Vision 2020The

The new Social Enterprise Age

By Gordon Dryden

*Co-author of The Learning Revolution1*

*Since the 1950s the power of our computers has advanced by a factor of roughly 10 billion. By 2020 microprocessors will likely be as cheap and plentiful as scrap paper, scattered by millions into the environment, allowing us to place intelligent systems everywhere.*

 Michio Kaku, *VISIONS: How science will revolutionize the 21st century (1998)*

*Logic will get you from A to B. Imagination will take you anywhere.*

Albert Einstein

*Eventually books, files, television programmes, computer information and telecommunications will merge. We'll have this portable object, which is a television screen with first a typewriter, later a voice activator attached. Afterwards it will be miniaturised so that your personal access instrument can be carried in your buttonhole, but there will be these cheap terminals around everywhere, more widely than telephones of 1984.*

 Norman Macrae (with Chris Macrae), *The 2024 Report* (1984)

*We are at the dawn of a new Age of Networked Intelligence—an age that is giving birth to a new economy, a new politics, a new society.*

 Don Tapscott, *The Digital Economy* (2000)

***Matapouri Bay, Aotearoa-New Zealand, June 7, 2020***

 On January 6, 1984, Steve Jobs launched the Apple *Mac:* from the company he’d set up, at age 19, with Steve Wozniac. And with the *Mac* came the new age of interactive home computing.

 Even then, at age 28, Jobs was the youngest CEO of a *Fortune 500* company. By 2010 he had reinvented six entire global industries.2

 On May 14, 1984, Mark Zuckerberg was born in White Plains, New York.  By the time he was 19, he had had launched a tiny Website to link Harvard University students with each other online.  He called it *The Facebook*.

 By 2010, when he was 26, *Facebook* was the world’s biggest social network, with 550 million members. And *Time* magazine named him *Person of The Year.*

 Also in 1984, Norman Macrae, the Deputy Editor of *The Economist,* wrote *The 2024 Report: “A history of the next 40 years”.*Its predictions would prove remarkably accurate. They included the 1989-90 collapse of the Soviet Union and the 21st-century destruction of the global banking-financial system.

 In 2010, Norman Macrae died at age 86.3   And even “his last article” was spelling out how a new global “social enterprise” network could replace that last broken (banking) system—just as the social networks of *Wikipedia, Facebook, YouTube* and *Google* have revealed a different future. And, as ATM machines and Internet banking prove: we may still need banking, but we may not need banks

 *The 2024 Report* was the second of two Macrae books that would take me on a personal journey to investigate, and perhaps help shape, some parts of the future he predicted—including a new vision of the now-decisive leap to 2020 and my own specialties, digital communications and education.

 The first, in 1964, steered me from New Zealand to Japan for a month, and then on a one-man research mission around Asia. That was a direct result of his 1962series of articles and then his book, *Consider Japan.4* In them he told how, in 17 years, a bombed, devastated and defeated Japan had soared back as a world power. Japan’s 1960s annual Development Plans spelled out how its people could double their family incomes in ten years. And they did. (On my 1964 visit I bought a copy of Japan’s 1963 *National Development Plan—*in English—for $1. It was almost entirely devoted to proving how Japan could quickly become the world’s biggest and most efficient car manufacturer. It did.)

 Japan achieved all this by ignoring every bit of advice given their government by American economic advisers after World War II.

 The new Japanese way was economic planning with a difference. Not the Soviet Union’s failed five-year “pretend” plans: *“We pretend to work; you pretend to pay us.”* But a deep analysis of (1) where the world was heading, (2) the best leading role for Japan, (3) which of its industries could achieve that and (4) what was needed, specifically, to make that happen.

 The path Japan took from then until 1990 was to put it back on top as a wealthy industrial nation. It would also inspire the *Asian Tigers—*South Korea, Taiwan, Singapore and Hong Kong—to follow it. Amazingly, in both one-party states like Singapore and free-wheeling economies like Hong Kong, the magic worked: as it did later in China, under Deng Xiaoping’s policies from 1978.

*The 1964 Japanese visit also introduced me to W. Edwards Deming’s “continuous improvement” Kaizen programme—and how it, too, could revolutionise a country. Soon the same philosophy would show how to reinvent schooling, with teenage students from tiny remote villages in Alaska. In one unique high school5, classrooms were turned into real-life manufacturing, processing and exporting companies—and students into innovative village entrepreneurs.*

**The 2024 Report**

 Then in 1984, Norman Macrae and his computer-skilled son Chris produced *The 2024 Report6* and its 40-years leap to 2024; then how their imagined society had changed in four decades.

 And what uncanny predictions: from the fall of communism to the way entrepreneurship and innovation could completely transform education, health, manufacturing and financial systems.

 ***He even forecast the birth and dominance of what we know as the Web. And how it could provide, in the 21st century, the global platform to reinvent everything: a new world of co-creative democracy.***

 Not all his forecasts were correct. And certainly young British computer scientist Tim Berners-Lee fulfilled two parts of Macrae’s dream way ahead of time. In 1990, Berners-Lee developed amazingly simple software and networking protocols to build what he called the World Wide Web.

 What was even more amazing: the simple way Berners-Lee did this—in his “spare time”. As Michael L. Dertouzes wrote nine years later in the Foreword to *Weaving The Web7:* “Thousands of computer scientists had been staring for two decades at the same two things—*hypertext* and *computer networks.* But only Tim conceived how to put these two elements together to create the Web.”

 “The vision I have for the Web,” said Berners-Lee, “is about everything connected with everything.” He also saw it as more a social creation than technical one. “I designed it for a social effect—to help people work together.”

 In 2010 Mark Zuckerman would express the same wish for the Web’s first global “social community. When *Time* magazine chose him as *Person of the Year,* it added: “Whereas earlier entrepreneurs looked at the Internet as a network of computers, he saw a network of people.” And Zuckerman himself stressed: “The thing that I really care about is making the world more open and connected.”

 Also in 2010 the 2006 Nobel Peace Prize winner, Dr. Muhammad Yunus—the inventor of *Microfinance* and “*Banker To The Poor”8***—** published the second of his two books urging the world to adopt “Social Business”9 ton the drive to wipe out poverty

 ***From 1990,*** ***Berners-Lee also insisted on placing all the software, specifications and ownership of the Web in “the public domain”.***  ***Had he chosen otherwise then he, not Bill Gates, could have become the world’s richest man.***

 Seven years later another futurist, former *Wired* magazine co-founder Kevin Kelly, could tell a TEDconference:10 “The Web, as we know it, is less than 5,000 days old—with all these amazing things.” And then, as a multimedia montage showed those new Web-driven 21st-century tools converging: “It’s amazing,” he said, as he prepared to demonstrate *The next 5,000 days of the Web*  ***(***[***http://www.youtube.com/watch?v=yDYCf4ONh5M***](http://www.youtube.com/watch?v=yDYCf4ONh5M)***).*** *“* But we are not amazed.”

Many of those “amazing things” followed Macrae’s 1984 predictions. So that pivotal, tipping-point year is as good as any for the start-point for this 2020 tribute to Norman Macrae

***In 1984, of course, came Steve Jobs’ Apple Mac****, with point-and-click graphics on your desktop screen, at the touch of an electronic “mouse”. The Mac was launched with the world’s most famous television commercial: “Why 1984 won’t be like [George Orwell’s] 1984.”*

***In 1984, too, came the birth of Cisco Systems:*** *when Sandy Lerner and Len Bosack strung “digital routers” through ducts and pipes at Stanford University to create networks to link even incompatible computer-systems together. By 2010, Cisco was a $40 billion-a-year networking company. And its online Networking Academies were the future model for continually updating skills throughout life.*

***In 1984 19-year-old Michael Dell started assembling personal computers in his Texas university bedroom.*** *He was soon to drop out of university and, from 1997, pioneer selling computers direct on the new Web. By 2010, Dell’s Web sales averaged $50 million a day.*

***In 1984, too, in Finland, a 120-year-old lumber and gumboot company decided to explore making mobile phones: heavy, clunky and costly.*** *It called the new venture Nokia, after a nearby river.**By 2010, five billion people carried “a mobile”. In the previous decade, Nokia had made 40 percent of them. And more students in China were learning English on them (singing to Karaoke pop tunes) than the population of the United States.*

***In 1984 came the product that would soon be called Powerpoint.*** *In 1947 Bill Gates’ Microsoft bought it for $14 million. Within 20 years 30 million Powerpoint presentations were being made every day. Well before then, Powerpoint, Microsoft Word and Excel—packaged as Microsoft Office—would make Bill Gates the world’s richest man.*

