It is always a pleasure to address such a large audience of people from many different backgrounds and responsibilities all gathered together to consider the needs of young people.

I don’t come from Tameside, and unlike the Minister, I don’t live nearby but once years ago I did live and work in Manchester. I was the youngest Head of a Secondary School in England when I was appointed to develop the old sixteenth century Grammar School in Stevenage into a Comprehensive School. Being young I was enthusiastic, and I think enterprising. In 1979 we put in what was to become England’s first fully computerised classroom with a terminal for every pupil – that was twenty-six years ago. When I left in 1985 to take up the directorship of a not-for-profit foundation my governor suggested that there were more pilot projects in my school than there were aircraft in the RAF… and they all seemed to be looping different loops! Why was that, I kept asking myself. I must have been a slow learner, and it was awhile before I came to the sober realisation that, as a Secondary Head, I knew less about how children learnt than did the staff in the neighbouring primary school.

How people learned, and the new research emerging every year from a variety of disciplines, is fascinating stuff. We educationalists don’t know as much about this as we should. Part of this is an issue of time… we just don’t read enough, or widely enough. One afternoon some years ago my youngest son, Tom, who was about seven or eight at the time, suddenly looked up and asked me “Dad, how do little children learn to talk?” I was so intrigued that I thought I had better structure my answer carefully – you know the way we teachers are! He looked up at me impatiently; “I think that’s a pretty simple question, I bet you’re now going to give me a long and complicated answer!”

Out of the mouths of babes and sucklings! Yet young Tom was quite right. Because we don’t understand these issues clearly we end up getting confused ourselves and then give other people unnecessarily long and complicated answers… which are, in themselves, a measure of what we don’t actually know.

We have to accept the reality that, so fast is our knowledge about the learning process growing and what is involved in the brain, that we get bogged down in devising solutions that are already out-of-date before they come off our drawing boards. Because of the hectic pace of social change in the past twenty-five years teachers have lost the art of being prophetic, and of leading the educational debate; instead it is politicians and their advisers who spell out the future… not those most closely involved with the young. This is dangerous.

In the interest of the children – and the politicians – I hope I can help you to regain the initiative. That is a tall order for forty-five minutes, and forty-five slides, but here goes!
I’ve entitled my speech “Learning for the Future”. I could have used my alternative title: about battery hens for free-range chickens. You all know enough about the differences. An accountant will advise a farmer to keep chickens in little wire cages so they waste no energy running around – they lose the use of their legs and wings, they become obese, but they produce lots of eggs and good profit for the farmer. But if the cage is removed they can’t even stand on their own feet, and become perfect morsels for a predatory fox. Not so the free-range cockerel, however, who can always fly away out of reach of the fox. I must ask you to question your assumptions about the future. Is the future as certain and as rosy as we are often lead to believe? Do you want your children to be prepared for life as we know it now or to be prepared to adapt to a possibly vastly different set of circumstances?

Most of you are involved in schools most days of your working life. Do you ever consider why it is, knowing what we now know about the significance of the earliest years of life, and what we know of the adolescent’s need for space to do things for themselves, that England persistently spends more money on the oldest youngsters, and less on the younger ones? That is reflected in smaller classes when they’re older than when they start school. Isn’t that the wrong way around? And why do we think that everything that has to be learnt by a child has to be taught in school? Consider your own life – weren’t some of your most important learning experiences outside school? Have we not got an upside down and inside out system of education? Even worse, are we not in danger of creating an overschooled but under-educated society? The longer children have to spend travelling on buses and increasingly in cars backwards and forwards from school, the more reduced are their experiences of learning at home and in the community at large. That’s how you get an over-institutionalised society.
Tameside has adopted the rainforest as a metaphor for children’s learning. It’s a good one. Education, as a rainforest, is an ecosystem where everything connects to everything: a healthy and safe environment — to quote Excellency and Enjoyment — is to be found in the conditions on the forest floor, Enjoying and Achieving in the understorey and Economic Wellbeing and Positive Contributions in the forest canopy.

The humblest insects on the forest floor devour the rotting vegetation, and so create the nutrients for new life. It’s the understorey that teams with life, and which gives the rainforest its variety and extravagance; but it is largely invisible. It is the canopy (the young adolescent) that demonstrates the value of everything that has gone on before, and it’s the emergents – the tallest trees that break through the canopy in their hunger to get to the sunlight — that are the pride of the forest. They, in turn, fall and rot away, and the whole process is repeated. There is more biological diversity in an acre of rainforest than in any zoo or biological laboratory.

