Breaking the Cycle of Distrust:

Developing creativity and empathy in a challenging world.

By Anne Miller, The Creativity Partnership

About the author

Anne Miller https://annemiller.eu/ is an expert in creativity and innovation with over 30 years experience in sustainability. She is Director of the Creativity Partnership where she helps people and organisations innovate.

She started her career as a research and development engineer developing energy efficient heating appliances, solar panels and heat pumps, before moving into technical consultancy. In 1988 she was a co-founder of TTPGroup, one of Europe's leading technology innovation organizations. She became probably one of the world's most prolific female inventors, responsible for a wide range of products and processes including power tools for Bosch and medical products.

In 2000 she founded her own business, The Creativity Partnership where she now provides consultancy, training and workshops for organisations ranging from large corporations to the NHS and other public sector bodies.

She was a co-founder and then board member 2005-10 of the Climate Coalition, the charity that built the UK's largest and most diverse coalition of UK NGOs campaigning on climate change. She was a non-executive board member of British Antarctic Survey, one of the world's leading environmental science research centres, and is currently a trustee of LRI: a charity providing pro-bono legal support for developing countries in the international climate negotiations.

She has a 1st class degree in Engineering from Cambridge University, 39 patents and is author of the book *"How to get your ideas adopted (and change the world)"*

Summary

It's very clear that the next generation will need to do better than us if they're to resolve the huge environmental and economic challenges ahead of us, build a better society and provide wellbeing for 8-10 billion people while using less resources than at present. They will need innovators, but educational systems in many countries – not least the UK - are killing rather than fostering creativity.

The UK faces particular challenges because our public institutions seem to be inflicted with a vicious cycle of distrust in which blame, fear and pervasive micromanagement is rife. In our educational system we have developed a dysfunctional obsession with testing, assessment and accountability, despite the widespread agreement from teachers and educational experts that it is restricting children's learning.

I believe that anyone who cares about poverty and the environment should join with teachers and parents to transform the educational system and help our young people to develop creativity, empathy and a sense of joy in the world that they'll need if they're to build a good world for all.

Specifically, I propose three areas for interventions:

- *Schools to be encouraged to test children only where it helps them learn or provides useful qualifications. This should include legal right for parents and schools to opt out of SATs, and for schools to be allowed to develop more meaningful ways show their effectiveness, select which body inspects them and opt out of league tables.*
- *To put much greater focus on learning through play.*
- *For us all to personally take more responsibility for helping others learn, and to be more forgiving of the mistakes of others.*

Creativity and empathy are universal human attributes, and many of the problems I discuss are experienced in worldwide. However, when it comes to discussing the changes to the educational system, I am focusing particularly on the UK. This is partly because it's the area I know best, and partly because I think we have a real opportunity to avoid following some chilling trends that are already evident in the USA. Other nations may well face similar threats.

A challenging world

The world is already a challenging place for many, but the trends are not encouraging.

It's clear that today's young people are going to be faced with an increasingly difficult, uncertain and interconnected world. They'll have to deal with climate change, resource shortages, population growth and migration. As if this wasn't enough, they'll have to find a way to deal with our generation's financial and environmental debts, probably in an environment of enduring austerity.

Many people who care about the environment and poverty believe that we already have all the solutions we need, if only we get on with implementing them. However this isn't true. In many cases we have only the vaguest idea of how to solve the challenges ahead, and we are quite explicitly relying on the creativity of the next generation to invent the solutions we need.

For example, it is already clear that climate change and resource shortages are going to loom large. At the recent COP21 climate summit in Paris, the world's nations effectively agreed to stop using fossil fuels within the lifetime of today's children. This is a hugely significant challenge. It will have major impacts on the sort of lives we lead: how we power our homes, produce the things we need, feed ourselves, travel, care for others and have fun, all without wasting increasingly scarce resources, or emitting more pollution than the world can cope with. At a rough estimate, we probably already know technically how to achieve half of this, the other half of the solution has yet to be invented. Even where technical solutions are clear (for example going vegan), we may not know how to persuade ourselves to do it. This means that an inspirational, persuasive, creative chef might well be as important for the world's future wellbeing as an inventive engineer!

Every generation faces challenges and changes, but the ones that will face our young people over their lifetime seem to me to relate to the fact that the world is increasingly interconnected and vulnerable. Natural and manmade systems are entwined together around the globe, so crashes and catastrophes are becoming more serious and widespread, and the consequences may be felt very far away from the multiple causes.

The collapse of the US housing bubble, together with a complex mixture of "innovative" financial products, regulatory failure and greed, led to the global financial crisis of 2007-8 and widespread austerity measures that are still in place today in many parts of the world, including the UK.

Businesses are increasingly paying attention to the risks[1] posed by their globalised, yet surprisingly concentrated supply chains. In March 2013 an earthquake in Taiwan caused severe damage to the world's only manufacturer of some specialised chips used in smart phones, affecting the availability of several well-known smartphone brands worldwide.

Environmental issues such as climate change and resource shortages are increasing the risk of unexpected disruptions. In 2010-11, a drought led China to buy wheat on the international market, contributing to a doubling of global wheat prices. This had a serious economic impact in Egypt, the world's largest wheat importer, where bread prices tripled, contributing to the unrest that led to the fall of Mubarak in February 2011.

This systemic interconnection means that unexpected things happen, and it's hard to assign blame when they do. I believe that instead, we should put more effort on being creative about how to resolve the problem and address the root causes.

So how do we prepare ourselves and our young people to meet these challenges? In particular, what do we need to do differently, so that they have a better chance of thriving in the challenging world ahead of them?

What do our young people need to learn?

