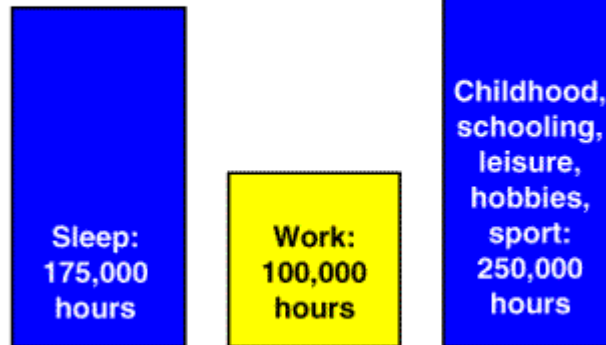
7. The new age of leisure

British educator, broadcaster and business consultant Charles Handy puts the figures neatly in *The Age of Unreason*. When he first started work in the 1940s it was standard for each person to spend 100,000 hours in his or her lifetime in paid work, although we never thought of it in those terms. But we generally worked around 47 hours a week, for 47 weeks of the year for 47 years - generally from age 16, 17 or 18. And that worked out at just over 100,000 hours. Handy predicts that very soon - at least in developed countries - we will each need to spend only around 50,000 hours of a lifetime in paid work. And he thinks we will each split that into different and convenient "chunks".

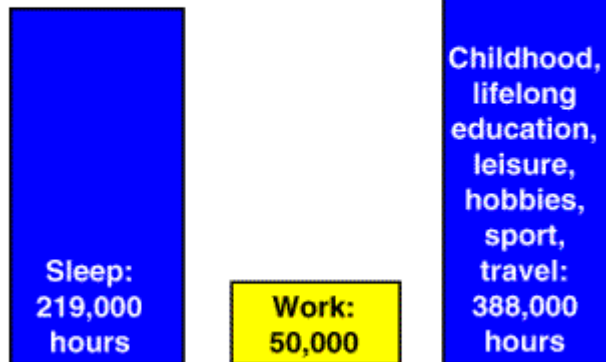
On average the average male now lives to at least 70 years - a total of

The new age of leisure

1930: life expectancy at birth
60 years—525,000 hours



The year 2000:
life expectancy at birth
75 years—657,000 hours



* Calculations based on *The Age of Unreason*, by Charles Handy, published by Century Hutchinson, London, England.

over 600,000 hours. And if we sleep for 200,000 hours and spend only 50,000 hours in paid employment, we will have over 350,000 hours to spend on leisure, education, travel, hobbies and everything else.

Leisure, tourism and lifelong education will be among the major growth industries. Already some of the trends are obvious. Half a billion tourists travel each year. By the year 2000, the prediction is a billion.³²

Overcrowded Japan set goals in the mid-1980s to have 10 million of its citizens taking holidays abroad by 1991.³³ The target was achieved. Over 90 percent of Japanese newlyweds honeymoon in other countries.

In Florida, 33 million visitors a year now flock into the former swampland of Orlando - thanks to the vision of Walt Disney and the planning of his successors. More than 55 million tourists from other countries visit France each year, and the 23.6 million who visited Britain in 1995 spent \$17.5 billion. London's main airport at Heathrow is now also a major shopping centre, with a retail turnover of \$500 million a year.

Baltimore, Maryland, once a dirty, rundown port city, now attracts eight million visitors a year to the cultural and entertainment attractions on its revamped waterfront. The giant Mall of America in Minnesota is built around a seven-acre amusement park, adapted from Knotts' Berry Farm in California. Sega has opened three virtual-reality theme parks in Japan, one in London, and it plans 50 around the world. Hyatt plans to open 25 fantasy hotels within the next few years. Legoland, at Windsor, is one of Britain's newest tourist venues. And Disneyland, in Tokyo, is Japan's biggest single tourist attraction.

Tourism is one of the few industries capable of creating vast numbers of new jobs. Achieving that will require big increases in foreign language training, culture-knowledge, hospitality service skills and the creation of exciting new leisure experiences.

And not the least of education's tasks will be to help prepare each country's citizens for a stimulating age of leisure.

8. The changing shape of work

Handy forecasts that soon a minority of working-age adults will be employed in fulltime permanent employment by traditional-style companies. Those will generally be highly-trained people, probably not starting work until their mid-twenties - with graduate and postgraduate qualifications. They are likely to provide the essential core management

By the year
2020 the
largest
employer
in the
developed
world will
be 'self'.