One of the world’s leading biologists, Gerald Edelman, who got his first Nobel prize for describing the human immune system, now talks about human learning proceeding in a similar fashion. Just as the human immune system operates through the body, responding to any new virus by searching through its naturally constructed set of antibodies, so the new brain grows through responding to a variety of different kinds of challenges. No tree starts off with a genetic imperative to grow to three hundred feet... it’s only those trees that have the opportunity to break through the rainforest cover which then attract still more energy both from the sun and from the forest floor to grow to such a great height. Learning is like that. Every teacher knows that learning is essentially a messy process, far removed from a logical straight-line progression. Seeing a child’s brain as such an ecosystem reminds us of the need for children to have as wide a range of opportunities as possible. Thankfully life is about more than knowing how to exist in a classroom, and teachers are certainly not the only people who can, and should, teach.
In a complex world the role of the teacher is ever more important, but not in the way that teachers used to teach. It’s not simply about instruction. It’s about ensuring that the child is surrounded by a positive ecosystem, and that we help every learner to know how to make sense of all this vast range of experiences. We need to help them to know how to learn better. Too often we mistake this and think we need to teach them more. That’s all wrong. We forget that, in the ancestral environment from which we came, there were no ‘teachers’ as we now understand them; what there was, was an inquisitive society where people relied on each other to help them find the right strategy to solve a problem. It is in ‘learning how to learn’ that today’s young people need the greatest support from adults.

While the rainforest is a most useful metaphor for human learning, it is useful in another sense. Biologists regard the rainforest as the planet’s lungs, and its biological diversity as the library, or repository, for biological diversity. It is the rainforest that has acted to counter the devastating influence of Carbon Dioxide (C0₂) gases in destroying the ozone layer. No rainforest, and global warming will go ahead far more rapidly. Like our lungs most of us don’t see the rainforest, and pictures of its destruction on television becomes part of a daily litany of disaster. Half the rainforest has already gone – it’s going at a rate equivalent to losing two football pitches the size of Manchester United every second of every day – a massive eighty thousand acres a day. It will, at this rate, all have gone within forty years. The increased sunshine and warm weather of 2005 may be only a taste of things to come.

“The Future of Life”

E. O. Wilson, 2002

“The mood of western civilizations is Abrahamic: “May we take this land that God has provided and let it drip milk and honey into our mouths forever.” Now more than 6 billion people fill the world. The great majority are very poor; nearly one billion exist on the edge of starvation… half of the great tropical forests have been cleared. It is the wreckage of the planet by an exuberantly plentiful and ingenious humanity… a global land ethic is urgently needed. Surely our stewardship is the only hope.”
Asked on television on the first day of the new millennium what would be the chances of the world surviving the next thousand years, the Astronomer Royal, Sir Martin Rees, responded with the caution that so fast was our technological knowledge expanding, and so limited is human wisdom to know what to do about it, that he could only give us a fifty/fifty chance of surviving the next century.

That is a horrendous thought. It’s not simply a statistic. It is as clear a call to ‘repentance’ ever issued by an Old Testament prophet. If we are clear headed we should easily understand this. We are living in a world where we convince ourselves that we have to work ever harder to buy things that we actually doubt we really need. We see our colleagues suffering from depression, and young people worried about the level of debt they have incurred. We see binge drinking increasing, and levels of consumerism – even amongst young children – that frighten us. We sense that we have become too big for our collective boots. We delight in our technological discoveries, but we sense that we live in a world of such inequalities that someone, somewhere, could bring about a level of terrorism that, as yet, we can hardly comprehend. We could destroy the planet.

In last year’s Canadian equivalent to the Reeth Lecture on the BBC an Englishman living in British Columbia, Ronald Wright, gave a series of talks entitled “A Short History of Progress”. In these talks he showed how, as civilizations grow old and ever more removed from their natural roots, they over reach themselves and implode (collapse inward on themselves). In times past as one civilization went down, another came up. At least that is what used to happen. Wright suggests that now the world is all caught up in a single economy/civilization and that, if this were to collapse, we would all be involved – and would go down with it. There would be no one around to pick up the pieces. The statistics he uses to support this argument are to be found in the writings of many other biologists, and they are stark. We are maintaining our ‘standard of living’ at this level by consuming our seed corn. We are plundering our non-renewable sources. These are finite. In his book he suggests that we have some twenty or thirty years to reverse this.

The Rainforest is a symbol both of the human brain, and the world as an ecosystem. Both are at risk, and the risk is aggravated by mankind’s greed. A subtle
change has come over society in little more than twenty or thirty years; in England we can describe it almost in biblical terms – are we educating our children to be consumers, or pilgrims? Are we training them so well in how to make decisions about what they want to buy, that we have developed the image of the customer as the model of all things? Four hundred years ago John Bunyan wrote “The Pilgrim’s Progress”, which for more than two centuries was the second most widely read book – after the Bible – in English. His pilgrim was a self-reliant person, very human in his passion but so determined to go his own way that he floundered whilst trying to cross the Slough of Despond. Not until he had thrown away all his worldly cares was he light enough to cross the swamp to the house beautiful on the hillside beyond. Once he got there he realised his relatives were still stuck on the other side so, tired, dirty and weary, he went back into the swamp and showed them the way across.