***In 1984, too, 34-year-old British entrepreneur Richard Branson was aboard his group’s first Virgin Airlines flight from London to Newark, New Jersey.*** *By 2010****,*** *the Virgin Group**had grown from his first music-recording company—set up at age 16— to 400 employee-inspired (and co-owned) subsidiaries, all under the Virgin brand, financed initially by Virgin’s Venture Capital Fund.*

***In 1984, the Apple Mac’s “killer application” was to be Pagemaker.*** *And**the following year,**in isolated New Zealand, former high-school dropouts Gordon Dryden and David Johnson devised their country’s first Mac-Pagemaker publishing network. As a self-trained printing typographer and layout editor, one partner (the present author) soon turned the 500-page Pagemaker manual into nine simplified page-layouts—and a series of digitised magazine and book “templates”: as easy to learn as Powerpoint. Anyone with basic typing skills could, within a day, be producing professional-quality finished four-colour magazine or book pages, ready to print.*

***Soon their Trends Group was producing and exporting 80 full-colour global home-improvement books a year. Many of the best colour photos and ideas were contributed, free, by kitchen and bathroom designers—and later architects—in the Trends Designer-of- The-Year Awards.*** *From that arose a dream to involve the world’s 59 million schoolteachers and two billion students to redesign and co-create a new education system.*

***And when the 1986 paperback edition of The 2024 Report finally reached my in-tray, it sparked a linked-in idea.*** *For 10 years I’d been hosting daily three-hour radio phone-in programmes. Their aim was to share new positive alternatives. Many were on education. Three separate national television series had done the same.*

***Now The 2024 Report predicted that satellite “teleputer networks” would soon provide the new platforms for “Global Village” computerised town meetings.*** *“By 2005, the gap in income expectations between rich and poor companies,” Macrae wrote, “was recognised to be man’s most dangerous problem. Internet-linked television channels in 68 countries invited their viewers to participate in a computerised conference about it. About 400 million watched the first programme, and 3 million individuals or groups tapped in suggestions. About 99 percent were rejected by the computer.” Of the 31,000 suggestions rated worthy of going through of ongoing computer analysis, two finally emerged as so simple that one billion people tuned into the last programme and overwhelmingly voted for both.* [***http://www.normanmacrae.com/netfuture.html***](http://www.normanmacrae.com/netfuture.html)

***Amazingly, in 1985 singer Bob Geldorf had proved the concept could work****. He and fellow musicians had put together a global, satellite phenomenon: a multi-venue LiveAid* *concert to raise funds for African famine relief. It won a world audience between 150 million and 200 million, and raised $245 million.*

**The New Zealand initiative**

 *So what could be our own similar starting point?*

 In New Zealand one national platform was soon obvious: the nationwide 1990 celebrations to mark the 150th anniversary, of the country’s founding—as a treaty partnership between the original Maori (Polynesian) tribes and the British Government.

 So the Big Idea was again simple: to open-up a 1990 nationwide, multimedia debate (on television, radio, and in seminars and conferences around New Zealand) to involve the country’s innovators to reinvent the future.

 The “pilot” was a 15-day, three-hours-a-day radio programme during the next summer vacation. Fortunately, in the normally sunny Christmas-New Year holiday break, unseasonal rain pelted down. Family vacationers were stranded indoors—and left to listen to daytime radio. (Even one-day cricket, the summer television fill-in, was cancelled.) The radio show proved a big hit—as the ideas bubbled forth: to reinvent early childhood development, the health system, banking, credit, industrial relations, new forms of education, democracy, transport—even religion.

 ***Better still, the opening programme struck a major chord: the challenge for families to phone in the 10 most important innovations that had, over the previous 150 years, given New Zealand one of the world’s highest living standards—and most enjoyable lifestyles?***

 Today *Googling* “New Zealand history timelines”would find these 10 instantly.

 But—on families’ rained-in vacations—parents, grandparents and students reconstructed their own history lesson. And many children absorbed for the first time not only their country’s innovations, but how to link the wisdom of parents and grandparents with the talents of young innovators like Zuckerman, Jobs and Dell?

 The home and on-air discussions also reaffirmed New Zealand’s own unique do-it-yourself culture. [New Zealanders still describe that culture as “No. 8 fencing wire”: the wire used to quickly erect fences on farms. Around 12,000 miles from the centre of Europe’s industrial revolution—from the 1840s—it took two months for mail to get to Britain on a sailing ship—to reorder any broken machinery. Then another two months for the replacement parts to arrive. So the self-sufficient “Kiwis” quickly learned “to fix anything with a piece of No. 8 fencing wire”. Even well into the 21st century, New Zealand’s best-known venture-capital company was named Number 8.]

 So dozens of answers filtered through our airwaves. And from the previous 150 years, these were voted the ten best history-defining innovations that had determined New Zealand’s ranking for one of the world best living standards and quality of life:

1. **Refrigerated shipping.** New Zealand had not invented it but, from 1882, no country had used it better. For years it had enabled us to live “off the sheep’s back” as the world’s biggest exporters of frozen lamb.

**2. Grasslands research:** Led by Sir Bruce Levy, scientists added nitrogen-fixing “white clover” to cocksfoot and rye grass, and then trace elements of cobalt, to create farms with the world’s highest protein content per hectare. New Zealand is still the only country with high living standards largely based on a one-crop economy: grasslands farming.

**3. Cross-breeding of sheep:** to produce both great meat (for lamb) and great wool (for carpet production—and later to become the world’s biggest exporter of all-wool tufted carpet.)

**4. Farmer-owned cooperative dairy companies:** from 1871,linking mechanised (and then later

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***My favourite wasn’t counted as it was used as the opening challenge:*** *In the 1950s, Auckland marathon runner Arthur Lydiard concluded that thousands of athletes could run a quarter-mile in under a minute—but did not have the stamina to string four quarters together to run a mile in under four minutes. So he devised a training schedule that started with short-distance jogging—then built up gradually to running 100 miles a week (160.9 kilometres). By the 1960 Olympic Games, and over the next six years, five of his New Zealand athletes—Peter Snell, Murray Halberg, Barry Magee, John Davies and Bill Bailey—had either broken every world record or won the Olympic Gold Medal in men’s middle-distance running. So the radio-competition-challenge was simple: if five New Zealanders—four living within a mile of their coach’s home—could all become world champions, what could the rest of us achieve? [When U.S. Olympic track coach Bill Bowerman trained with Lydiard in Auckland in 1964, he returned to Oregon hooked on jogging, wrote the definitive book on it, sold a million copies, and then teamed with one of his university running students, Phil Knight, to start a small company selling running shoes out the back of a car. Their first sales rep suggested a brand-name: Nike—the Greek winged goddess of victory. And a young Portland graphic design student, Carolyn Davidson, produced a draft logo—a swoosh without any name—for $35. Knight liked neither the name nor the logo but decided “to run with them for now”.] In 1975, John Walker—another New Zealand runner, using mainly the Lydiard methods—became the first man in history to run a mile under 3min 50 secs.*

automated) butter, cheese and milk-powder processing with single-family farms. That became the model for a series of cooperatively-owned export industries.

**5. Mechanised “circular” milking sheds on farms:** where electric milking machines in new configurations enabled each farm to double its productivity with twice the number of cows.

**6. Tanker collection of milk:** instead of “machine-separating” of milk on each farm, milk tankers (like petrol transporters) collect “whole milk” each day and transport it for automated processing at Fonterra’s cooperative processing plants.

**7. Aerial top-dressing (“crop-dusting”):** spreading fertiliser from small New Zealand-made aircraft on hill-country and low-mountain farms. This doubled sheep-farming productivity after World War II.

**8. Hydro-electricity:** world leader in low-cost, sustainable electric power.

**9. Shipping containers:**  the simple innovation that dramatically reduced the cost of getting New exports to the other side of the world.

**10. Education innovation:** “Beeb’s” lasting legacy: to learn it, do it—in the real world.

 In 1938 the Government brought the world’s best educational innovators to New Zealand for a series of open public discussions, organized by Dr. Clarence Beeby .

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**TV interview:** *New Zealand innovations: Gordon Dryden.* <http://www.send1keep1.com/tlw/bgo/>

 Scottish-born Education Minister Peter Fraser attended every session, but didn’t make any public speeches. Instead, he listened. His staff took notes. Then the Minister acted. First he persuaded Beeby to apply for the vacant post of Deputy-Director of Education.