NICHOLAS NEGROPONTE
*Being Digital**

* Published by Vintage Books (Random House), New York.

services. The rest, predicts Handy, will work in three separate clusters:

Cluster one will involve project groups: people coming together for specific projects, often for short periods. This will probably be the dominant high-paying work method of the coming decade. And its requirements will provide some of education's biggest challenges.

It is impossible to overstate the importance of the growing *project-group* nature of work, each person an open-minded self-acting specialist collaborating with an open-minded team to produce new solutions.

Says Handy: "The upside-down school would make study more like work, based on real problems to be solved or real tasks to be done, in groups of mixed ages and different types of ability, all of them useful. Not only would people learn more in such a school, because they would see the point and purpose of what they were doing, but it would give them a better idea of the world they would be entering."³⁴

The second cluster will be part-time and seasonal workers: those who work two or three days a week in supermarkets, or weekends or summers in the tourist industry. It will be one of the few outlets for the unskilled or semiskilled. Those filling these positions are already the new-poor of the working population: the low-paid checkout cashiers, the peak-time, part-time fast-food servers.

The third cluster will be those who work individually or as a family group - often doing things they love to do. Effectively, the new world-wide information web enables competent people in any country to sell goods and services to anyone else - and to use databases to identify those services. Families will be able to use such services to swap everything from holiday-houses to ideas. And we will have the choice of the world's best educators in nearly every home.

9. Women in leadership

Of the 22 million new jobs created in America in the eighties, two thirds were taken by women. Naisbitt says that the increase of women in leadership positions in America is now reaching critical mass. "Forty percent of all managers are now women. Thirty-five percent of the computer scientists are women. Half the accountants are women, as are an increasing number of lawyers and doctors. If you go to medical schools or business schools, half of the freshman class are women. And women are creating new companies at twice the rate of men."³⁵

In the
workplace
the
new
technology
is
gender-
blind.

JOHN NAISBITT
*Megatrends Asia**

* Published by Simon & Schuster, 1230 The Avenue of the Americas,
New York, NY 10020.

In *Megatrends Asia*, he underlines the explosive impact of women in the world's fastest growth area. "In Japan, nearly all currency traders are women. The number of female managers in Singapore has nearly tripled in the last decade. One in five management jobs in Hong Kong is held by a woman."

Instant access to global events through international satellite broadcasts gives Asian women a window on a world that earlier generations could not even fathom. "Education and financial independence," says Naisbitt, "will deliver what Asian women may value most - options."

The Economist says girls in many countries now seem to be outperforming boys before starting school and right through to the end of high school.³⁶ In many others they don't yet get the chance; there is undoubted, and often horrific, discrimination based on sex, but where the barriers are coming down, women are excelling.

There is also no doubt that in many cases women provide a different perspective. Anita Roddick is an outstanding example. In 1976 she opened her first retail venture, The Body Shop, in Brighton, England. By 1991 her world-wide chain had 709 shops, sales of \$238 million and profits of \$26 million. By 1993, 893 shops and a new one opening every two and a half days - nearly all of them franchises.

In her book *Body and Soul*, Roddick's perspective comes through on almost every page. "The great advantage I had when I started The Body Shop was that I had never been to business school . . . If I had to name a driving force in my life, I'd plump for passion every time . . . The twin ideas of love and care touch everything we do .

"For me there are no modern-day heroes in the business world. I have met no captains of industry who made my blood surge. I have met no corporate executive who values labour and who exhibits a sense of joy, magic or theatre. In the 15 years I have been involved in the world of business it has taught me nothing. There is so much ignorance in top management and boards of directors: all the big companies seem to be led by accountants and lawyers and become moribund carbon-copy versions of each other. If there is excitement and adventure in their lives, it is contained in the figures on the profit-and-loss sheet. What an indictment!"

Just as women are changing business, so will philosophies like this change education. But how will we teach "love," "care" and "compassion?"

Your
brain
is
like a
sleeping
giant.

TONY BUZAN
author of *Use Your Head*

10. Your amazing brain rediscovered

Some say the 1970s provided the decade of space exploration; the eighties, the decade of greed; and the nineties relaunched the discovery of inner-space: when we finally came to appreciate and utilize the tremendous potential of the human brain.

Tony Buzan puts it into perspective. To anyone studying education, he would seem a typically bright product of an excellent education system. He graduated in 1964 from the University of British Columbia, Canada, achieving double honours in psychology, English, mathematics and general sciences.

But looking back today, he is staggered at what he *wasn't* taught.