To a customer the Rainforest is a resource to be cut down, but to a pilgrim it is a resource to be treasured.

We need to rethink education at a most basic level.

Perhaps we haven’t even realised that the basic tenet of the current curriculum can all too easily be seen as a curriculum for consumerism, whereas what we need is a curriculum for sustainability. We need a curriculum which, from the very start, is about connectivity... it has to be the corrective to a world made up of specialists who see their areas of concern with great clarity, but are so short sighted they fail to see the Big Picture. It is rather like looking at an impressionist painting; stand too close and all you see are a mass of disconnected dots and brush strokes, but stand back and let your eye glaze over a little and the most beautiful picture emerges.
After delivering a series of lectures on these topics to the Head Teachers of the international schools of the Middle East, the chairman closed a four-day conference by urging his colleagues to dare to think about such matters because, only when they saw things clearly and for what they really are, would they be able to see the way forward.

And the way forward is to be found in the amazing creativity of the human brain, especially in the brains of young children. They have the most to lose if we get this wrong, and will be the ones to gain most if we get it right. But, as of now, it’s us – the older generation – who control the curriculum. If we don’t change things now we will still be around to stand rebuked by the next generation trying, in an ever tenser world, to put right that which we were not perceptive enough ourselves to prevent.

The question as to whether education is a matter of the development of character, or of the development of intellect, concerned ancient philosophers as much as did the question as to whether education was primarily for personal gain, or the good of the community. Presumably these questions were being asked before the time of Aristotle as much as they have been since. In the secular society that many politicians and their advisors assume England has moved into, the assumption seems to be that, in an ‘unfair’ world, the best that can be done for a child is to give him the opportunity of earning as much money as possible, thus freeing him to create whatever ‘heaven on earth’ they think appropriate. By reducing every transaction to a money equivalent it has elevated ‘the love of money’ in modern society to a status that earlier society would have found intolerable.
Schooling is only part of a young person’s experience, and teachers are only one of a number of sources that a youngster can turn to for information and knowledge. Consequently a young mind is not simply fixed on what the formal curriculum can teach him or her; every day they’re subject to views and opinions, facts and prejudices, about a multitude of ideas. Such trends influence what a child thinks, and the assumption it makes. To many youngsters schooling does not help them much in making sense of all these other issues, while to the perceptive the curriculum seems to be more about the status quo than it is about how they might, for instance, make meaningful sense of their intended careers in the light of globalisation, or establishing meaningful ways of working when so many factors that could affect this are outside their control.

We cannot think of schooling in isolation from many other changes in our social structures.

- The Market Economy, and globalisation
- Demographics, and the beginning of the pension crisis
- The Spiritual issue - “What is life all about?”
- The Communication Revolution
- The Sexual Revolution, and its impact on the family
- The creation of a Sustainable World/Economy
- The Nature of Work, and Human Dignity
- The Patterns of normal Human Development

... only having considered the above can we really begin to work on what may be the future contributions of schools.

We can’t get a hold on schooling, as a head teacher remarked last week, simply with a national curriculum for education; what is needed is a national philosophy of education.

Crisis of meaning

“The biggest crisis we are facing is a Crisis of Meaning. The tremendous social changes of the last 100 years have stripped modern society of that which gives us meaning, be it in our roots to our ancestors, religions, spirituality, our relationship to nature... Within this Crisis of Meaning our young people are facing a MORAL crisis - a crisis of values. Without these anchors young people no longer understand the value of perseverance, learning for learning’s sake etc. Instead our daily lives are filled with a pursuit of money and temporary ecstasy. Both of these goals are unfulfillable and result in a misguided frenzy in the pursuit of the next thrill, or in depression.”

Jakarta International School 2001

This slide speaks for itself. It was received from the school psychologist at the prestigious Jakarta International School in 2001 just after a lecture similar to this one had been given.
Until very recently educationalists have lacked access to disciplines that could explain how the brain works, and possibly how humans learn. When Charles Darwin first published “The Origins of Species” in 1859 setting out the theory of evolution, medical science leapt at a concept that essentially took our species as being ‘a work in progress’, and ‘progress’ having taken place over an extremely long period of time. The medical profession leapt at this theory as it helped to explain why some parts of the human body are not quite as they would have expected; it provided an overall theory into which the different issues can be fitted. Psychology was only three years old when Darwin published his book and, lacking the necessary technologies to explore the brain at a meaningful level, they assumed that the brain was not affected by evolution – it was, always had been, and always would be, exactly the same. It was a machine. There was nothing in the brain that was not put there by experience. Behaviourism, the theory that suggests all learning takes place through systematic instruction, remained dominant in psychology well into the 1970s and beyond.

