

Chapter 6 Segregation of problems or homogeneity of solutions

*“I am in this earthly world; where to do harm
Is often laudable, to do good sometime
Accounted dangerous folly.”*

In a fit of political correctness, the education system in the UK was instructed to incorporate sustainability and equality into teaching. All schools would be judged on their incorporation of these topics into lesson plans with government inspectors seeking out best practice and castigating those schools that failed to do so. My college, probably like many others, dutifully toed the line and put on training programmes and workshops for the staff, most of whom had only the most superficial knowledge of climate change which was limited to knowing that it has something to do with rising CO₂ levels and we need to build lots of wind turbines. In the college's attempt at compliance management, I was invited to deliver a presentation on climate change to the staff. Attendance was compulsory and it was clear that most were there under duress. I opened up with what I thought to be the inspirational statement that education was the last bastion of hope in the fight against climate change as the media and political systems had become so paralysed. There was little reaction, so I continued regardless. I went on to explain that the rise in CO₂ was so severe the window of opportunity for the drastic changes was only about 10 years - still little reaction. I explained that a carbon rationing system would have to be introduced - the little bit of reaction now created was overshadowed by disbelief. I explained how things would play out if we did not tackle the crisis, still hardly any reaction with everyone believing that it would never get this bad. Finally I summarised up the talk, sat down and waited for the feedback. What's the point of that - what has this to do with my subject - we needed something more positive - were just some of the more polite statements that dribbled back over the following days.

Talking about climate change is always a deeply depressing experience, but talking to teachers who do not want to bother to understand it and therefore not prepare our young people for the future they face is even worse. Shortly after the presentation, the drive to make sustainability a measurable item by government inspectors on the school curriculum died a death like many other well intentioned ideas. Things then swiftly got back to normal with colleges such as mine getting back to organising high carbon international educational trips such as world development classes that send plane loads of students off to countries like Morocco, which are definitely not developing. Thus the process of indoctrination students in maintaining business as usual continues, and what happens in my college happens in all others.

Sustainability has now been replaced by employability as the flavour of the month and our college is now measured on how successful students are in getting jobs, irrespective of there being far fewer jobs than there are students. Being good at getting a job requires a different set of skills to being good at under-

standing the challenges of climate change. It needs expertise in segregating problems along with the ability to acquire depth in a few specific areas. Most of all, it requires that students demonstrate compliance and do not become cynical of the corporations that will one day employ them. Acquiring these sets of skills are what our economic system is based on and in all industrialised economies this is how young people are taught to think and it becomes the basis of industrialised educational systems. Students eventually leave education with a collection of qualifications governed by a pre-set curriculum which they are ultimately measured against. So long as a student can recite the respective curriculum for each qualification and perform appropriately in exams then he or she is deemed to be worthy of success.

It is an approach great for managing the education system, but it is the antithesis for developing the broad and open thinking skills needed to tackle the complex multi-disciplinary problems that plague the planet. Not only is the system highly segmented and compartmentalised, but it structured to resist any attempt to create broad minded and challenging thinking. For example, the standard text book for the UK A-Level maths syllabus¹ that my college uses sandwiches the chapter on the exponential function, which has such profound implications on economics and the environment, between a chapter on the sine rule and another on the equations of a circle. Though the sine rule and the equations of a circle may be interesting, they hardly have same the life changing implications of the exponential function, yet the exponential function is presented in exactly the same way as the others - just another set of abstract mathematical ideas which need to be completed to achieve exam success. Thus discussion of one of the most profound pieces of thinking any young person should be exposed to is largely censored out. Likewise the A-level economics course does not even talk about the exponential function, instead its curriculum chooses to indoctrinate students on the merits of supply and demand relationships and the anarchical ideas of different tax policies without ever reconciling the fact that the study of economics is about maintaining the impossibility of continuous exponential growth.

By contrast, I once had the pleasure to once teach a wonderful young lady from rural Zimbabwe who took great pride in describing the community that her family lived. She told how her grandmother had taught her mother about the herbs and animals in their area and how this information had been treasured and passed down through the community for generations. She explained how the older generations saw this passing of knowledge as their obligation and they took great pride in doing so. She told also how the community's environment that had been so treasured for so many generations was now being destroyed by the Chinese companies that were moving in under Robert Mugabe. What was especially inspiring with her was the level of knowledge and understanding that she had on a wide range of critical global issues exceeded by far that of many of my other students who had been indoctrinated by the education system of

¹Edexcel AS and A Level Modular Mathematics Core Mathematics 2 C2
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an industrial democracy. Her community had done all this without curriculum, exams and government inspectors.