It's clear that just as at present, young people will need a broad range of knowledge and skills, from basic social skills to the specialist subject specific knowledge. Collectively these cover the huge range of topics that result in a diverse and satisfying society, from accountancy to brick laying, from poetry to physics.

Knowledge and skills are of course important and I don't want to belittle them, but in this piece I want to focus on the development of personal character, because I believe it's what determines the nature of our society. Is it oppressive or flexible? Fearful or innovative? I also want to focus particularly on how teaching is done, rather than what we are teaching.

Given the likely nature of the challenges ahead, I believe we need to put particular emphasis on developing two deeply human characteristics: Creativity and empathy. It's also important to foster the sense of joy in our wonderful natural world, and courage in the face of the inevitable risks and challenges ahead.

Creativity

Firstly, I think we will need a greater focus on creativity. By this, I don't mean that we should paint pictures or write novels, although this might help to some extent. I mean that we need to foster the deeply human creative ability to solve problems and invent the new, in a wide variety of fields. This is a process that involves making use of what we know, discovering what we don't, and making the connections to create things that have never been.

I think this is particularly important now for several reasons.

In December 2015, at the Paris climate summit, the world's nations agreed that we needed a technological and social revolution to take us into a low carbon age. Some are already calling this the world's first planned industrial revolution. It's certainly going to have to be the biggest and fastest, and it won't happen without creativity.

Some may be tempted to say "leave it to the engineers" in the hope that they'll invent new technologies that will allow our lives to continue unchanged. There certainly are exciting technological innovations underway, for example, the cost of photovoltaic solar panels has fallen by a factor of 4 in the last five years, and this is contributing to a steady increase in the proportion of electricity that is generated from renewables. But the reality is that the changes will be much more profound than that.

Significant technological innovations change society and society's changing needs drive technological invention. This can result in what are known as "disruptive" innovations that completely change first the dominant industries and then our whole society. Just look at the consequences of the invention of the car, and the succession of related innovations that made it ubiquitous. It not only displaced the horse as the main means of transport, creating

a powerful new automotive industry in its place, it also led to the growth of suburbs and roads, changing fundamentally the way we live our lives. Instead of streets coated in horse dung, we now have climate change and air pollution to deal with.

Given time, technological innovation changes not just how we live our lives, but also how we want to live our lives[2]. For example, the widespread availability of the domestic freezer and washing machine played a key part in transforming women's lives and aspirations. My grandmother never wanted a career, she took pride in being a good housewife. My mother would have liked a career, but never had the chance. I had every encouragement and became a professional engineer and innovator.[3]

I see that participation in innovation is a matter of social justice, and democracy too. If we leave it to the engineers and politicians, we'll just get technical and regulatory solutions. These may work, but they may not be sufficient, and we may not always like the sort of society that results. Instead I think we should try to equip everyone with the creativity and skills to take part[4].

For example, engineers and politicians are busy planning to invest at least £43 Billion in the HS2 high-speed train to increase the capacity of the west coast main line, because of the dramatic growth in the number of people wanting to travel by train. This involves heavy engineering and lots of concrete, but other innovations are the sort of thing that could be set up by anyone with imagination, insight and computer skills: the Danish high school dropout Janus Friis, co-founded Skype in his 20s: an invention that has significantly reduced global demand for business travel.

Other "peer-peer" innovators such as Airbnb, Zipcar or BlaBlaCar are developing new business models around sharing[5], rather than owning. These bring their own challenges about how they can be appropriately regulated, but all are part of a transformation of the nature of ownership that may ultimately be as disruptive as the internet. These innovations may also become a fundamental aspect of how we live good lives with a lower impact on the planet, even though they're not explicitly labelled as "green".

I find it significant that, instead of just building what worked in the past, these peer-peer innovators are finding new solutions that build on people's real needs. Instead of needing to understand the behaviour of concrete and steel under stress, they need to understand IT, but also people under stress: how to enable strangers to trust each other. In other words, they need creativity and empathy.

We will also need creativity if we're to maintain our economic prosperity. As NESTA (The National Endowment for Science Technology and the Arts) reported[6] in 2010, innovation drives economic growth. If we want to remain a country with a relatively high standard of living, we'll only succeed by being clever and creative in developing the products and services the world actually wants. At the same time, the ever-worsening austerity and cuts in our public sector require us to be creative in doing more with less.

Comfort with creativity and experience of innovation also makes it much easier to cope psychologically with the risks and uncertainties that we'll face as the "climate chaos" of climate change kicks in. This is because creativity involves a process of exploring the unknown, experimenting and filtering out the best ideas from a multitude of less good ones. This develops comfort with the idea that things don't always work, that there will be valid alternative approaches, and that change is possible. Because uncertainty is inevitable,

innovators develop skills in managing risk and learning from mistakes, rather than fruitlessly trying to eliminate any possibility of ‘failure’.

Finally, an important aspect of creativity is confidence, because a lack of self confidence cripples your ability to do anything. With creative self-confidence, you have the courage to recognise that you have an idea that's worth sharing. Or the courage to take the lead and pursue a dream, despite being uncertain about exactly how to achieve it. It's also a simple matter of social justice. It's unjust if some are taught to exhibit a confidence that quite outstrips their ability, while others are deprived of the opportunity to develop the confidence that will allow them to fulfil their true potential.

Empathy

If we are to make the world a better place to live in, we also need empathy and its natural consequence: ethics. Confidence and creativity are a powerful combination, but they can be used for evil, just as easily as for good. Hitler's interest in the arts was as intense as his racism[7]. The Al Qaeda terrorists behind 9/11 were creative in that they found a way to collapse two iconic buildings and damage a third, crash three planes and kill nearly 3000 people armed just with some box cutters. This is clearly not the sort of creativity we want to encourage.