Three disciplines now challenge this model. Cognitive Science which was developed in the late 1950s to see how similar were human brains to computer systems; Neurobiology which, with the technology that PET, CAT and functional MRI in the middle to late 1970s developed the ability to see an actual section of a brain working as recorded by electrical impulses on a computer screen, and thirdly, Evolutionary Psychology, a hybrid subject involving psychology, evolutionary biology, genetics, archaeology and other support disciplines. Separately these disciplines don’t tell us much that we need to know, but drawn together they are starting to present a new theoretical framework for learning. The trouble is no synthesis of these disciplines has yet been effectively made. It is rather like listening to the Hindu proverb of the three blind men trying to describe an elephant. One man steps forward and, feeling its trunk, immediately assumes it to be a snake; a second moves and feels the elephant’s leg and assumes it’s a forest; while the third, touching its ear, assumes that it is a vast plant.

At this moment education in England, as in other countries, needs a very heavy investment in trying to make such a synthesis in advance of any further expenditure on school buildings which simply reflect an earlier model of human learning.
Recent research has shown that the human brain is ‘built’ to expect nurture. It’s all to do with our species being born with their brain only some forty percent fully formed – the difficulty of ever-larger skulls (necessary to contain ever-larger brains) getting down the birth canal. Consequently human brain development takes place largely outside the womb, and it’s driven by our insatiable curiosity; we are the question-raising species. The more we use our brains, the more they grow, and this is especially true in the first three, four or five years of life. We humans are as we are because of the interaction between nature and nurture – starve a young child’s brain of nurture and it’s as devastating to the brain as lack of food is to the body.

All of the above helps to explain the significance of the Confucian proverb. Every second the human brain receives about a million pieces of information. It immediately gets rid of all those things which it doesn’t deem to be important to its survival. When a child asks a question and is given an immediate answer, the probability is that the child will not find that that answer fits with its own questioning process. It will ask the question perhaps again and again. However, if the parent or teacher takes time to show the child, then that child’s attention is immediately grabbed and, not only will they remember what they are being told, they will probably press the adult for the opportunity to do it for themselves. It’s only when they do it for themselves that they begin to develop the skill of transferability. Within modern schooling pressures of time make it much more difficult for teachers to stick with a child’s question through to the third level and thereby develop an appropriate form of transferability.

Tell me, and I forget;
Show me, and I remember;
Let me do and I understand.

Chinese Proverb
Biologists and other scientists are largely agreeing that the human species parted company with the great apes about seven million years ago. We still share over ninety-eight percent of our genes with chimpanzees. It seems that the human brain has got larger through a series of leaps, rather than steady changes. Genetic change is very slow, and it’s generally thought that there has been no apparent change in brain structure in thirty thousand years. In effect that means that the brain of today’s children (as with our own brain) is like a computer hardware system that is already thirty thousand years old, and on this we are trying to run twenty-first century software. Within these hardware systems, however, is the potential ‘hardwiring’ that transmits to future generations these useful strategies for dealing with a variety of situations that enabled our ancestors to do things in the past. The brain has a very particular ‘grain’ to it, and we have to discover much more about this.

At birth the brain is a mass of ‘disconnected potentialities’, a bundle of exuberant neurons and buzzing synapses all trying to work out where they fit in. A baby’s brain is so full of such potentials that, for it to survive, it has to connect as many of the potential neural connections as possible and, to make this happen, it then has to create space by getting rid of those neurons for which it (the baby) thinks it will not need. This is called synaptogenesis, a form of spring cleaning. It happens three times in a lifetime – in the first few months, at adolescence, and in old age. A baby only a few weeks old can hardly control its arm or leg movements, the one thing that it does have complete control over are its eye movements. But long ago it was noted that a baby’s eyes focus at thirteen inches, and later it was realised that thirteen inches is the difference between the mother’s eyes and the baby’s eyes when the baby is feeding at the breast. It was only very recently that scientists applied functional MRI scans to the brains of very young children at the breast and it was discovered there was a tenfold increase in synaptic activity when the baby’s eyes were bonding with the mother’s. Probably the chief significance of breast feeding is the intellectual and emotional stimulant that the baby receives through this direct connection with the emotions of its mother. It should be remembered that until comparatively recently mothers breastfed their children for two or three years, and in the case of some African tribes for four years.
Lengthy periods of breastfeeding prevent women from returning to many modern forms of employment – unlike farmer’s wives of generations past, or the women in some of the most remote of African and South American tribes – breastfeeding is still regarded as such a distraction to other employees that it is not acceptable (even in the House of Commons). Consequently there has been a massive increase in providing surrogate childcare facilities which enable the mother to work, and the baby to be physically cared for. In the most extreme cases companies are providing breast pumps, lactation support rooms and even motorbike outriders ready to whisk fresh mother’s milk to some distant day nursery where the mother can watch her baby receiving her milk on a closed-circuit video link, but the baby can’t see the mother’s eyes. This could be a serious threat to the development of intelligence in future generations.