 Then Fraser refused to sign his own annual Education Report to Parliament, as drafted by his Ministry staff—“because it didn’t say anything”. He asked the department to redraft—overnight— a new opening, based on the Government’s election policy. And this is what Beeby wrote:

 ***“The Government’s objective, broadly expressed, is that every person, whatever his level of academic ability, whether he be rich or poor, whether he live in town or country, has a right as a citizen to a free education of the kind to which he is best fitted, and to the fullest extent of his powers. So far is this from being a mere pious platitude that the acceptance of the principle will involve the reorientation of the education system.”***

 [In his 1992 book, *The Biography of an Idea11,* Beeby apologised for the masculine “he” in that report: “unforgivable”, he wrote, especially in the first country where women had won the right to vote in national elections—99 years before.]

 That became the core of the new national education policy. It would also stamp Beeby’s legacy on that policy when he became Director of Education from 1940 to 1960. Its core was to be based on the central philosophy of American educational reformer John Dewey (1859-1952). Dewey believed democracy was not merely voting every four years. Democracy meant opening up all issues to “an informed choice of alternatives”—by public debate on options.

 And “education” meant students themselves taking charge of their own learning: to “learn by doing” and not merely listening to lectures. It also meant “using the world as a classroom”, and applying “education” to creatively solve real-world problems.

 This was the policy Beeby recommended to Government after Fraser became Prime Minister in 1939. Fraser and new Minister of Education Rex Mason quickly adopted it

 His policies figured largely in the late 1980s radio debates we organised to “invent New Zealand’s future.” But “education” was not the only theme*.* We even tried on air to find an answer to the hardest question I had ever been asked in 10 years running daily radio talkshows. It had come from an 11-year-old: “Where does all the money go to when we decide to have a depression?”

 By the time of our radio “pilot”, the 1987 global financial crash had caused havoc around the world. Financial speculation was threatening to replace or stall real growth and the productivity gains made possible by the growing impact of Moore’s Law (named after Gordon Moore, one of the founders of Intel, the world’s biggest silicon-chip and integrated-circuits company).

*One of the recurring themes in The 2024 Report was the compounding impact of what has become known as Moore’s Law: that the number of transistors we can pack on to a silicon chip or integrated circuit continues to double every two years. (Some now say 18 months). The result: to regularly halve the cost of producing products powered by silicon-chip technology. That has since slashed prices in every competitive new industry—except one: banking. Instead, banking charges based on falsified credit “ratios” (and exorbitant credit-card interest rates) have continued to soar. From them came the multi-trillion banking-financial disaster of 2008-2012. See “Norman Macrae’s Last Article”, on banking alternatives: written in 2009 for the Website of 2006 Nobel Prize Winning “Banker To The Poor” economist Dr. Muhammad Yunus:* [*http://yunusforum.net/?p=80*](http://yunusforum.net/?p=80)

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**The next step**

 The 1988-89 radio series was a soaring success.After three weeks, the radio station’s audience had doubled. New Zealand’s biggest daily newspaper wrote in praise. So the evidence existed to find funding for a national television and radio debate: to provide Dewey’s and Beeby’s “informed *choice of alternatives”.*

 A detailed application to the ASB (for Auckland Savings Bank) Charitable Trust won a quick donation of $2 million to set up a not-for-profit Pacific Foundation. The New Zealand Television Commission agreed to contribute $400,000. Television New Zealand agreed to provide the prime-time Sunday evening slots for six one-hour documentaries. Radio New Zealand agreed to launch follow-on talk-show discussions. And the Auckland Area Health Board provided part of the funding for “the future of health policies” to join “education” at the centre of the proposed national debate.

 Co-founder of the Pacific Foundation Lesley Max took charge of developing a parent-education programme. That started with a series of three full-colour booklets on early-childhood parenting education, issued free to all parents in our area: *Right From The Start* (on pregnancy), *From Day One* (the first year of life), and *Growing Up Great* (the other pre-school years.) She also set out to plan and build the first of our Foundation’s combined one-stop parenting and early childhood centre: the first of several.

 I finished off the research needed to structure the shooting scripts for six one-hour television programmes on New Zealand’s future, under the title: *Where To Now?* And a professional TV researcher was off around New Zealand to follow-up our advertised appeal to find great New Zealand success stories in education, parenting and health—to video on our return from abroad. Before the TV scripts were finished, the Government 1989 released another a commissioned report on the future of education, called *Tomorrow’s Schools*, by an independent think-tank headed by business leader Brian Picot.

Thatreport was to revolutionise *the structure* of school administration—but only part of *the philosophy* (because that was not its brief). It boldly recommended:

 **Abolish** the national Department of Education.

 **Replace** it with a scaled-down policy-recommending Ministry.

 **Abolish a**ll Regional Education Boards.

 **Turn** all 2,700 schools—public and private—into “charter schools”, with an overall brief to encourage innovation and a raft of fresh ideas.

 **Turn** control of each school over to a Board of Trustees, elected by parents, one elected by teachers, and (in the case of high schools) one elected by students—plus the principal.

 **Each charter** to be drawn up by each board, in two parts: (a) a commitment to aspire for excellence in fulfilling “national curriculum guidelines”, but with widespread innovation in how to do this; and (b) to each become “a centre for excellence” in one agreed initiative.

 **Share** the savings (from slashing the bureaucracy) with each school.

Prime Minister David Lange (also the Minister of Education) immediately accepted the report, and Parliament endorsed it.

 And so, as I prepared to head off around the world in 1990 with a professional television crew, New Zealand communities, and schools, set out on the race to invent *Tomorrow’s Schools.* Some had even started earlier—with separate pilot programmes.

 By mid-1991, we had edited 150 hours of video down to six one-hour prime-time TV shows, and they had been broadcast nationally.

*But little did we know then that 56 of New Zealand’s 2,700 schools were soon to choose “new technologies” as the core of their proposed “centres of excellence”.*

As we started our world video-shooting tour in London in the second half of 1990, we had no idea, either, that Berners-Lee was about reveal his new Web. He had worked out all the details—and simplified them—while engaged on other projects at CERN (The European Particle Physics Laboratory) on the French-Swiss border. He eventually demonstrated a working model to CERN colleagues on Christmas Day, 1990. He wasn’t even employed by CERN to develop the Web. It was

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**Fast-animation video:** *Changing Education Paradigms: http://www.youtube.com/watch?v=zDZFcDGpL4*

almost a part-time hobby—although CERN did buy—and let him use to produce a prototype—a high-powered advanced computer, developed by Steve Jobs’ new company, NeXT.

 And when he did, he insisted that it should become “the common property” of the world: open for anyone to use, so long as they, too, signed up to freely share the additional developments that, they might contribute.

***In the high-tech world this would become known as “open-source” technology. I much prefer the term “co-creative enterprise”—as Macrae’s 2024 forecast had predicted—and New Zealand’s “cooperative enterprise” culture had nurtured for years.***

 A year later, Berners-Lee revealed it in a makeshift demonstration to several “nerds” at the *Hypertext* conference in San Antonio, Texas. But the organisers declined to accept a “technical paper”—as “it wasn’t finished, and didn’t make enough references to work in the field”. Not until 1993 did the “The Web” start to become much better known to the general public—soon to power the first cyber-hub of “The Next Society”.

 As Michael Dertouzos, Director of the MIT LCS, wrote in the Foreword to Tim Berners-Lee’s *Weaving The Web* book in 1999: “When I first met Tim, I was surprised by another unique trait of his. As technologists and entrepreneurs were launching or merging companies to exploit the Web, they seemed fixated on one question: *‘How can I make the Web mine?’* Meanwhile Tim was asking: *‘How can I make the Web yours?’”*

**Web 1.0 flowers to life**

 The follow-on successes from the new Web were almost instant:

**September 1991: *Linux.*** Linus Torvalds, a 22-year-old Finnish computer-science student, announces on the Web that he’s working on a computer operating system, and seeks co-developers for what will become the *Linux* open-source system, and still the most-recognised early working example of “free open-source technology”: co-created in cooperative teams on the Web.

**1993:** ***Mosaic.*** American student Marc Andreessen and colleagues at the University of Illinois create *Mosaic:* a new “Web browser” that adds interactive multimedia graphics to make easier for *Windows* and *Mac* operating systems—not only NeXT—to access the Web.