Challenging circumstances can result in an increase in community spirit and collaboration, as for example, developed in Britain during the Second World War. However it can also very easily breakdown into conflict and selfishness. I think there is a real risk of this, in part because of the steady succession of technological developments that distance us from human contact and interaction. We see ever more human suffering on our screens, but feel unable to help. At most we click a button to make a donation or sign a petition.

Human decision makers are steadily being replaced by artificial intelligence (AI), for example to decide who gets a bank loan, or a job interview, or a top grade in an exam. Increasingly the AI systems are allowed to evolve, without human oversight, using so-called "neural networks" and genetic algorithms to look for patterns in huge datasets to decide what factors indicate "success". This means that if your CV doesn't contain the right key words, maybe your connections on Linked-in aren't right[8], not only will you not be considered for the job, the system won't even be able to tell you why you weren't considered. These trends have been quietly at work for a decade or more, but are poised to go big time.

If we're to increase the chance that creativity and confidence is used for good, we need to fight these systematic dehumanising trends. We need to encourage a culture of empathy and ethics, with an understanding of the needs and complexities of the people and species in our interconnected, complex world.

How do we learn?

It's easy to think that it's the job of teachers and the educational system to teach our children, but before we dive into a discussion of the formal educational system, I want to make it clear that in reality the formal educational system is only a very small part of the way we learn[9]. In many cases we learn much more from our peers, from our parents, from our employers, from what we do online, the advertisements we watch and from our experiences in the real world. As any frustrated parent or teacher knows, it's very hard to counteract these wider influences on your own.

One of humanity's strengths as a species is that each generation learns from previous one: our ability to transmit important social information is as important as the size of our brains, and its deeply hardwired in. As I watch my grandchildren develop, I'm fascinated by the way they, almost unconsciously, pick up the things that seem most important and relevant to their future lives, whether or not these are the things we want them to learn. My husband accidentally taught our grandson to kick the door to open it.

A young Inuit hunter[10] needs to learn the patience to hunt safely: for the ice to form, the animals to surface and the winds to die down. In contrast our children need to learn how to hunt safely in the online realm: to avoid dangerous situations, to decide whether information is true or misleading, and to learn to withstand the temptations of consumerism. We may try to tear them away from their screens but given how much of our time we adults spend online, it's only natural that our children are driven to do the same.

The environment we're in is an important factor in determining what characteristics we develop. The confident teachers in prestigious public schools develop confident, articulate young people (even if sometimes their confidence completely outstrips their ability). Fearful managers, who are themselves being bullied and oppressed, produce cautious, compliant, fearful employees.

In my work, I see many people who have the right basic aptitudes to be creative and productive innovators, but are held back because they're in an environment that's not conducive to creativity. Some people know they are creative, but are frustrated. They have good ideas for how to improve things, but "the system" makes it so difficult to try them out that they feel overwhelmed and give up. In other cases, I see people who believe themselves to be much less creative than they really are: they lack creative self-confidence. Often they lost this at school, so one workshop participant told me that it happened when she got told off, age 12, for painting the sky the wrong colour in a school art class.

Whether they're engineers, bankers, doctors, teachers or students, many of the same systemic factors seem to be making it increasingly hard to be creative.

I think this matters.

So what's going wrong?

Basically, I think the problem is that, over the last few decades, particularly in the English-speaking world, we've developed a culture in many of our institutions which involves a cycle of lack of trust, fear, risk aversion and micromanagement. This plays out in our education system, our healthcare systems, our banks, our political systems and many corporations. I think it's deeply damaging to our ability to foster the creativity, empathy and sense of the joy in the natural world that we need, given the many challenges we're facing.

It's a vicious cycle of distrust, starting with quite a deep-seated culture of suspicion and lack of trust in those in power. In reality, things may be no worse than they were back in the Victorian age (when leaders were much more respected), but the speed and ease of communication today means that we're much more aware of the failings of our organisations and their leaders. This gets reinforced every time there's a government U-turn, a school or hospital is deemed a failure, or those in power turn out to have abused their power.

Leaders, at all levels, are afraid of being pilloried if things go wrong, so try to avoid this by tightening up control, typically by introducing more targets, regulations and

micromanagement. The problem is that this may work for managing "business as usual" but if something unexpected happens it's now much harder for people to respond appropriately. The regulations are very often backwards looking: bolting the stable after the horse has bolted. They slow everything down and no-one feels they have the freedom to come up with an innovative solution, or even to do the obvious. Little problems then turn into major crises.

There's then a media outcry about the crisis and the search for someone to blame, which results in us all losing even more trust in our organisations and leaders. New regulations and controls are introduced in an attempt to make sure "this never happens again", and the sense of fear increases.

This sense of fear and micromanagement steadily erodes creative self-confidence and leads to a dysfunctional system in which no-one feels free to use their creativity.

In the UK we have a public (i.e. maintained) sector educational system that's obsessed with testing, even though as one experienced teacher points out, many of the assessment systems that teachers now operate seem largely, if not entirely, divorced from the central purpose of helping pupils learn[11]. Instead they are primarily focussed on collecting data so that the school can be held accountable for pupil's achievements. Indeed, the Department for Education's definition of effective assessment systems starts by stating that they are the ones that "*give reliable information to parents about how their child, and their child's school, is performing*"

It's confusing for teachers, parents and the public to keep track, because the accountability system keeps changing, each time attempting to address the distortions created by the previous system.

In 2015, public sector schools had to do statutory assessment tests (SATs) in key subjects at the end of years 2, 6 and 9. At a typical secondary school, pupils in years 7-9 were formally assessed by their teachers at least 6 times a year (in order to be able to demonstrate to Ofsted that they'd made progress), then had GCSEs in years 10 and/or 11, AS levels in year 12 and finally A levels in year 13.