Remember, the baby’s brain is ‘a work in progress’, and that we humans have to quite literally make our brains through the way we interact with our environment in the first months of life. It’s not until about the thirtieth month after birth that the human baby’s brain gains its full structural form. In particular the baby’s emotions are not hardwired at birth. The baby has to learn how to set up its own emotional reactions, and it does this largely through imitation of the adults around it. Happy is the child whose parents have their emotions under control, while the baby surrounded by adults whose emotional reactions are simply off the wall will set its own emotional thermostat at similar random levels. It’s rather like a new house owner taking delivery of a brand new building; the first thing that has to be done is to set the thermostat on the boiler, and then adjust the various thermostatic valves on the radiators in different rooms to achieve whatever is thought to be the best ambient temperature. Get that right and the house is a delight to live in, but set those wrong and the place becomes very unpleasant.
There is much research on the impact of early environment on a baby’s development. One of the most significant pieces of research was the massive study made in Michigan by the Kellogg Foundation into the biggest predictors of success at the age of eighteen. The most significant factor was the quality and quantity of dialogue in the child’s home before the fifth birthday. Parents matter quite enormously. Its findings did not surprise thoughtful observers, especially those in the United States who had been tracking the progress of youngsters who, under Sure Start and Head Start programmes had been given expensive support to improve their language skills at school. Such programmes work for a while but then most children tend to revert to a level of language literacy compatible to the language used in every day life by the adults around them. It is through the use of language, more than anything else, that we grow our brain.

Human intellectual and emotional growth can be seen in diagrammatic form. Starting from just before birth to about the age of twenty, with dependency below the line and autonomy above, a line of intellectual weaning can be constructed. Given the vulnerability of our young they have to be able to learn very quickly when they are very small. To facilitate this their brains are comparable to dry sponges, providing the environment around them is rich (an even interactive) the brain just soaks all this up. In ‘soaking it up’ the brain categorises such knowledge into useful structures – such as learning a language. This process starts to wane at the age of four and is largely gone by the age of eight or nine. Henceforth, learning has to be a very conscious effort – learning to speak your native language at two is so easy as to largely pass unnoticed, but to learn French or German at the age of fourteen or fifteen is hard work. Adolescence is a biological state in which the young person puts into good use skills they learnt as a child so as to take control of their own learning, so eventually becoming independent of their teacher. This was the basis of early models of apprenticeship... the craft master invested very heavily in providing the young learner with basis skills which the apprentice was then expected to develop more and more on their own, so eventually becoming an even better learner than the craftsman himself.
The brain has evolved, in a way of speaking, to be a general-purpose organism that can adjust, within certain broad bands, to operate in a variety of ways. Always remembering that the brain is primarily concerned with constructing possible forms of action that will enable each individual to survive, it has developed ways which enable the individual to build on what they already know so as to reach ever more complex levels of operation. All this starts very young. As we use our brains so we shape them for the next, higher, level of activity. The broader the experience when young in life, the more opportunities we have later on to develop a breadth of understanding.

Adolescence tends to be seen as a problem, yet its origins lie in actions that have enhanced the human race’s survival opportunities. Until comparatively recently the energy of adolescents, the willingness to break the rules, to work unusual hours (remember that teenagers stay awake most of the night and only go to sleep with the dawn) was just what our ancestors needed in young people so as to protect the tribe and to get carried away with their enthusiasm, and all of that benefitted the community.

We have to ask ourselves whether or not we have created a way of life for adult society that simply has no space for adolescents. If that is so, it’s the adults’ problems, not theirs.
To adults working frantically in the modern economy the adolescent almost holds up a mirror to our own frustrations. “Why do you have to do that?” asks the frustrated teenager, who shows you little support when you reply “I do this, not because I want to, but because I need to earn the money to keep you in the style that you think you are accustomed to”. When both parties stand off from each other we know that we are on different wave lengths — being a teenager is accepting all the contradictions, while becoming an adult means that you have had to come to terms with one or other of the ways of life that you are looking for.