"At school I spent thousands of hours learning about mathematics. Thousands of hours learning about language and literature. Thousands of hours about the sciences and geography and history. Then I asked myself: How many hours did I spend learning about how my memory works? How many hours did I spend learning about how my eyes function? How many hours in learning how to learn? How many hours in learning how my brain works? How many hours on the nature of my thought, and how it affects my body? And the answer was: none. In other words, I hadn't been actually taught how to use my head."³⁷

Well after leaving university, he went into a library and asked for a book on how to use his brain. "The librarian said: 'The medical section's over there.' I said: 'I don't want to take my brain out; I want to use it.' And she said: 'Oh, there are no books on that.' And I thought: No books on how to use your most valuable tool. I must write one. And I did."

Since then he has written eight books. One of them, *Use Your Head*, has sold over a million copies. It is a recommended introductory text for Britain's Open University. It and the other simple Buzan techniques are essential for anyone joining The Learning Revolution.

11. Cultural nationalism

The more we become a one-world economy, the more we develop a global lifestyle, the more we will see an equal counter movement for what Naisbitt calls cultural nationalism.

"The more we globalize and become economically interdependent," he says, "the more we do the human thing; the more we assert our distinctiveness, the more we want to hang on to our language, the more

The other alternative: a rising underclass

The telephone gap

Half the world's population has never placed a phonecall.

The computer gap

Only 3 percent of the world's population uses computers, and even in the rich United States half the population cannot afford them.

The unemployment gap

Even in affluent Western Europe, 19 million people cannot find jobs.

The poverty gap

At least 27 million Americans are now living in poverty and 40 percent of the nation's poor are children.

The education gap

More than half of America's young people leave school without the foundation needed to hold a good job.

The violence trap

270,000 American students carry guns to school.

The wealth gap

20% of Americans now earn 80 percent of the country's annual income.

The knowledge gap

The have-nots become the know-nots and do-nots.

we want to hold on to our roots and our culture. Even as Europe comes together economically, I think the Germans will become more German and the French more French."

The downside of this is obvious: the "ethnic cleansing" and horror of the civil war in the former Balkan country of Yugoslavia; the Middle East wars, often with religious overtones; rebellion in parts of the former Soviet Union; the racial bigotry in many countries.

But the positive challenges for education are equally obvious. The more technology thrives, the more the striving to capture our cultural heritage, in music, dance, language, art and history. Where individual communities are inspiring new directions in education, particularly among so-called minority groups, we're seeing a flowering of cultural initiatives - and a tremendous rise in self-esteem.

12. The growing underclass

You don't have to move too far from the centre of the city in places like New York, Chicago, Philadelphia and Los Angeles to see the grim signs of a soaring underclass - predominantly associated with colour and educational failure, and overwhelmingly among unemployed youth.

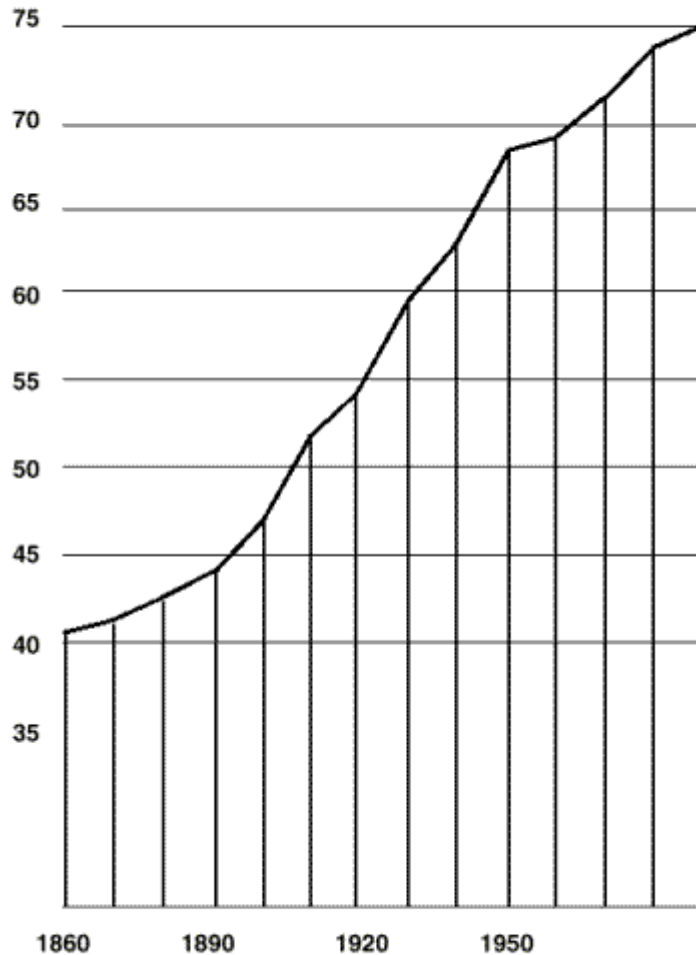
Statistic after statistic shows that members of this underclass are often trapped in a self-perpetuating cycle. Back in 1970 Alvin Toffler predicted in *Future Shock* the era of the *fractured family*: more divorces, changing lifestyles, the breakdown of the nuclear family. Most of his predictions have come true. And where the fractured family has coincided with unemployment, the ingredients have formed the recipe for social disaster.