From 2015/16 the new, mandatory Progress 8 measure will focus on performance in 8 subjects rather than 5. This may be an improvement, but there is concern that the changes will also increase the marginalisation of creative subjects. It increases the emphasis on measuring progress, and many are saying that although it calculates progress in a more complicated way, it will give a similarly unfair result.

The budget of March 2016 announced further changes, including the requirement for all maintained schools to become academies by 2022.

Some schools are bolder than others in how they use the freedoms they do have, but I find it significant that the independent sector has fought hard to remain exempt from compulsory SATs and Ofsted inspections (they're inspected by a variety of bodies, with what has been described as a lighter touch).

The situation is getting worse. From September 2016, to the horror of teachers, parents and educationalists[12], all publically funded primary schools in England will be required to conduct "baseline assessment" tests on four year olds. In what teachers describe as a farce and educationalists describe[13] as a disruptive burden that "*does not support education and learning"*, each child's literacy, numeracy, emotional and social development must be

assessed within six weeks of them starting school. It's then condensed down to a single overall number, so that the school can be held accountable for the difference by the time the cohort takes Key Stage 2 SATs tests in year 6, age 11. This is a ridiculously simplistic view of child development.

Many public sector schools and teachers live in fear of Ofsted and parents, because they have to be able to prove that the pupils are making progress. If they can't, the school risks being ranked as "requiring improvement" or worse, "inadequate" and will be put in Special Measures.

This is a very real threat. Schools can be placed in Special Measures if just 10% of lessons are unsatisfactory. In a third of local authority areas in England in 2014, over 30% of secondary schools were rated as "requires improvement" or "inadequate"[14] and all of these schools will be very nervous indeed.

Few outsiders realise how punitive Special Measures is. The head will usually effectively be dismissed and prevented from ever working as a head again[15]. The school will usually be forced to become a sponsored academy. Some will be closed. If the school does survive, the remaining staff will have two years of hell[16], with significantly higher workloads and stress. There will be continuous monitoring and surveillance, including down to the detail of lesson plans and observing individual teaching. There will be a colossal increase in paperwork and everyone will be faced with the public humiliation of being labelled as a failed school. The stigma can last for years.

The threat of this punitive sanction terrifies teachers and school governors.

A governor in a rural primary school told me that *"its continual micro-management: we spend most of our meetings trying to get our heads round the latest set of edicts. The staff are obsessed about achievements so we look at pages and pages of ticks. I'm not even sure what they all mean".*

A secondary school teacher described to me how in her school they felt they had no choice but to collate these vast spreadsheets of ticks, updating them twice a term to list precisely which child had learnt which grammatical structure in order to prove to Ofsted that they'd made the required progress.

Targets are imposed, even though research repeatedly shows[17] that externally imposed targets reduce creative performance.

A foreign language teacher told me "*I'm given both minimum and aspirational targets for where I need to get them to each year. These are generated by computer, based on their SATs result in English, but don't take account of whether they did foreign languages in Primary School, nor their ability. The pupil is given it as a target, and I'm then judged on whether they achieve it."*

In the best schools with good leadership and where they feel safe from Special Measures, teachers are confident enough to teach the way they know it ought to be done, and to use their creativity to try out new ways of helping children learn. But in far too many, there's huge pressure on teachers to focus only on moving pupils through narrowly defined levels: to their distress they feel forced to "teach to the test".

In subjects like Art or Design Technology (DT), when a student leaves school and tries to get a job, they find that creativity is a fundamental part of what employers are looking for. But in schools it seems to be being squeezed out by the pressure to design curricula that let you prove that a child has made the required progress through pre-defined levels. It's easy to understand how a DT teacher, faced with the question "*what do we expect a pupil who has done DT to know by the end of year 7*", would pick nice tangible facts like the properties of wood. Assessing the quality of a design, or the creativity of a painting is a much more subjective business, so is being squeezed out.

I was puzzled and horrified when an artistic young friend[18] of mine told me that she wanted to stop doing GCSE Art because it was boring. However I totally understood when she explained that instead of just being allowed to paint a horse, they had to spend much their time studying how other people had painted horses.

Some years ago, I was in discussion with the senior manager of the department responsible for curriculum development at one of the UK's leading examination boards. I commented that it seemed to me that curriculum design must be an exciting opportunity to inspire teachers to excite the creativity of the kids. His scathing reply? "*Inspiration, that's a bit idealistic. And creativity- that can come later*"

I was so shocked, I didn't know what to say.

Not only is our educational system not fostering the creativity that we as a society need, it's actively turning off our most creative kids.

League tables add another level of pressure to maximise the percentage of children achieving at least 5 GCSEs (or equivalents) grade A*-C (although this measure is about to change). I'm told *"Game playing is rife. Some schools restrict which subjects pupils can take, based on their knowledge of who might get a grade C. Others bring in new subjects that will win them points*." Many marginalise the activities that don't win points.

Whereas Special Measures terrifies the "weaker" schools, the league table pressure can be most intense for the "best" schools.

I once was the judge in an invention competition for primary school children. We'd expected to be mobbed with entries, because there were really generous cash prizes on offer and the local paper was publicising the results. However, although we got some lovely inventive entries, we got many fewer than we'd expected, and none at all from many prestigious schools in the area. One of the winning schools told me that they only felt able to participate in something like this because they knew they were never going to feature particularly highly in the league tables, and this gave them the freedom to get involved in exciting projects like this.