**1964: *Netscape.*** Former Stanford ProfessorJim Clark, the creator of Silicon Graphics—the first professional interactive digital-effects, movie-making software—hires Marc Andreessen and his student team to produce a “Web browser” similar to *Mosaic,* which they call *Netscape.*

**1995: *Navigator.*** Netscape launches as a public company to make Clark an instant billionaire, Andreessen worth more than $100 million, and all his student partners millionaires. Netscape releases its *Navigator* browser free on “the Net”—and 40 million computer users download it inside the first three months. “Web mania” arrives; and the beginnings of *Web 2.0:* the much more interactive phase.

**1995: *Yahoo.*** Stanford students Jerry Wang and David Filo launch the *“portal”* that provides the Web’s first directory services.

**1995:** ***Internet Explorer.*** Microsoft pays $2 million to license browser-code from a small company called *Spyglass.* Bill Gates’ company adapts the software, renames its own version *Internet Explorer* and packages it free with all new *Windows* computers. The browser wars were about to rage.

**1995: *Pixar.*** Steve Jobs’ Pixar studios release John Lasseter’s *Toy Story,* the first feature-length computer-animated movie. A new era in movie-making has begun.

**1995: *Amazon:*** Jeff Bezoslaunches the world’s first online bookstore with the company he had founded the year before.

**1996: *Apache.*** This open-source Web server (central computer storage centre) emerges to link other computers to the Web: later to provide the big increase in storage needed to make videos, movies, digital animations and games available online. [By 2010, Apache served 60 per cent of the world’s websites, and was still controlled and developed by an open community called The Apache Software Foundation.]

**1998: *eBay.***Pierre Omidyar founds an online version of a garage sale: soon to become the world’s biggest online auction system.

**1998:** ***Google.*** Two Stanford graduate students, Larry Page and Sergey Brin, announce the development of what will soon be the world’s greatest search engine. With it, Web 2.0’s interactivity will soon soar.

**1999: *Alibaba*:** Jack Ma, China’s best English-speaker, founds what will become the world’s biggest e-commerce site: to sell (mostly in English) the abilities of 50 million small Chinese family companies to the rest of the world. Like the fictional Alibaba, a global *“Open Sesame”.*

**1999: *Cloud computing.*** Marc Benioff founds *Salesforce.com* to move business applications on to the Web, pioneering “cloud” computing. No longer should 2 billion PC owners have to buy 2 billion expensive individual software programmes. Instead, a master copy would be stored on the Web—and anyone could select any part of it to download cheaply (or free) as needed.

**1990s: The two-sided picture**

 While the new PC and Web era quickly altered the entire face of business, at first it left most school systems unchanged. Most failed because they tried to paste 21st-century technology on to an outdated, 350-year-old model: *like inventing the jet engine and trying to strap it on a stagecoach.*

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*In 1658, Moravian priest Jon Amos Comenius invented machine-printed textbooks with The Visible World in Pictures. By the time he died, in 1670, he had published 154 more. Together with slates, blackboards, chalk and desks in rows—with a teacher in front of each class—these were to become the core of the “modern” school, with “standardised tests” from “standardised” textbook-based “instruction”. Comenius had also linked these with holistic, multi-sensory learning methods—later reinspired in the early 20th century by the Italian early-childhood pioneer Maria Montessori. But in 1717 the Prussian Government, when it introduced compulsory primary schooling, insisted on “standardised teaching and testing” in “chalk and talk” classrooms. Most schools remained like that for three centuries.*

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 Fortunately, as our TV crew in 1990-91 visited many of the emerging exceptions—in pockets around the world—we also discovered great new research and ideas starting to converge:

***In America, Dr. Sivasailam (Thiaji) Thiagarajan was already building a brilliant reputation as “the Mad Scientist” at The Thiagi Group****, creating an amazing array of non-tech games for learning, teaching and training—by having more fun. His Website still says: “He would like his epitaph to say that he dropped dead in the middle of a workshop while making people laugh.”*

***In Britain, businessman Colin Rose successfully developed multimedia “accelerated learning” kits for Europeans to learn English.*** *In the new European Community, researchers had discovered that 2,000 words made up 90% of most spoken European languages. And Rose worked out that interactive games could teach “the first 2,000” much quicker than rote learning.*

***Tony Buzan invented “Mind Mapping”:*** *to store information like the human brain does—like building “new branches” on a tree.*

***Edward De Bono developed “lateral thinking”, and then a series of creative learning methods, such as “Six Thinking Hats”:*** *to teach even young children to think in six different ways.*

***Technic Lego was joining the more common interlocking Lego blocks****—soon voted the “Toy of the century”.*

***New versions of China’s traditional suanpan—or abacus—were now becoming popular*** *in the Western world for multi-sensory learning: by colour and movement.*

***Californian kindergarten teacher Jan Davidson pioneered digital multimedia early-childhood learning games: Math Blaster and Reading Blaster****—and later sold her digital-learning company for $1 billion.*

***Joan Ganz Cooney’s Sesame Street*** *had startled the television world (from 1969) by showing how learning could be fun—later to become the most widely-viewed television show in the world; enjoyed in over 250 countries.*

***Harvard Professor Howard Gardner published his revolutionary first book on “multiple intelligence”:12*** *that everyone is smart in different ways.*

***Professors Ken and Rita Dunn’s13 research proved that everyone also had a learning style as unique as one’s finger-prints.***

***From Western Australia Glenn Capelli was fashioning new modes for fun-filled non-tech training****—in education and business: an incredible non-tech presenter.*

***Roger von Oech was teaching creativity through his “Creative Whack Pack” of playing cards*** *based on his “Whack on the Side of The Head”14 book.*

***Dr. Jeannette Vos had just completed her seven-year-research program into the world’s best interactive learning programmes—****and her doctoral thesis based on SuperCamp methods**devised by co-founders Bobbi DePorter and Eric Jensen.*

***The pioneering Deming-based Kaizen methods had transformed Mt. Edgecumbe High School in Sitka, Alaska:***  *where boarding students from tiny, poor-income villages were learning to run their own Pacific Rim food processing and export businesses.*

***Will Wright in 1989 produced SimCity: later hailed as the most influential digital game of all time.*** *No need any longer for students to only* ***read*** *about ancient Rome; they could* ***build*** *Rome itself—ancient or futuristic****.*** *The new era of “creative-simulation” digital games was born.*

***And emerging brain research was proving that the 100 billion active neurons in the human cortex linked a network more creative than any computer.***

 *On the last day of our TV tour in America, at the University of California’s Berkeley campus, brain-scientist Marian Diamond put it all in perspective. In her office at the Lawrence Hall of Science, she dissected two human brains, with a running commentary for our television crew.*

For 30 years Dr. Diamond had been testing developmental theories upon rats. Consistently she found— as Montessori had with young children—that if rats were raised alone in dull, boring, uninteresting, unstimulating cages, with poor diets, they grew up to be dull, unintelligent rats.

 ***And if healthy rats grew up with other healthy rats—in stimulating environments, with interactive games, in bright surroundings, and with healthy diets—they grew up as intelligent, happy rats.***

 The day before, we’d videotaped pre-school children from America’s poorest workers: Mexican families with parents working from 4 a.m. each day picking vegetables and fruit on Californian orchards and farms. The children were getting a world-class early-childhood education at an incredible Montessori Centre, one of 18 set up by The Foundation Centre for Phenomenological Research.

Within five years, the California pre-school centres had closed. The research funding had run out. By the 2008 U.S. Census, 23 percent of Hispanic citizens and 24 percent of African-Americans were living in poverty.

 But the best research in the world was still breeding the planet’s most intelligent rats. And our 150 hours of video showed the research could be applied, too, to humans.

**How to do it—and how not to**

***Well into the 1990s Silicon Valley was still leading the world as the model forerunner of a total 21st-century eco-system. So why was America not leading in the potential new electronic e-Learning revolution?***

 In 1985, Apple started a 10-year project called ACOT (Apple Classrooms of Tomorrow) with a vision of making computers in classrooms used as routinely as paper, pencils and books. This started on a small scale, with only two American schools involved. Then, a year later: five more.

 Development was slow and cautious, as do-it-yourself concepts—ideal for students using their own computers to explore the world in new ways—clashed with the traditional U.S. “teacher-as-instructor” classroom system.

 Soon the ACOT leaders determined five sequential development stages:

**1. Entry:** Teachers “get used to computers” connected in the classroom.

**2. Adoption stage:** Moving tentatively from connecting the computers to using them.

**3. Adaptation:** Starting to “use the new technology to support their established-text-based drill-and-practise instruction”.