Adolescence is a term largely developed by the French aristocracy in the mid eighteenth century to describe their own children. Such parents had nothing to offer their children by way of skills (apart from sleight of hand at the card tables), and gave their children money to get them out of their way. Alexis de Tocqueville was of the French aristocratic tradition, but he spent much time in the new American Republic which fascinated him, and about which he wrote at length. In America, he noted, as he would have done in England at the same time, there was no self-contained period called adolescence — youngsters easily migrated from being a child to becoming an adult. Employment was an important part of this process. Adolescents need something to do.

Colonial America was fed by the applied energy of what later became known as Adolescents.

“But as soon as the young American begins to approach man’s state, the reins of filial obedience are daily slackened. Master of his thoughts, he soon becomes responsible for his own behaviour. In America there is, in truth, no adolescence. At the close of boyhood, he is a man and begins to trace out his own path.”

Alexis de Tocqueville
Democracy in America (1835)
(By 1900 in America)…

Most educators convinced themselves that employment was detrimental to an adolescent’s development. “They wanted to believe that young people were in school because parents and students saw the value of education. They rarely acknowledged that for many students, and even their parents, high school was a very reluctant second choice”. 

“The rise and Fall of the American Teenager”

By 1900 the United States was fully industrialised, and many of the jobs traditionally done by adolescents had disappeared. There was no longer anything for them to do, and most of their parents were now employed working at tasks in the factory that required only limited skills. Lacking anything constructive to do for themselves secondary schools were expanded ‘to take up the slack’ in what would have otherwise have been the unemployed. President Roosevelt, faced with the aftermath of the Great Depression created ‘The New Deal’ in the 1930s whereby youngsters below the age of eighteen were no longer allowed to work, so releasing nearly three and a half million jobs for the adult unemployed and created nearly half a million new teachers. School started to emerge as the replacement for learning on the job. Secondary education for all came even later in England and it was not until the 1944 Education Act that it became compulsory up to the age of fifteen; only six years before that, in 1938, eighty-two percent of all children left school on their fourteenth birthday.

Modern society has become so familiar with the idea of seeing adolescents as school children that we need to question seriously whether a form of schooling which largely resembles an extended form of elementary education is what the adolescent’s biological imperative to learn suggests to them is a good idea. It is almost as if in the way that we adults have organized our own existence we have actually squeezed out the opportunities for young people to learn directly from us as apprentices in the ways in which countless generations of our predecessors did most successfully.
Until very recently adolescence was explained as a function of hormonal changes in the teenage brain associated with sexual development. The idea of such hormonal changes is not being rejected, rather it is being added to by some very recent research into the nature of the adolescent brain, made possible by a large scale project mounted by the National Institute of Health in the U.S. using functional MRI scans to follow a cohort of eighteen hundred ‘normal adolescents’ over a ten-year period from the ages of twelve to twenty-two. Early findings from this programme have amazed researchers; the adolescent brain is changing dramatically at a functional level during this period. It seems that many of the connections made during the first dozen years of life are, quite involuntarily, broken during the teenage years, and the brain scan shows them struggling to make new connections. Maybe this is actually what adolescence is all about ─ forcing youngsters to work things out for themselves, and not to develop simply as a clone of their parents. Maybe the adolescent brain is, quite literally, ‘crazy by design’.

A biological adaptation is a change that takes place in a species over a very long period of time, and is something which so benefits the individual that it improves their survival possibilities. In a world of continuous change it would be a bad idea for an individual to be just like his parents (horrible thought!); each generation needs to make many fine adjustments to its individual circumstances. Adolescence looks to be a time-limited adaptation that has been developed over the past sixty thousand years — the time which geneticists and biologists now suggest has elapsed since our species left the plains of central Africa. It is all about doing the opposite — for a short period of time — to that which stood the youngest child in such good stead, namely learning through imitation. Adolescence is very different — it’s all about learning by standing on your own feet, it’s about taking risks if you’re going to survive. It may well be that this predisposition to take risks only lasts for a few years and, if not activated, actually disappears. If we over-school youngsters in this period we have only ourselves to blame if they become dependent adults always awaiting someone else to tell them what to do.
Latest estimates suggest that our species may have composed only some four to ten thousand people when, sixty thousand years ago, climatic change out on the savannah in central Africa forced our ancestors to walk away to find better homes. At that stage our ancestors would have looked and acted just like us. Critically they had all the linguistic skills needed to adapt their single African (click) language as circumstances elsewhere necessitated. As their descendants we now speak some six thousand different languages (it was more than seventeen thousand two hundred years ago). Africans have many more words to describe heat than we English do, but the Eskimos have many more ways of describing ice and snow. As we have moved out of Africa so our population has grown. Eleven thousand years ago it would seem that there were about fifty million of us, even two hundred years ago there were only four hundred million, and then population numbers went mad so that there are now six and a half billion people on the earth — but we all carry the same genetic legacy of sixty thousand years ago. The fear is that by the year 2050 there will be nearly ten billion of us.