Assessment is widely agreed to be an important part of education, because it's important to know whether pupils are progressing, and how to help them to do so. However there is growing concern[19] about how these assessments are used, how frequently they're done, the side effects and whether the money spent on assessment could be better spent on training teachers and providing better teaching resources. In the 2011 UK government review[20] of Key Stage 2 SATs taken by children leaving primary school, half of respondents wanted league tables removed all together or suggested that the SATs results should not be used for compiling them. 47% said that the tests encouraged teaching to the test and narrowed

the curriculum and a third thought the tests should be scrapped entirely. There is similar concern in the USA.

Even the inspectors are unhappy about the punitive way schools are being forced to become academies and the reduced support for schools. A retired Ofsted inspector told me "*I sit on my sofa raging. It's so punitive, and so unfair*"

It's clear the testing has got completely out of hand. I think it's tantamount to bullying, and it's destroying creativity.

I became curious about what all this testing was costing. Surprisingly, although it's widely agreed that the cost is a very part of the significant educational budget, Ofqual laments[21] there's no longer even an attempt to collect the figures. A partial indication of the cost, is perhaps given in their 2010 report[22] which estimated the total value of the regulated qualifications market (ie GCSEs, A levels and vocational qualifications, but not SATs, internal assessment or staff time) as £933 million. The US campaign group, SaveTexasSchools[23], estimated that testing activity now takes up to 45days of each school year.

It's hard to break free of this treadmill of testing, because its being driven by the cycle of fear, micromanagement and lack of trust that we seem to have inflicted on ourselves in the English-speaking world. However I also worry that there are some external trends which are tending to make it worse.

The first is commercial pressure. As schools are forced to become sponsored academies, and academies are driven into chains, there is growing concern about conflicts of interest, particularly where academies buy services from related businesses. One of the examples[24] of real or potential conflict of interest given to the Education Select Committee in 2014 was The Academy Enterprise Trust, which *"has paid nearly £500,000 into the private business interests of its trustees and executives. The payments are for services ranging from project management to HR consultancy.... In all the cases the services had not been put out to competitive tender"*

There is also concern[25] about Pearson group, the giant London based multinational and the world's largest education firm. Not only does it own the FT and Penguin books, it owns the Edexcel examination board (the only one in the UK to be run overtly for profit[26]). It sells educational books and resources for schools. It provides on-line learning platforms. In 2011 it had a contract to administer the marking of all 3.8 million SATs from England's 11 year olds. It administers driving tests, provides school improvement services, has a policy think tank and advises government policy. Testing is big business, so for example Pearson's 5-year contract for providing testing in Texas schools was reportedly[27] worth $500 million.

Increasingly, it also owns academies: the Pearson Academy of Vocational Training in Corby, is run by its military focussed subsidiary, Pearson TQ.

The dangers from allowing such powerful commercial interests to have such influence on our educational system are becoming very clear in the USA[28], where there's an explosive growth of grassroots "opt-out" campaigns such as Fairtest,[29] Unitedoptout,[30] and SaveTexasSchools[31] all aiming to end the overuse and misuse of tests in schools.

All this testing imposes an almost impossible burden on teachers and examiners, so there's a steady growth in automated marking and digital assessment. Sometimes this can help

learning, so for example, if the process of learning can be turned into an enjoyable computer game, the student can get immediate feedback on mistakes and can be motivated to make progress through the levels at their own pace. This is becoming a hot topic in both education[32] and corporate learning.[33] However, I, and others[34] worry that the drive to accommodate the limitations of digital learning and automated marking will progressively constrain what's taught and what's tested. Testing knowledge of simple facts, or typing speed, or marking multiple-choice questions is easy. Assessing the coherence of an argument, the emotional power of a poem or the inventiveness of a design is likely to continue to require human judgement for many decades to come. We weed this out at our peril.

I've focussed on the education system, but it's important to realise that this dysfunctional cycle of lack of trust, fear, micromanagement and punitive sanctions is steadily spreading throughout the public sector. NHS Trusts, care homes, and even local authority planning departments can be put in Special Measures and subjected to punitive control for failing to meet the often impossible targets for performance and cost savings.

How can we break the cycle of distrust, and develop creativity and empathy[35] [36] in a challenging world?

I think it's important to recognise that even though we may feel trapped in this vicious cycle of distrust that has led to an obsession with testing, it is by no means inevitable. It is less prevalent outside the English-speaking world, and was less common at other times in our history.

Change is possible. For example, in the 1970s and 80s, Finland[37] had a strict regime of central control and state inspections of schools, but in a conscious decision in the 1990s they set out to develop a culture of trust, professionalism and autonomy. Finland now has one of the world's most effective education systems. Teachers are respected and free. Schools are responsible for their own curriculum planning and student assessment, and there are no state inspections. Recent developments are extending this[38]. In discussion with the computer games industry, Finland is moving away from traditional teaching by subject and introducing "phenomenon" teaching for older pupils, in which they are taught by cross disciplinary topics (for example the EU, or Catering) and work together in problem solving groups. They have a programme to increase "playful learning" for younger pupils.

It's clear to me that we need to transform our education system too, and I think this can be done simply by focussing on 3 areas: testing less, playing more and blaming less.

Less testing

It is becoming very clear that our obsession with testing and assessment has got completely out of hand. We're devising ever more complicated systems to try to condense human complexity down to a simple set of numbers, but this will always fail. Firstly, because people are complicated: we're not robots. Secondly, because imposing a high stakes target always distorts human behaviour in unhelpful ways, because people devote their creativity to meeting the narrowly defined target, rather than solving the real problem.

Under the mantra of holding public sector schools "accountable", the system is making it harder for teachers to teach, harder for schools to innovate and is killing the creativity of our children. It is squeezing out the breathing space teachers need to develop children's love of our complex interconnected, fragile world. It's being used to punish teachers and schools

and at times seems to benefit only the commercial interests of those selling the tests and assessment systems.