Education is a vital key to unlock an alternative future. In America's ten largest cities, the number of jobs requiring less than a high-school education has dropped by half since 1970. Two thirds of new jobs created in America since 1989 have been professional and managerial.³⁸ In Germany, by 2010 only 10 percent of jobs will be appropriate for unskilled workers, compared with 35 percent in 1976.³⁹

But this is not only an unemployment problem. Unemployed young men tend to commit more violent crimes and not take on the responsibility of parenthood. "Adolescent boys are the most volatile and violent of all. Those under 24 are responsible for half of America's violent crime; those under 18 commit a quarter. The figures for most western countries are comparable."⁴⁰

The new third age

Life expectancy at birth in the United States



Data compiled from U.S. National Center for Health Statistics, updated from a graph which appears in Ken Dychtwald's book, *Age Wave*, published by Bantam Books, 666 Fifth Avenue, New York, NY 10103.

And *The Economist*, in a definitive survey, asks what restrains such behaviour?" The short answer is: a two-parent home. Two-parent homes are demonstrably better at raising trouble-free children than one-parent ones."⁴¹ All the more reason to worry that, in America in 1991, just 50.8 percent of children lived in traditional nuclear families (families where both parents were present and the children were the biological offspring of both parents). Among Hispanics, the figure was 38 percent; among Afro-Americans, 27 percent.⁴²

Says *The Economist's* survey: "When men find it impossible to provide, they also seem to find it difficult to learn the nurturing bits. They may retreat into fundamentalist masculinity - the world of gangs which provides for their members a kind of rule-based behaviour that boys do not get elsewhere."

Those who lack earning power, who lack self-esteem, those who get pregnant young and don't marry, those who marry young but don't have training in parenthood, and those who are poor are those most at risk of failing as parents. In turn their children have the hardest time breaking out of the poverty trap. And unfortunately that trap is not going away.

As Jeremy Rifkin puts it so well in his brilliant book *The End of Work*: "The Information age has arrived. In the years ahead, new, more sophisticated software technologies are going to bring civilization ever closer to a near-workerless world. In the agricultural, manufacturing and service sectors, machines are quickly replacing human labour, and promise an economy of near automated production by the mid-decades of the 21st century. The wholesale substitution of machines for workers is going to force every nation to rethink the role of human beings in the social process."

Even if no other factor demanded a learning revolution - and a corresponding social revolution - that paragraph screams out for one.

13. The active aging of the population

Just as economies are dramatically changing, so are demographics. And the most striking trend in developed countries is the active aging of the population.

A hundred years ago only 2.4 million Americans were over 65, under four in every 100. Today there are over 30 million - around one in eight. By 2050: over 67 million - almost 22 percent of the population.⁴³

Since 1920 in America average life expectancy has increased from

One of the
only places
operating
largely as it
did more than
50 years ago
would be
the local
school.

RENATE NUMMELA and GEOFFREY CAINE
*Making Connections**

* Published by the Association for Supervision and Curriculum
Development, 1250 N. Pitt St., Alexandria, VA 22134-1403.

54 years to 75. In most developed countries, with the notable exception of Russia, the average male reaching 60 can also expect to live to at least 75, and the average woman over 80.

At current rates of growth, by the year 2025, the world's over-60 population will have increased to one billion. Little wonder that many are calling 60-plus *The Third Age*. Others are challenging us to abolish the word "retirement" from our vocabularies.

The over-60s generation also represents one of the greatest untapped resources for the future of education.

14. The new do-it-yourself boom

The industrial age also gave birth to another phenomenon: the confusion of structures with reality. Just as giant corporations arose to provide standardized mass-produced products to millions of people, so giant organizations arose to "deliver" health and education.

And so we came to confuse education with schooling; health with sickness-treatment and hospitals; law with lawyers. We came to regard education as something someone else provided for you; we believed that health was something you purchased from doctors, specialists and hospitals. Today that concept is changing rapidly. The new do-it-yourself revolution involves more than painting your home and doing your gardening. It involves taking control of your own life.