That sixty thousand represents between two thousand and two and a half thousand generations of our ancestors since that long walk out of Africa began. Geneticists know a lot about this by studying the blood groups of indigenous peoples. Moving around the globe this meant each generation walking three or four miles further than their ancestors. It is an amazing thought, rather like the story of the hare and the tortoise. In each generation it was probably the active adolescent who led the way — to the top of a mountain that the others were too scared to climb, or across the river the others wouldn’t dare go. When our ancestors first met up again after all those years — say an English immigrant on the Canadian prairie, the man’s genes that might have come through Europe and the native Canadian woman’s genes who probably came by India and Mongolia — they had no difficulty in producing healthy children (there had been no change in our body form) but cultural speciation had gone crazy... we might have looked alike, but we certainly didn’t talk alike.

The 21st Century Learning Initiative

www.21learn.org

The Journey of Man: a genetic odyssey

“Today we are in many ways the same Palaeolithic species that left Africa only 2,000 generations ago, with the same drive and foibles”.

Spencer Wells, 2002

Our distant ancestors reached India 50,000 years ago, Thailand 40,000 years ago, northern Europe 25,000 years ago and Tierra del Fuego 10,000 years ago.

... They were ‘travelling’ at a speed of about 3 or 4 miles in every generation; life was a constant struggle, but there were always ‘pastures new’ beyond the next mountains. (The oldest remains in Jericho are over 8,5000 years old). There were possibly 10 million humans when settled agriculture started 10,000 years ago, 400 million two hundred years ago; there are now 6.5 billion.
The adolescent youngster sitting in today’s classroom is still of a prototype that is, in many cases, wanting to be out there on that frontier, predisposed to take risks which we cautious, older people are not willing to face. To them the world is essentially new, fresh, challenging, but in our day increasingly constraining; survival is not so much about being alert to a multitude of stimuli to which there could be a multitude of solutions, as it is about keeping your head down, and your nose ever-closer to an academic grinding stone. That may make sense to an adult world looking to a younger generation to ‘keep the wealth flowing’, but it’s often nonsensical to the adolescent. Recently an audience in Ireland said that the cry of adolescents is the old Cole Porter song,

“Give me Land,
Lots of land under starry skies above,
Don’t fence me in,
Let me wander over yonder
Till I see the mountains rise.
I want to ride to the ridge
Where the West commences,
Gaze at the moon
Till I lose my senses;
Can’t look at hobbies
And I can’t stand fences,
DON’T FENCE ME IN.”
England is not the only country to have heard its political leaders for twenty or more years exhorting schools to make it possible for the next generation to be so well taught that we will increase our competitive advantage over other countries. Every country is saying this, as if no one else has ever thought about it! It is leading to the most almighty educational rat race. Immediately it seems an obvious strategy, and political advisors with their eyes fixed solely on the classroom, have come up with endless programmes ‘to improve results’. What is meant, too often, is to devise courses of work which are easy to quantify; it is easier to mark a twenty one-word-answer test than it is to judge the merit of an essay. So school curricula have become progressively shaped by the need to get easily quantifiable data, even though practicing teachers in many lands see this as an abrogation of quality education. One country that has been preeminent in doing this has been South Korea who have so raised their results that this former war-ravaged land is now only a point or two below the most outstanding country in the OECD League Table (Finland). South Korea has done this by developing an intensive system of schooling that often holds children in school for as long as thirteen and a half hours a day of solid instruction and rote learning. Finland, incredibly, does it in an almost exactly opposite way — it thinks children should spend the first seven years of their life within their homes and their local communities because it regards them as not being mature enough to start school until they are seven years of age; they then remain in the same school (which is small) until they are sixteen; are taught by very well trained staff, and ninety-seven percent of them go on to higher education.

Just at the stage when some British officials are urging English teachers to emulate the way the Koreans do it, the Korean intelligentsia are identifying the faults in their system which — they said in October 2005 — “was giving a standardized education like battery hens”. England has to rethink its educational system at a fundamental level.

**Seeking a balance between Teaching and learning**

*News Report from Seoul, south Korea - 04/10/2005*  
*The Chosun libo Paper*

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**The 21st Century Learning Initiative**

www.21learn.org

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As was said at the start of this lecture English education still suffers from Victorian assumptions about learning; firstly that the education of young children does not merit as much attention as that of older children, and secondly that it is school-based experience that is of more value than informal learning. The ghost of Queen Victoria still stalks our corridors; “Little children should be seen, and not heard”. This lecture has argued for these assumptions to be reversed.