So I think UK policy makers should give schools the encouragement and freedom to test less.

- We should stop introducing new tests, particularly the new "baseline assessment" of four year olds which becomes mandatory in September 2016. A wide range of teaching organisations (even Ofsted) and parents are campaigning[39] to stop it and I think anyone who cares about our ability to build a better world should join them.

- We should commission and publish studies to estimate the true cost of testing (figures haven't been collected since 2009) so we can make rational decisions about how we can best use our scarce resources to help young people develop the characteristics, knowledge and skills they'll need in the challenging world ahead of them.

- Schools should be encouraged and allowed to test children only where it helps them learn or provides useful qualifications. To enable this, schools and parents should also be given the freedom to opt out of SATs and league tables.

- All schools should be given the freedom to choose how to show their effectiveness and allowed to select which body inspects them. It is unfair that currently only independent schools are given this freedom of choice. It's clear that we need more sophisticated ways of measuring pupil's achievement and development than simple test results.

- Ofsted[40] and other inspection bodies should be reformed so that inspections are about supporting schools in raising standards, rather than punitive box ticking. We will need a powerful regulator to prevent the abuse of corporate power in education, particularly if all schools are forced out of local authority control into commercially run academy chains, as announced in the 2016 Budget.

More Play and project based learning

In addition to reducing testing down to the minimum necessary, I think we should put much greater focus on learning through play and project based learning.

As in the Finnish example discussed above, US[41] experience, Norwegian experience[42] and the UK's new UTC colleges[43] show, well-resourced project based learning can be extremely effective. It does however take creative leadership and a lot of work to do it well, unless there is good external support.

An inspiring example of this is Duncan Bathgate, head teacher of Bealings Primary School near Ipswich: the visionary pioneer of a role-play based method of learning called Mantle of the Expert[44] developed by Dorothy Heathcote[45]. In this approach, instead of having normal lessons, children run "enterprises" solving a series of problems which provide the context for all their learning. These are meticulously designed to deliver large chunks of the national curriculum.

For example, in one project, Years 3 and 4 have been working together as the management team of a thriving container port - Bealixstowe (no relation to Felixstowe just up the road).

This involved lots of maths, calculating the volume of containers and how many could be stacked up, and geography - the origins and destinations of the ships and their cargoes. But then they get a tipoff that in one there's some contraband from Venezula. They have to decide what to do... They go on a hunt through cardboard boxes and eventually they discover that it's fashion items, apparently made from Orinoco crocodile skin. They use Google (developing ICT skills) to discover that it's from an endangered species, and once again have to decide what to do. Should they call the police? …

Assessment appears to happen organically, so instead of having homework marked, children receive feedback from the "client" who identifies their strengths and weaknesses. The Key Stage tests (SATs) are of course compulsory, although not particularly welcomed by the school. Nevertheless, the children get excellent results and the Bealings School regularly receives an Outstanding rating from Ofsted.

This approach has been adopted by other schools, at least for some lessons, but it's not easy. As a 2009 assessment by Cambridgeshire Local Education Authority[46] showed, although it was great for stimulating the creativity of teachers and pupils, it was difficult fitting it around the constraints of timetabling and SATs, particularly in secondary schools. A school under threat of Special Measures wouldn't have a chance.

Well designed, well resourced projects are an excellent way of motivating learning and helping people develop a deep understanding of the interconnections of the real world. They stimulate creativity, and are self directed[47]: both essential personal characteristics for success in later life.

Play is also powerful.

Play isn't just about having fun. As is immediately obvious if you look at kittens, or any young animals tumbling around, it's a deeply embedded way of learning the skills that young creatures need if they're to survive and thrive. It's also a fundamental aspect of creativity: amongst top inventors, artists and the creative professions in general it's really common for people to talk about "playing with ideas".

The growing movement for wild play[48] is important and valuable. Nature offers such wonderful opportunities to mess around, and in the process develop creativity, confidence and courage. Building dens, climbing trees, making rope swings, platting daisies into a necklace or investigating beetles: all wonderful. Wild nature is also the perfect environment in which to learn to look after yourself, to learn about risk and how to plan ahead to avoid unpleasant consequences. If it rains, and you forgot your waterproofs, you'll get unpleasantly wet.

It helps develop a deep love of the natural world, and is deeply empowering. Researchers have also shown that where children have early experience of messing around in nature, they are likely to grow up to become passionate defenders of it. Where they just learn about it in an academic way, as adults they are much more likely to be paralysed with indecision about what's best to do.

Contact with nature also seems to improve health and wellbeing.

The growth of the Forest Schools[49] movement has been phenomenal, and many schools have an outdoor classroom, or take groups of children to woodland. Bristol Zoo runs the

Wildplace Forest School [50] an excellent project with local schools involving lots of mud, creativity, running around and camp fires.

Forest schools are good, but I do worry that the same culture of fear that's resulted in the UK's obsession with testing, has also created an obsession with health and safety. Deciding how to manage risk is always difficult, but it's a question of finding the right balance: providing enough challenge to excite, without being dangerous. One teacher complained to me that in her primary school, the children all had to have the right clothes and footwear before they were allowed out to the forest classroom. They weren't allowed to climb trees unless they had climbing helmets on, so the overall effect seemed to be to disempower the children.

What a pity kids weren't instead taught the simple rules about how to climb trees safely, and their parents reassured the resulting dirty clothes could easily be cleaned[51]

The wonderful charity Forest School Camps[52] takes groups of children, some disabled or from disadvantaged backgrounds into wild countryside for an "adventure in education". The charity's approach to education is about allowing the children to discover how to do things, rather than being told. This results in them developing independence, responsibility, and a sense of care and concern for others, the environment and themselves. I was thrilled to see that all children are advised to bring a penknife!