**4. Appropriation:** Using computers more efficiently, but still to support the existing “instructional” methods.

**5. The invention stage:** Finally waking up to the *Aha!* when it becomes obvious that the new technology could actually be used to invent new ways of learning—and teaching.

 By 1996, *w*hen the programme leaders compiled the book on the first 10 years of ACOT—*Education & Technology:* *Reflections on computing in classroom15—t*hey would reflect, ruefully, in the last chapter, how America’s long-time standardised “teach to the test” tradition left most teachers still locked into an old philosophy. Most found it almost impossible to switch to the different teaching methods required to benefit from the new technology—and the brainpower waiting to be unleashed.

 From 1990, one brand-new Canadian school, River Oaks—in Oakville, Ontario—flowered quickly as a strongly-publicized example of a high-tech Apple school based almost entirely on the use of digital technology. But the leaders became obsessed that the new technology was all-important. One glowing report even referred to parents lining up to “steep their offspring in the silicon crucible”. But, as other schools were to learn: only fools worship their tools. A new approach was needed to link a new creative-learning philosophy with some of the interactive, digital learning-games now emerging from Apple, Nintendo, Sony and Electronic Arts.

 Fortunately, the Dewey-Beeby “to learn it, to it” model could have been invented for the computer age. So, too, could New Zealand’s own bottoms-up “No. 8” culture.

Many New Zealand schools were already using Edward De Bono’s *Lateral Thinking* methods to reinvent the future. His different-coloured *Six Thinking Hats* swung from classroom ceilings and walls, and bobbed on the heads of young students as they learned to think in six different ways. New interactive software was emerging to stimulate creativity.

 Apple had great interactive computers. And at least one Canadian teacher had learned from her River Oaks experience. Lane Clark soon linked De Bono, Buzan, Thiagi, Wright, von Oech and Alec Osborn’s brainstorming together in an interactive student toolkit. She called it *!Ideasys*. Then she combined it with the growing number of interactive computer games and graphics.

***Several of New Zealand’s new Tomorrow’s Schools, students and teachers had already decided the ACOT five-step process was back to front. Why wait 10 years to invent the future? Several schools decided to do it now. And to do it mainly in partnership with Apple Education: a subsidiary of the New Zealand company with the national Apple franchise.***

In most other countries, computer companies concentrated on selling computers to schools. In New Zealand, AppleEd was set up to partner schools in inventing a new future for education: train the teachers first to use a handful of Macs in an interactive way in regular classrooms—not separate computer laboratories. And then to see the teachers’ and students’ own enthusiasm drive the process forward.

 Our six-part TV series played some part in spreading the word: on television itself in 1991; on video cassettes of the programmes sold at cost to schools; in radio discussions, and in seminars, workshops and at multimedia conference presentations throughout 1992, with interactive, how-to video-clips a big feature. Hundreds of New Zealand teachers also rushed to visit some of New Zealand’s own breakthrough school programmes, shown in the video series.

 By now, those 56 schools had also decided to develop as “centres for excellence” in “e-Learning”: but mainly to use those new technologies as the catalyst to reinvent schooling itself.

 ***For AppleEd—with its competent teaching staff—the model was to be New Zealand’s first school built since Tomorrow’s Schools became Government policy: Tahatai Coast Primary School, at Papamoa, in the Bay of Plenty (Tahatai, in the native Maori language, means By the Ocean).***

With no students yet, and therefore no parents to elect its Board of Trustees, the Minister of Education had to appoint a Development Board. For chairman, he chose the Finance Director of Tauranga Port: New Zealand’s biggest export port. It was an inspired choice.

 Stephen Covey’s *The Seven Habits of Highly Effective People16 was the top-selling business book in 1989.*  Its “Habit No. 2”: *Start with the end in mind.*

 So the businessman school chairman, at the first meeting, asked members to do just that: to imagine the ever-changing world their 13-year-old students could face when finishing primary school. The board agreed they should emerge as open-minded “rounded global citizens”, confident and competent to face an unknown future—with the ability to solve any challenge life might bring—based on creative innovation and new interactive multimedia technology.

 The board’s next challenge: to find a principal to define and action to reach that goal. Their choice, Mark Beach, was also inspired. Fortunately, New Zealand’s AppleEd also knew of Lane Clark’s methods and results. So they partnered with the Tahatai School Board to being her to the new school for 12 weeks. The fit was perfect: a public-corporate/teacher-retraining partnership that was to become a model for 21st-century schooling.

 New Zealand’s school year is divided into four “terms” not two semesters. So Tahatai opted for four Dewey “inquiry” topics a year—but these to be school-wide—with all subjects (mathematics, reading, writing and so on) “blended into each topic-project”.

 The school also adopted “e-Learning” as their “centre of excellence”—not as a separate subject but as the creative catalyst to reinvent education. Not one teacher was employed on the basis of existing computer-knowledge—but on their enthusiasm to “change the way the world learns”. Creative thinking has always been more important there than the technology.

 For state funding, New Zealand divides its school locations on a “decile scale”: with decile 10 the country’s highest average incomes, and decile 1 the lowest. “Low decile” schools get extra government funding to compensate. Tahatai opened as a decile-2 school.

 ***About 35 percent of students were Maori, from an indigenous “minority” culture that has often fared poorly in the traditional structured school classroom. For a school where classes started at 9 a.m. each day, many students were lining up to get in at 7 a.m.: generally led by Maori students keen to turn their own culture into 21st-century digital literacy or art.***

Soon the school was becoming a Mecca for other New Zealand schools to visit—and as a model.

AppleEd soon worked in with Tahatai to organize two-day weekend teacher-retraining courses. Again, innovation was the norm: each half-day session started with a one-hour interactive “plenary” session with a visiting “overview” presenter, with all 180 trainee-teachers. Then all 180 broke up into six two-hour, 30-teacher-classroom, hands-on sessions to learn specific computer skills. AppleEd.then mounted “five-day Apple Bus Tours”, where teams of teachers spent three days visiting six model schools, a full day at Tahatai, and then a final live-in day at a hotel to “repackage” the week’s visit for highlights and action plans.

**The New Renaissance**

That combined “learning programme” was soon to see New Zealand emerging as the centre for a new “educational renaissance”. In part, this was encouraged, too, by another corporate-school —and university—partnership:

* **The corporation:** IBM.
* **The New Zealand school:** Freyberg High, in Palmerston North.
* **The University:** Massey, one of New Zealand’s two original “agricultural colleges”.
* **The driving catalyst:** Australian-born senior lecturer (later Professor) of Education Pat Nolan.
* **His passion:** “integrated studies” at high school.

 In 1987, Dr. Nolan persuaded IBM to join him and Freyberg High School to become partners in a new learning initiative. Its aim: to switch high schools away from their traditional single-subject classrooms to integrated project-based learning. But most of the projects would be “out in the real world”—often for up to four or five days on location. And then using IBM computers back in class to synthesize the students’ projects into computerised multimedia summaries and plans.

 The results were brilliant, including excellent examination passes. Our video coverage of “The Freyberg Experiment” was among the highlights of our TV series. But then we found once again—as Beeby had discovered from the 1940s (and later globally with UNESCO): it’s easier to change early childhood and primary schooling than it is to change traditional high school and university systems.

 ***Primary schools around New Zealand were soon rushing to adopt the “Tatahai model”. Within seven years more than 8,000 teachers had visited Tahatai: around 2,000 from other countries.***

 Hundreds were visiting Freyberg—again many from outside New Zealand. Yet most high school leaders, and university education departments, were reluctant to change.

 Another series of coincidences fortunately provided the next catalysts:

 Our television research had unearthed the names of leaders in the new “accelerated learning movement”—and I was beginning to attend several of their national and international “non-tech” conferences.

 Because of the AppleEd. connection, and my early involvement with *Mac* networks, I’d been a frequent visitor to Silicon Valley, including “silicon chip” (semi-conductor) conferences.

 And, soon an interesting three-way contradiction became obvious:

\* Most of these non-academic “accelerated learning” conference presenters were brilliant with non-tech activities—*but had not adapted the new technologies to add to their skills.*

*\** Senior university researchers, with two notable exceptions (Marian Diamond was one, Jeannette Vos the other), had the great research messages—*but didn’t “walk the talk”.*

\* And, at Silicon-Valley high-tech technology conferences, the presenters also had great product knowledge—*but no idea how to present it in new accelerated-learning ways. (Steve Jobs was the exception.)*

\* Then, also in 1991, the solution came like a flash—in Geoffrey A. Moore’s then-new book, *Crossing The Chasm, subtitled “Marketing and Selling High-Tech Products to Mainstream Customers.”* Silicon Valley “evangelists”, he stressed, had to make their new idea “brilliantly simple” to *leap across the chasm* to sell it to millions.