What is now known about how humans learn should suggest that we need a process of learning that aims, from the very start, to give the youngest children such a sense of mastery of their own learning that, as they get older, they are positively encouraged to take as much responsibility as possible for working things out for themselves. Life-long learning should start in the elementary school, not be seen as an ‘add-on’ after the age of eighteen. As the child grows so the role of the teacher needs to change. The doctrine of subsidiarity is what underpinned old models of apprenticeship; the older the apprentice became the more confident they were in directing their own learning, so much so that, by the time they had left school, they didn’t need a teacher to tell them how to work things out by themselves. In the language of the eighteenth century “Jack has produced his masterpiece, and Jack is as good as his master”. That is what intellectual weaning is all about — and we need it as much now as was needed in the eighteenth century.
Schools can’t change without the knowledgeable support of the community of which they are apart. If schools are to do more for their pupils than schools in earlier generations did, then today’s parents will need to know why, and how, the schools will be acting as they are. They will also need to be reminded that they have a key role to play... it’s not just that they are partners with the schools, it is that they are the prime teacher and emotional support of the child.

Instead of seeing primary school as very different to secondary school the funding for all levels of schooling needs to be combined and reallocated. This reallocation needs to be on the basis of supporting the youngest learners; a ‘rule of thumb’ could be applied that class size should never be more than twice chronological age. Ten pupils at the age of five, twelve at the age of six, twenty at the age of ten. Would that mean thirty-six at the age of eighteen? Most certainly not. Once a pedagogy has been developed that enables teachers to develop within their pupil the skills of working things out more and more for themselves then it would be absurd to think that at the age of seventeen or eighteen everything that a child had to learn needed to be taught in a classroom. Possibly by the age of eighteen a young person might need no more than two or at the most three formal lessons a day, but the rest of their time would be spent in intensive work directed by themselves. This is the preparation they need for a lifetime of learning.

The world faces an enormous problem in coping with rapidly escalating expectations, but with ultimately finite resources. Not just physical resources like air, water, soil, oil or food but mental aspirations that are ultimately constrained by our biological and mental predispositions. If we are not careful, as we have been warned, our technological knowledge could outpace our wisdom. What is meant by the use of the words ‘we’ or ‘our’? We as individuals are both citizens of this planet, as well as its guardians. Whole societies, as well as individuals, have to start thinking — and acting — as if they really did believe this.

Such thinking has to be encouraged at every level, especially in schools. We need a curriculum that is not about consumption (the customer model) but about sustainability, the interconnected curriculum that is about respecting the entire ecosystem of which we humans are a part (and potentially the most dangerous part).
“Much to my surprise I can’t really fault your theory. You are probably educationally right; certainly your argument is ethically correct.

But the system you’re arguing for would require very good teachers. We’re not convinced that there will ever be enough good teachers. So, instead, we’re going for a teacher-proof system of organising schools - that way we can get a uniform standard.

What was said in Downing Street in 1996 may not be very different to what is still assumed in government offices in many places. Behind this is a terrible misconception — ultimately it is not governments who make these decisions; it is the common ‘ordinary people of the land’. To suggest that teachers have to be instructed as to what to do at every twist and turn of the way is to deny them the opportunity of showing that they are thinking people, more able to work out what is in the best interest of an individual child than can any book of agreed procedures ever suggest. If the teacher is not able to do this, then the child will never learn to think for itself. To set up an education system on such a set of assumptions is to downgrade what education has to be all about. What the South Korean intelligentsia have started to say is what large numbers of English people already know.

It is often said that we live in a multicultural society, and as such the state has to set a moral framework into which people of all persuasions can fit. In our relativistic world even the suggestion of a ‘moral position’ sets some people’s nerves on edge — whose morality, and on whose authority? England is experiencing particular problems. Because we are no longer the Christian country that we once were, it is often assumed that we should live within a ‘godless morality’. A complex world of endless conflicting expectations can’t live without a moral code. Perhaps it is the ethic expressed in the proverb of the Native Americans that people of different ethics, religions and moral codes can rally around. Then we would know which way we were trying to go.

We have not inherited this world from our parents. We have been loaned it by our children.

Native American Tradition
“We are not blind! We are men and women with eyes and brains... and we don’t have to be driven hither and thither by the blind workings of The Market, or of History, or of Progress, or of any other abstraction.”

Fritz Schumacher
“Small is Beautiful”, 1992

Remember the Rainforest! The brains of our children and the forests of the Tropics are awesome in their magnificence... but like so many things of beauty they are terribly vulnerable. And they can disappear.

We can’t opt out of these big questions. Without first asking them, and then coming up with some agreed answers, education will continue to be a roundabout of ever-changing fantasies. It really is up to us... the ‘ordinary people’ have to tell the politicians what we need — it must no longer continue to be the other way round. We are, after all, thinking people.