Experiencing risk is important too, so there's a growing movement towards scrap yard playgrounds[53], where children can experience risky play, supported by playworkers. These are grounded in the ideas of "playwork" [54] which builds on the observation that children are often much more interested in playing with a cardboard box than the expensive present within. One example is Plas Madoc, an adventure playground developed by a local mother of two on an estate in a deprived area near Wrexham in North Wales: watch this lovely short video clip[55] to see how the kids revel in their freedom.

Parents often find it hard to tear their kids away from their screens, but all is not lost. There are now video games designed to develop creativity and empathy. One example is the multi-award winning game from the Canadian company Minority Media called Papa-yo[56] This is about a young boy, Quico, and his best friend, Monster, who likes eating poisonous frogs which throw him into a dangerous rage. Quico's task (and yours) is to solve puzzles and have adventures together with Monster, while understanding his emotions and using them to help solve the quest.

Professor Adele Jones, from the University of Huddersfield is working with young people in the Caribbean to develop video games in order to help young men empathise with the victims of violence[57] and thus reduce the horrifying rate of domestic violence.To summarise, I think we should have

- More wild play and risk taking, particularly in nature.
- More project work, particularly involving creativity and communication rather than competition and consumption.
- More games, particularly those involving empathy, discussion and understanding of our interconnected, uncertain world.

Less blame

Finally, as I discussed earlier, to break the vicious cycle of distrust, you can't just say test less, play more. You have to develop more sophisticated ways of demonstrating achievement than box ticking tests. You have also to deal with the fear that helps drive the obsession with testing, the "health-and-safety-gone-mad" culture that restricts exciting play, and the fear of failure that prevents creative experimentation.

Rather than obsessing over league tables and fighting to get our children into the "best" school or university, we should take the trouble to go deeper than looking at a single number in a ranking, and make a wise choice about what's best to do.

We can emphasise with the difficulties teachers face and give them the courage to use the freedoms they do have to try innovative ways to inspire children's creativity, empathy and love of the natural world.

We should accept that sometimes these innovative experiments won't work out and not blame people for trying, if they do it in a thoughtful way. As experienced innovators know, experimentation is a normal part of innovation[58]. The aim is always to maximise learning while making sure that if/when something unexpected happens, the result isn't disastrous. For example if a teacher was trying out the idea of taking children tree climbing, the trial run might show that its harder to find a good tree than expected, so the kids enjoyed it less than expected. The teacher might then decide to drop the idea, or realise that they needed to do more advance preparation in order to make it a success. This sort of iterative learning is normal.

Where we're in leadership role ourselves, we should resist the temptation to impose ever more rigid controls. These won't stop things going wrong, but will just stifle our people's creativity. Instead we should provide the sense of autonomy, support and guidance[59] that stimulates effective creativity. We should try to develop a low-blame culture in which only thing that counts as failure is "failure to learn."

Finally, I believe that we should personally accept more responsibility for achieving a good outcome, and should be more understanding and less blaming of others if there's a bad outcome.

We should recognise that formal teaching is only a small part of the way our children learn: we all have a role in helping support the next generation as they learn to cope with the risks and challenges ahead, even if we're neither a teacher, nor a parent.

In summary, to support the transformation of our educational system into one with less testing and more play, we should personally:

- Take more responsibility and be more tolerant of mistakes and misfortune.
- Trust in the wisdom and experience of our teachers when they tell us how they want to teach, and give them the resources and training they need to do a good job.
- Support bold policy makers when they attempt to make useful changes.

In conclusion.

The changes I'm proposing may seem inadequate. People may question how doing a bit more play, or blaming a little less, or testing less can help solve the serious challenges ahead? Or whether these proposals can succeed in the face of the powerful commercial interests that contribute to excessive testing. However the key thing to realise is that these simple steps are the starting point for very significant systemic change. And once you release creativity, almost anything is possible.

There are already powerful alliances of teachers, parents, school inspectors, educational experts and policy makers, calling for the reform of the UK's punitive, micromanaging education system. Other nations, such as Finland have shown the benefits. Grass roots "opt-out" campaigners in the US are already tackling some of the root causes. Employers, particularly in business, technology, IT and the creative industries are desperate for the sort of creative, self motivated collaborative employees that the policies I describe above will help produce. As the Chancellor of the Exchequer, George Osborne announced in the Budget of March 2016, the government firmly intends to devolve more power to school leaders and is in favour of greater freedom for schools.

I therefore think there is a huge opportunity for people who care about the environment, poverty and humanity's future to join forces with this growing movement for change, so our young people will be able to do a better job than we've managed, and create a fair, healthy and safe world for all.

If we can succeed in this, the children born in the current decade will be the first of a new generation. They will grow up free of the vicious cycle of distrust that has been stifling our creativity and empathy. Instead of experiencing an oppressive culture of bullying, micromanagement and fear, they'll grow up in an atmosphere of creativity, empathy and optimism and will be equipped to create a better world for all.

We owe it to them to start now.

Anne.miller@Tcp-uk.co.uk

[1] http://www.munichre.com/en/reinsurance/magazine/topics-online/2015/11/manufacturing-processes/index.html

[2] To explore the deeper impacts, see Moralising Technology, by Peter-Paul Verbeek

[3] Although I was annoyed by the few remaining restrictions.