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***Silicon Valley’s ‘Crossing The Chasm’ model****: 2% of adults are visionaries or innovators (and, in hi-tech industries often the software-creating “nerds”); 13% are “early adopters”. And then there is a big chasm to the 70% majority mass-market (ignoring the final 15% laggards”). To jump across the chasm (and win majority support), Silicon Valley visionaries have to convince venture capital investors that their new IT invention scores high in four main tests (25% each):* ***1: How big*** *is the market?* ***2: How simple*** *is the product or idea?* ***3: How quickly*** *can it “scale”?* ***4****.* ***How strong*** *is your management and business plan?*

*Amazingly, the 56 New Zealand schools that opted to be creative-technology “centres of excellence” represented the same 2 percent of visionaries—out of 2,700 schools—as in Geoffrey Moore’s Silicon Valley model. So how could the teaching model be made “brilliantly simple” to “cross the schooling chasm”?*

The “simple” answer: link **both** the new breakthrough innovations—in brain-based non-tech methods **and** in new digital technology. ***But how to do that?***

The answers came quicker than we thought—when several of us who had met at “accelerated learning “ conferences in America and the United Kingdom ended up presenting on the same programme—and then doing joint presentations, linking the “best of each world”.

 U. S. school-teacher Jeannette Vos—with a new Doctorate of Education after a seven-year research programme into new methods of learning—watched all six of our TV programmes and immediately phoned New Zealand from California with a suggestion: “We should write a book together.”

And we did: *The Learning Revolution.* But not until 1993 when my 1992 Pacific Foundation round-New Zealand school seminar road-shows and conference presentations had finished.

The 150 hours of transcribed video and typed scripts helped greatly. So did Jeannette’s 2-inch-thick doctoral dissertation.

But the actual writing of the 512-page book (directly on to a *Pagemaker* template) also established something of an “accelerated writing” record: completed and page-set in eight weeks—with 18-hour days: one author in San Diego, California, and the other in Auckland, New Zealand.

Even the layout demonstrated the new learning style. Every left-hand page was a poster page—designed to “telegraph” graphically the main points: so readers could skim the entire book in under 30 minutes, like a “TV storyboard”. Then they could read the right-hand text pages at their leisure—either all the book or individual chapters for specific interests: from pregnancy and early childhood to high-school catch-up programmes.

**Blast-off in China**

***From its launch late in 1993, The Learning Revolution quickly sold 30,000 copies in New Zealand. And then, from 1994, it would climb to become the biggest-selling non-fiction book of 1998-99, with 10 million copies sold in China alone—in 7 months—by a company that had never sold a book. Before.***

Germany’s Bertelsmann Book Club in China first sold about 130,000 copies of a 260,000 print -run—in “simplified Chinese characters”. Clever Software—China’s leading educational software publisher—then gained an exclusive distribution contract for a second edition.

 It ordered a first print-run of 5 million copies, launched it with a dinner-party for 250 senior journalists, a half-hour prime-time national television show (and apologised that only 10 million book fans would be watching). The next day it launched 30 three-week simultaneous “Learning Revolution exhibitions” in the convention centres in China’s 30 biggest cities. Giant video-clips from the New Zealand television series dominated the exhibitions.

 ***In China’s main cities, the average family spends 35 percent of its total annual income on the education of their one child. They immediately flocked to the exhibition: 260,000 copies of the book were sold in the first day: 44,000 in Beijing alone***.

 As Clever Software President Song Shaodi could report by the end of 1999: “This book is truly causing a revolution in China. It sold a phenomenal 2 million copies in only three weeks—and 7.5 million copies in 25 weeks: 10 million in seven months.”

 After another later *Learning Revolution* conference presentation, in 2003, the Beijing Academy of Educational Science sent its President and eight Professors of Education to visit New Zealand to study its new methods. On their first visit—to Sherwood Primary School’s interactive digital classrooms—they were greeted by six-year-olds and a display of the videos they had each shot on their first day in first grade that year; the video-editing they had learned on Apple *iMovie* software; and the computer animations they had mastered soon after.

 The professors were equally impressed with the way New Zealand primary schools followed the Dewey methods. Said the Academy President at a farewell home barbecue: “If China doesn’t learn from this, we’ll be left behind.” Six years later, 14,000 Chinese students—included for the time in a global study of success—pipped Finland. South Korea and New Zealand for the top spot.

 ***In China-Taiwan, the book was impacting on a different level.*** The China Productivity Centre—the island’s main corporate training organisation—published the book in “traditional Chinese characters”, the written language still used by their target market: the 10 billion “Overseas Chinese”, including Taiwan and Hong Kong.

***In Sweden, Brain Books quickly launched a Swedish-language edition****, and contracted for co-author Vos to run five seminars a week, in different cities and towns every day, for four months in 1994 and again in 1995. Book sales: 40,000.*

Later both authors combined to run joint separate training programs for Swedish schoolteachers and corporate trainers.

***In England,*** one hectic day involved producing nine half-hour video programs at the Open University, before a live, participating audience of 400 educational opinion-leaders. (The Lord Mayor of the Royal City of Windsor even changed his peaked hat for a reptile one to act out the most primitive—reptilian—part of the human brain-stem. And a rather conservative grammar school head donned a “Goofy” dog’s hat as “the old mammalian, emotional brain”.)

***In the United States,*** 16 half-hour satellite television programs were produced in two days: interviews with some of the world’s best “accelerated learning” and research experts.

 ***In Singapore the book’s contents helped spark a different take-off.*** A new international school was being opened at the time the television series was being aired in New Zealand. Co-founder of the Overseas Family School was New Zealand businessman David Perry. And when *The Learning Revolution* was first published in New Zealand, he immediately ordered 500 copies (later adding another 1,000), gave one to each teacher, and sent one also to every international applicant for a teaching job—as a guide to the school’s basic philosophy.

In 1997, when the Singapore Ministry of Education launched a five-year, $2-billion “digital technology programme for schools”, both the OFS and later the Ministry organised “learning revolution” seminars for teachers.

Later, when the International Baccalaureate Organisation added a “Primary Years Programme” —for elementary students—to its Senior High School Diploma and Middle Years Programmes, OFS was the first in Asia and one of the first in the world to adopt all three. It then used a 16-page *Learning Revolution* full-colour tabloid as a supplement in Singapore’s major daily.

OFS is now the world’s biggest IB school, with 3,700 students from over 70 nationalities.

Within a few years, *The Learning* Revolution had been published in 20 languages. And when I finished the second edition in Singapore in 1997, it was time for one final editing task: to recheck progress in New Zealand.

 **“Scaling” The Revolution**

 I’d been out of the country when the first of the new *Tomorrow’s Schools* had been born. And soon the message was coming through to me: “You’ve got to see Tahatai Coast School.” And not only Tahatai. Those 56 specialist e-Learning schools were proving the future in practice.

 AppleEd’s two-day conferences and bus tours were spreading it around. And now the new Minister of Education and Deputy Prime Minister, Wyatt Creech, sought advice on “how to scale the breakthroughs nationally”.

 And yet again a “bottoms-up” solution worked brilliantly. First, one of the most effective “e-Learning” school principals, Carol Moffatt, was co-opted to become the Ministry’s “ICT (Information and Communications Technology) Coordinator”. [Many New Zealand schools, in country farming areas, are very small—still the community centres of their area. Carol Moffatt was the Principal of Oxford Area School—which had quickly acted as the e-Learning coordinator for a group of small country schools in the area.]

 In her new job, Carol immediately invited 23 excellent e-Learning schools to a two-day think-tank (with four outside advisers present the first day). The unanimous decision at the end of the second day:

\* Set up a nation-wide “e-Learning Cluster Programme” headed by a team of already established “lead schools”.

\* Each school to train up 10 other schools.

\* Each lead-school to receive only sufficient extra funding to employ one new teacher to release the school’s best e-Learning teacher to coordinate his or her “cluster”.

\* All schools, “decile 1 to 5”, entitled to apply to be cluster leaders, with 23 to be chosen in year one, with a country-wide spread.

\* A new group of lead-school to be selected every two years for three-year contracts.