Personal computers can now provide the basis for much of what we pay experts to do: prepare wills, handle accounts, buy stocks and bonds, and figure taxes. Every sensible person now accepts that health also comes from what you do personally: what you eat and drink, and how you exercise.

But in "education" the change is slow to come. Californian educationalists Renate Nummela Caine and Geoffrey Caine explain in their book *Making Connections: teaching and the human brain*: "One function of schooling should be to prepare students for the real world. They need to have a sense of what will be expected of them, how they will be challenged, and what they are capable of doing. The assumption is that, by and large, schooling as we know it meets those goals. The reality is that it does not. On the contrary, it fosters illusions and obscures the real challenges. In particular, it fails to deal with the impact of electronic media.

"Take a close look at American teenagers. For a moment, let time run

**3,000 out of
Microsoft's
17,800
employees
are also
millionaires
due to the
stocks
they own.**

**MICHAEL A. CUSUMANO and
RICHARD W. SELBY**
*Microsoft Secrets**

* Published by HarperCollins, 77-85 Fulham Palace Road,
Hammersmith, London W6 8JB, and The Free Press, a
division of Simon & Schuster, USA.

Note: by 1999 Microsoft's staff had risen to 28,000.

backwards to deprive teenagers of gadgets that are in some way dependent on electricity. One by one, we remove the television, the CD players, the computer, the videodisc, the radio, tape player, record player, electronic games, aeroplanes, air conditioning and automatic heating, shopping in large malls, and the opportunity to acquire large numbers of possessions. How well do you think our teenagers would cope? How would their lives be different? And what about our own?

"One of the only places that would reflect scarcely any difference in the scenario we've painted - and that would be operating largely as it did more than 50 years ago - would be the local school."

Obviously that criticism does not apply to those schools that are rapidly changing, and encouraging students to take control of their own world. But does it not apply to most?

Our own view is that more and more learning will become self-learning: self-directed and self-fulfilling.

15. Cooperative enterprise

The 1990s started with the collapse of Soviet-style communism, and we hope that the new decade has also heralded the decline of gambling-casino capitalism. Our own view is that both are rapidly being superseded by new concepts of *cooperative enterprise*.

In *The 100 Best Companies To Work For in America*, nearly every company listed has pioneered new forms of staff involvement: partnerships, stockholding, profit-sharing, continuing education, job-sharing, flextime, project teams and many more.

"If you want to see what the new company looks like," says John Naisbitt, "you look at the young companies, not the old household word companies that are shrinking and are often slow to change. And in the new companies you find a high degree of participative management and decision-making. You find everyone being involved in sharing the profits, including the people in the mailroom and the receptionist. You can't work for many of these new model companies unless you own stock. If you don't have the money, they lend you the money interest-free to buy stock, because you have to have literal ownership. And the company's daycare is often built-in right from the very beginning. They pay for any kind of education courses the people take in order for them to grow personally. And they create environments where people can nourish personal growth and educational growth."

**There is
a new
generation
emerging
that will
change
the world
as never
before.**

DON TAPSCOTT
*Growing Up Digital**

*Published by McGraw Hill,
11 West 19th Street, New York, NY 10011.

16. The triumph of the individual

Around the world we're also seeing a revival of individual power and responsibility as more and more people take responsibility for creating their own future.

For around 200 years, national governments and then industrial giants have dominated almost every aspect of society.

Now the individual consumer is king - and queen - with the right and ability to choose from the best products and services around the world. This will also involve each one of us in taking the responsibility for choosing our own education - and in selecting the very best educational systems from around the world: a change with revolutionary potential.

We believe that personal revolution should take place from very early in life. As Don Tapscott summarizes it in *Growing Up Digital*: "I have become convinced that the most revolutionary force for change is the students themselves. Give children the tools they need and they will be the single most important source of guidance on how to make the schools relevant and effective."

*

Obviously, these are not the only dominant changes. We have not mentioned the spiritual revival taking place in many parts of the world, nor the regrowth of fundamentalism in many religions. The need to protect the environment is another vital trend, and has been covered in dozens of other books. So has the new age of biochemistry.

But the 16 key points in this chapter represent major trends which we believe present an unchallenged case for a corresponding revolution in learning. Grasping all the opportunities will change not only the face of government and industry, but the very nature of the world we live in, and the very nature of the educational and learning systems that will groom us for the future.

A continuing theme in this book is that we cannot achieve the educational breakthroughs we need unless we make an increasing investment in new *methods* of education and learning.

No one would think of lighting a fire today by rubbing two sticks together. Yet much of what passes for education is based on equally outdated concepts.