[4] For a discussion of the merits of democratising innovation, see Professor Andy Stirling https://www.sussex.ac.uk/webteam/gateway/file.php?name=stirling-towards-innovation-democracy1.pdf&site=25 and Eric Van Hippel's book Democratising Innovation. http://web.mit.edu/evhippel/www/democ1.htm

[5] For further reading on the sharing economy see Professor Agyeman et al https://www.foe.co.uk/sites/default/files/downloads/agyeman_sharing_cities.pdf

[6] http://www.nesta.org.uk/sites/default/files/annual_innovation_report_2010.pdf

[7] See Frederic Spotts's book Hitler and the power of aethetics

[8] https://www.newscientist.com/article/mg22830452-700-why-pleasing-ai-headhunters-could-help-you-land-your-perfect-job/

[9] This idea is also discussed in the Thinkpiece https://www.foe.co.uk/sites/default/files/downloads/citizen_participation_and.pdf
[10] http://www.bbc.co.uk/programmes/b06tkx5k#play
[11] Geraint Brown Assessment after levels, available from http://www.history.org.uk/resources/secondary_resource_8132_265.html
[12] http://www.bbc.co.uk/news/education-35549611
[13] https://www.teachers.org.uk/baseline
[14] http://www.theguardian.com/education/2014/dec/10/ofsted-warns-rising-number-pupils-taught-failing-secondaries
[15] http://www.theguardian.com/education/2014/mar/11/heads-poor-ofsted-report-dismissal-shortages
[16] https://www.nfer.ac.uk/nfer/PRE_PDF_Files/01_25_06.pdf
[17] https://hbr.org/2012/04/balancing-the-four-factors-tha-1/
[18] She is now a professional illustrator
[19] http://edglossary.org/assessment
[20]https://www.education.gov.uk/consultations/downloadableDocs/Independent%20review%20of%20KS2%20call%20for%20evidence%20report.pdf
[21] http://dera.ioe.ac.uk/18307/1/2013-09-13-annual-qualifications-market-report-2013-main-report.pdf
[22] http://dera.ioe.ac.uk/1070/1/2010-03-19-Annual-Market-Report.pdf
[23] http://savetxschools.org/too-many-tests/
[24] http://www.parliament.uk/documents/commons-committees/Education/Conflicts-of-interest-in-academies-report.pdf
[25] http://www.theguardian.com/education/2012/jul/16/pearson-multinational-influence-education-poliy
[26] http://www.channel4.com/news/how-tax-free-exam-boards-profit-as-schools-pay-more
[27]http://www.telegraph.co.uk/finance/newsbysector/mediatechnologyandtelecoms/media/11155993/Pearsons-dominance-of-textbook-market-is-under-examination.html
[28] http://www.alternet.org/education/corporations-profit-standardized-tests
[29] http://www.fairtest.org/
[30] http://c-hit.org/2015/08/20/students-and-parents-mount-campaign-against-pearsons-standardized-tests/
[31] http://savetxschools.org/too-many-tests/
[32] http://www.edtechmagazine.com/higher/article/2013/10/awesome-power-gaming-higher-education
[33] http://www.trainingzone.co.uk/deliver/training/can-gamification-win-learners-hearts-and-minds
[34] https://www.newscientist.com/article/mg21128285-200-automated-marking-takes-teachers-out-of-the-loop/
[35] See also https://www.foe.co.uk/page/what-hell-education
[36] For further reading on empathy see https://www.foe.co.uk/sites/default/files/downloads/empathy-effect-roman-krznaric-76075.pdf
[37] http://www.theguardian.com/education/2015/jun/17/highly-trained-respected-and-free-why-finlands-teachers-are-different
[38] http://www.independent.co.uk/news/world/europe/finland-schools-subjects-are-out-and-topics-are-in-as-country-reforms-its-education-system-10123911.html#gallery
[39] https://www.teachers.org.uk/baseline
[40]https://www.atl.org.uk/Images/ATL_response_to_call_for_evidence_on_the_work_of_ofsted_september_2015.pdf
[41] Project based learning has also been shown to be very effective for high school leavers in the USAhttp://hepg.org/her-home/issues/harvard-educational-review-volume-66-issue-3/herbooknote/technology-education-in-the-classroom_243
[42] http://qz.com/377742/this-school-in-norway-abandoned-teaching-subjects-40-years-ago/
[43] http://www.utcolleges.org/
[44] http://www.mantleoftheexpert.com/
[45] There is a similar project in Norway http://qz.com/377742/this-school-in-norway-abandoned-teaching-subjects-40-years-ago/
[46] http://www.mantleoftheexpert.com/news/cambridgeshire-mantle-of-the-expert-project-evaluation/
[47] Similar ideas are behind the School in the Cloud https://www.ted.com/participate/ted-prize/prize-winning-wishes/school-in-the-cloud
[48] http://www.thewildnetwork.com/
[49] https://en.wikipedia.org/wiki/Forest_school_%28learning_style%29
[50] https://www.youtube.com/watch?v=y7Gbvearmvg

[51] https://www.persil.co.uk/activities-for-kids/tree-climbing-for-kids/
[52] https://www.fsc.org.uk/
[53] http://www.theguardian.com/lifeandstyle/2014/may/10/perfect-childrens-playground-the-land-plas-madoc-wales
[54] http://www.allianceforchildhood.org/sites/allianceforchildhood.org/files/file/PlayworkPrimer_2010.pdf
[55] It features in a documentary film, "The Land" by the American filmmaker Erin Davis. http://playfreemovie.com/
[56] http://www.weareminority.com/papo-yo/
[57] http://www.bbc.co.uk/programmes/p03hbrw5
[58] A nice example is the way the playing and experimentation of Californian enthusiasts resulted in the collective invention of the mountain bike http://mmbhof.org/mtn-bike-hall-of-fame/history/
[59] Discussion paper on this approach here: https://www.questia.com/library/journal/1P3-10183169/stimulating-innovative-thinking