 ***The Government immediately approved. Compared with Singapore’s $2 billion programme, the cost was low. Schools “did it themselves”. The first 23 schools were soon selected from applicants, and Tahatai Coast School also appointed as “National Lead School” to work in with Carol Moffatt. And the entire programme started the following year, 1998.***

 Coupled with regular annual and regional e-Cluster conferences, it was, up to 2011, the best programme of its type in the world. And by that time, virtually every school in New Zealand had been through e-Learning Clusters: learning by “doing” and co-creating.

 From 2003, brilliant annual national and regional conferences were organised by CORE-Ed, a not-for-profit New Zealand organisation associated with CORE-Ed in Britain. Both organisations grew out of the United Kingdom’s Ultralab, originally set up by Professor Stephen Heppell as an e-Learning research and development unit at Anglia Ruskin University.

 Both CORE-Ed and the New Zealand e-Learning Cluster have since played a leading part in the successful global scaling since 2011. So has Apple-Ed—which has now changed its name to RED: Renaissance Education Division, as its Renaissance parent company has expanded to sell beyond Apple brands.

 As the new century dawned, innovative smaller countries like New Zealand, Singapore and the Gulf Emirates, raced to join the even bigger revolutions about to converge,

**The new century**

 From 2000, those innovations cascaded. But seven major ones changed everything:

 **1. Mobile phones:** By the year 2000 half the people one earth had never placed a phone call. Over 96 percent of homes in China didn’t have phone. Only 12 percent of the global population owned a mobile phone.

 By the end of that decade five billion people—of 6.9 billion world wide—owned a tiny but powerful cellphone, so small two or three could fit in a shirt pocket.

 China had 850 million. India: 690 million. Many countries had more mobile phones than people—as many carried one for work and one personal. For a decade it had become the fastest growing personal home appliance in history. And just about to take off as the device that people still called a “smart phone”, but now a miniature multimedia computer.

 **2. Wikipedia:** In 2000, the printed *World Book* and *Britannica* still dominated global encyclopedia sales. Then, in 2001, a new venture called *Wikipedia* was launched by Jimmy Wales and Larry Sanger as the first real Web-based free encyclopedia. Larry Sanger coined the name—from Hawaii’s famous wiki-wiki fast buses*.*

By 2010, Wikipedia carried 17 million articles: 3.5 million in English alone—the rest in 261 languages. All those articles were written collaboratively by passionate volunteers. And nearly all updated regularly. By that year, too, it had become the most popular general reference work on the Internet; and the fifth most-used site on the Web.

 And, possibly more than anything else, it was a forerunner of the co-creative revolution that budded in the first decade of this century, then exploded to full bloom in the second.

 **3. Google:** After its 1998 launch by two Stanford university students—Sergey Brin and Larry Page—it had become by 2000 the world’s biggest search engine: scanning more than 1 billion websites; 2 billion by 2001; and 6 billion by 2004. Within half a second, all could be scanned and an answer to any question flashed to the inquirer’s PC or mobile screen, ranked in order.

 By 2010 Google was rated the most powerful brand on earth, performing one billion searches a day through one million servers around the world. Its innovations beyond search could fill a dozen books—almost all emerging from the 20 percent of their weekly working hours they devote to new personal innovations.

 **4.** **Apple iPod:** Thepersonal music player launched in 2001. Smaller than a pack of playing cards, it could store up to 15,000 personally-chosen tunes, each downloaded instantly at under $1 from Apple’s *iTunes* store. With 250 million *iPod* unit sales in the decade, it was to revolutionise music distribution. By 2010, the *iTunes* online store had sold its 10 billionth music track. ***So if music could be instantly personalised and downloaded, why not all types of personalised learning****?*

 **5.** **YouTube:** From its public launch in 2006, this massive video Website proved the fastest growing of its type in history. By 2010, fans were tuning in 2 billion times a day to watch their favourites. And now one of the great centres that have brought to life Norman Macrae’s vision of the new “Global Village” democracy to share the world best ideas

 **6. Facebook:** The world’s biggest online community network, also founded in 2006, and grown to 550 million members by the end of 2010: by 2012 the heart of the “Global Community” learning revolution.

 **7. And Apple’s iPad:** the first of the new touch-screen tablets, soon to be joined by similar innovations from Dell, Samsung, Hewlett Packer, Acer, Nokia, Amazon and Lenova. And many other were soon to come, powered by Google’s new *Android* open-source digital operating system. Theodore Gray’s *The Elements eBook for iPad* was the first super-star of the *new touch-screen 3-D revolution*—and dismayed other publishers as they realized it now made printed textbooks obsolete.

**The challenge that flashed around the planet**

 By the end of 2010, these seven technologies were converging in phenomenal ways. SUN Microsystems co-founder and former CEO Scott McNealy publicised his commitment to bring together $100 million to gather the world’s best curriculum ideas on his Curriki (Curriculum wiki) site. Great 18-minute video presentations from [www.TED.com](http://www.TED.com) were inspiring millions every week. PCs and mobiles were coming together. *Wikipedia, eBay, Skype* free phonecalls, *Google, YouTube, Facebook* and touch-screen technologies were blending.

 Dozens of billionaires had taken up Bill Gates’ challenge to donate at least half of their wealth to worthwhile causes during their lifetime. And the newest and youngest of these was *Facebook’s* Mark Zuckerberg. In September 2010 he had committed himself to donate $100 million of his *Facebook* equity to the under-performing Newark (New Jersey) School District.

 Around the same time, Dr. Jane McGonigal, an executive at the Institute for the Future, in Palo Alto, California, appeared on stage at a TED “futurist conference”, and presented a challenge to everyone present:

 ***“Imagine we can make any future we can imagine.” Because we can.***

 ***What would it be? What can you imagine? How would you achieve it?***

 As with all TED conferences, her presentation was videoed, and soon appeared on [www.TED.com](http://www.TED.com). And it presented her own incredible an answer, as a digital games designer:[*http://www.ted.com/talks/jane\_mcgonigal\_gaming\_can\_make\_a\_better\_world.html*](http://www.ted.com/talks/jane_mcgonigal_gaming_can_make_a_better_world.html)

 It was soon flashing around the planet.

One of my global friends, American Professor William Maxwell, was first to email it to me—from Albania—with this comment: *“Inspiring. Brilliant. Infectious.”*

 And from one of Bill Maxwell’s friends, Chris Doris: “*This is phenomenal. And her definition of an Epic Win: “An outcome that is so extraordinarily positive that you had no idea it was even possible until you achieved it. It was almost beyond the threshold of imagination. And when you get there you are so shocked to discover what you are capable of.”*

 ***So the “Imagine any future” concept quickly went “viral”, as Facebook groups (generally around 150 people in each) took up the challenge.***

 Soon those millions of people—swept up in the *Facebook* “global village” discussion groups—were reaching the simple, obvious conclusions:

 \* ***In a new world where everything was now possible, old systems were breaking down: the energy system, the banking system, the financial system, the energy system, the heath system, climate systems, and the educational system.***

 \* ***Systemic breakdown demanded systemic changes.***

 \* Then came another simple conclusion: ***nearly all problems have been solved somewhere.***

 \* So the solution again seemed simple: ***invite the creators of the best solutions to video and show their great answers to the world’s biggest problems online and open to public debate.***

 Mark Zuckerberg’s offer to Newark had been widely publicised on the Oprah Show. And large numbers of *Facebook* members offered to help Mark find educational solutions.

***Then someone at Facebook came up with a new 80-20 rule.*** Already most students were now spending only 20 percent of their waking hours at school—in outdated classrooms. For the other 80 per cent they were 21st-century citizens in a new digital age.

 ***“So let’s copy Google,” one suggested, “and spend 20 percent of that collective digital time co-creating new solutions—so we can make any future we can imagine.”***

 As at Google, it worked. And it worked by combining the big “Aha!” breakthroughs already mentioned in this 2020 Report. *Wikipedia* became full-colour and 3-D touch-screen *video-iBook*. *Skype* video-“mobiles” could link with anyone, anywhere, anytime.

 Fortunately, the now-soaring philanthropy foundation-funds (headed by the new young Web-based entrepreneurs) quickly backed the new ideas—supporting the Gates’ initiative, but most preferring to back co-creative, open-source ideas that were easy to share.

**The “big six” in first “Global Village” polls**

Six “blindingly obvious” policies quickly emerged to transform schooling from pre-kindergarten to senior high school—and were easily put into practice:

**1.****The “link the best” project**: The 2010 PISA Report (Programme for International Student Achievement)17 again linked Finland and New Zealand among the top five countries in real-life literacy, mathematics and science. But each scored well in slightly different ways.

 ***New Zealand:*** world leader in “21st-century multimedia digitally literacy”. Excellent at innovation and variety in public schools. Strong emphasis on creative thinking and critical thinking skills. But had a 15-to-20 percent “tail” of low-achieving students with specific learning and social problems.

 ***Finland:*** long recognised for having the world’s best teacher-trainee recruitment programmes; masters degrees for all teachers; and high community status of teachers. Also highly respected for training and employing special teachers to make sure low-achievement problems in every classroom are overcome.

 **Both** with student-centred classroom, teacher freedom to innovate, and balance of indoor-outdoor activities. ***The answer?*** ***Combine the best of both school systems—to wipe out failure and build global citizens in the new digital age***.

 **2. The “digital games” plan:** New York digital games designer Marc Prensky finally won his long-time crusade to have students “reinvent education” by designing “a digital games” database—covering every topic or subject at every grade level. As his website puts it:18 “*I am writing here about a Big Idea. The Idea is that the educational software we use (all of it—games, non-games and anything else, at all levels, pre-school to adult) should be created by the “world mind”, should not belong to any of us, and should be available, for free, to anybody, anywhere, who wants to use it. I know this is possible, and I believe it will lead to things being far better than what we have today. I also believe it can be done at very moderate cost and at no harm.”*

 No one reading all the detailed homework on Marc’s Website (www.marcprensky.com) can doubt his ability to achieve this—and so it has proved. But massive warm public support came when he and several of the world’s top designers—including *SimCity’s* Will Wright and *Nintendo’s* Shigeru Miyamoto—demonstrated an array of games for individual age groups and their parents.

 ***World masters:*** Two big demonstration-clinchers for adults, however, were from two “world masters”: at Contract Bridge (Omar Sharif) and at Chess (Gary Kasparov). Their interactive digital games are brilliant. In both cases, anyone can learn online by “playing against the world master” at any level, from “beginner to world master”, with built-in “hints from the master” whenever sought.

**3. The Mexican public-private partnership:** A leading Mexican privateschool, Instituto Thomas Jefferson, had already digitized, in English, the Government’s printed Spanish-language science curriculum, grades 3 through 6. But that official version of the “basics” lacked interactive “accelerated learning” components. So iTJ added—at each level and each topic—four *hypertext* Web links: (1) to the best free Website; (2) to free interactive games; (3) to great ideas for student “learn-by-doing activities”; and (4) for storing great new “learning applications” from students. The entire digital template was then made available to United Nations Millennium Programme to provide a basic education for every child in the world to enjoy from age six to 14

**4. The new India model:** For years India’s seven top research Universities have annually graduated 3,000 high-scoring science, math and engineering university students (many as Ph.Ds). And thousands have gone to Silicon Valley. By 2010 they made up 20 percent of the start-up companies in the Valley (and two-thirds of the CEO’s of all start-ups). But 47 percent of India’s villages still did not have a school by 201O. So multimedia *Learning Revolution* presentation to the Silicon Valley Chapters of two Indian entrepreneurs associations soon raised an average of $1 million from each Indian CEO to buy open-source Web-servers and new $35 Indian-made laptops to set up *Tomorrow’s Schools* in their own villages, games-based learning programs free from the new “cloud computing service”. As a bonus, new new Indian partnerships were established between Indian villages and England’s Montessori Farm Schools.

***5.*****China’s 10-million club:** In a special addendum to the 2009 PISA ratings (reported in December 201017), 14,000 Shanghai students beat out Finland for the world’s top spot. The PISA report paid tribute to the Shanghai schools now adopting (New Zealand’s) Dewey-based methods, although with teachers still reluctant to “cross the chasm” to use digital technology. Fortunately many of China’s leading high-tech companies are co-owned by the 10 million “Overseas Chinese”, with an existing strong multi-billion-commitment to homeland education. By 2010, Asia’s richest man, Hong Kong’s Li Ka-Shing, had already funded 10,000 educational satellite links to country schools. Alibaba’s founder, Jack Ma, too, was an early spur to joint educational partnerships. And a China that “didn’t want to be left behind by tiny New Zealand” in 2003 on a visit to a public primary school, was not going to be surpassed by India in the new century.

 **6. The CoCo Club:**  The new Co-creative Learning Web, set up quickly in 2011, was soon acting act as a global partnership-hub to link Social Enterprise initiatives world-wide. This could also be called the start of the *YouTube-Facebook* Open Alliancewhen the *Google* video subsidiary funded the first Global VideoQuest.

 In six months, two million video-clips had been produced by students: showing all these new “model learning centres” in action around the planet: often using the new Apple *iPad* andGoogle *Android* 3-D video-iBook touch-screen technology.

 So, at the first *Facebook “Global Village” Town Meetings,* a billionglobal citizens could not only vote on brilliant alternatives; they could see them working.

 ***From Christchurch, New Zealand*, *Discovery One was voted most innovative public elementary school.*** *For over a decade, its students had “used the entire ‘Garden City’ as a classroom”. To study botany, where better than working in the civic Botanical Garden, with graduate botanists ad mentors? Then back to Discovery’s Central City Hub to produce a multimedia, 3-D report on how to apply what had been learned?*

***Singapore’s Annual Robotics Competition won rave applause,*** *with Nanyang Polytechnic again winning most of the tertiary prizes. No surprise, since its opening in 1992 Nanyang has been a “Teaching and Learning City”. And like any commercial city, its robotic students design and produce actual working robots, under contract to some of the 3,200 international companies attracted to set up their Asian HQ in Singapore.*

 ***But the star was the 75-year-old Maine (U.S.A.) village grandmother whose 50-year-long hobby had been teaching parrots to talk,******and then making funny costumes for them.*** *Now her grandsons have turned her hobby into a free online “talking parrot” digital game. It seems half the world’s parrot-lovers have downloaded that free—taught their parrots to talk well— and then bought the fancy parrots’ clothing. Now 25 other village grandmothers are sewing the clothes at home under contract. Today it’s a $2 million a year village exporting success. (Maine was America’s first state to provide free laptops for all middle school students. That’s how the grandsons learned their skills. They are now tackling China’s market through Alibaba’s online auction system.)*

**The Upside-Down Revolution**

 By 2012, *The Economist* was calling this *The Upside-Down Revolution;* and re-quoting Don Tapscott’s book themes from 199819: “Give children the tools they need and they will be the single most important source of guidance on how to make schools relevant and effective.”

 And when the United Nations Millennium Fund finally accepted, in 2012, Marc Prensky’s dream to get the students of the world to co-create the interactive digital games to reinvent schooling, it opened up a new education renaissance: the upside-down revolution.

 From 2012 has burst forth a deluge of creative brilliance very similar to what happened in New Zealand early in the 21st century, when 900 young New Zealanders joined Peter Jackson’s and Richard Taylor’s digital-effects movie team to co-create *Lord of The Rings.* Eighty percent of them came from small country towns. Amazingly 90 percent of them were left-handed. Most had not been happy in traditional school classrooms. Yet all flowered in an open environment of brilliant creativity, and in multi-talented teams. The first of the movie-trilogy picked up a world record-equalling 11 Academy Awards in a night. Five more came later for the 3-D digital effects in *Avatar.*

 *When the last Lord of The Rings Oscar was called out in Hollywood, a bemused MC asked: “Is there anyone else in New Zealand left to thank?” [Perhaps No. 8 fencing wire.]*

 From April 2010, Steve Jobs’ launch of the *iPad* again opened up the chance for students to “touch the future and change the world”: the new system soon to make printed textbooks obsolete.\* And enable young students to became their own designers, editors and producers of the new phenomena: where a touch on a photo turned it into a 3-D movie.

 But Tapscott and Jobs were only partly right.

 ***As Dr. Yunus’ Bangladesh revolution has shown: poor, sometimes illiterate, women can lift themselves out of poverty with a few dollars of well-placed credit . . .***

 ***As BBC global radio icon Alistair Cook has proven (still broadcasting at 96) and Peter Drucker has confirmed (writing his last great management book at 95) . . .***

 ***We now know everyone has a unique talent to excel at something. The real challenge is how to unleash it.***

 On June 7, 2021—my 90th birthday—as we sat together to launch the new *video-iBook* touch-screen version of this 2020 manuscript, I said to Chris Macrae, co-author of *The 2024 Report (as 3-D videos of the past decade converged on the eight split-screens):*

 *“I think the world has finally cracked it. What a pity Norman didn’t live to see it.”*

 *“Ah,” said Chris, “but he did. In 1984.”*

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