While the home grown Zimbabwean education system may be out performing that of the UK on many measures, it is not an education system that would support the industrialised democratic society that we operate today, so we have been forced to stick with what we have got. The result is that virtually everyone ends up with a similar mindset, from the man in street to journalists to politicians, and the discourse that we have on many topics becomes similarly narrow minded. So discussions on a complex issue such as climate change become limited to the narrow context of how we can reduce greenhouse gases by developing technologies for a renewable economy or proposing that to mitigate the effects of climate change all we need do is develop improved flood relief programmes. Thus the complex is made to seem simple and the impossible is made to seem possible. However, it is a naturally flawed approach that leads to paralysis when dealing with complex problems where the domain of the solution reaches into many different areas and knowledge in all of these is needed to develop the framework for a viable solution.

This segmented approach to learning will guarantee that the impact of events such as climate change will always overtake the actions that are proposed, as the actions are doomed to be inadequate. It is however an ideal approach to make it look like action is being taken when there is no intent to do so. It is also the approach that is being consistently taken to the three biggest crises that we face today - climate change, nuclear weapons proliferation and financial instability, yet the solution to each one of these lies within the other. By avoiding these interconnections, politicians who falsely claim they are doing their best will always get media support because this is a simpler message for the media to communicate than the full complexity of the picture. Like many things, it becomes a self reinforcing cycle. The narrow but deep thinking needed for an industrial democracy forces a lack of consideration on inter-connectivity and so less debate happens on this. This encourages politicians to pursue their myopically failing approaches, which they can do because there is no viable democratic challenge. These actions, which are reported myopically by the media, allows the continuous segmentation of complex problems to continue.

For example, we thus have the extraordinary situation that no COP summit has discussed how security should be ensured in a collapsing world despite the acknowledgement that climate change will lead to political instability and statements from the UN secretary that “current proposals lack ambition.” Likewise the economic summits such as Davos and G20 play lip service to climate change, with little more than platitudes being offered through ideas such as “sustainable development” and no discussion on how tax receipts can collapse due to the combined effects of climate change and peak oil. Hence, the travesty of the solution to the banking crisis of the 2008 was to increase tax burdens and axe public spending thus hitting the poorest in society while the excess consumption of the worlds richest was not curtailed. Perhaps most disturbingly, the nuclear disarmament talks and debates on the replacement of Trident do not cover the questions raised in chapter 4. While I am yet to see any rigorous challenge to

these evident conflicts of thinking in the main stream media the goals that are needed in each of these areas are clear. With climate change, we require all nations to move to a zero carbon economy, on financial development we require all nations to develop a system which equitably shares access to critical resources and on nuclear disarmament we require all nations to abandon nuclear weapons. These goals sound so idealistic that they should be dismissed. But we cannot avoid the evidence in front of us. CO2 is increasing super exponentially giving us only a tiny window of opportunity, the global financial system already came to with 24 hours of a total collapse in 2008 and is primed for a second collapse and 17,000 nuclear weapons remain in the world's arsenals, only a small fraction of which need to be fired to destroy our increasingly fragile and high risk civilisation through the secondary effects of a nuclear winter or through strikes on high impact targets such as nuclear power plants. We have no choice but to strive towards these goals irrespective of how idealistic they seem and we must achieve them; however failure to achieve any one will result in failure of the others and will doom the planet. It is the ultimate strive for a homogeneous solution that is required and it needs a mindset that is the opposite of the segmented teaching and learning ethos that our industrialised democracy has equipped us with.

If we are unprepared to break into a homogeneous solution, then we should consider the consequence of remaining with segmented thinking and determine how dim the chances of success will be. To do this we return to the prisoners dilemma of chapter 3 and calculate the probability of successfully achieving all three goals simultaneously as if the games are independent. We have already seen how the prisoners dilemma forces two prisoners who are being held in two separate cells to act in a way that secures the worst collective outcome; with the pay-off matrix that we used the result is that both end up getting eight years in jail as they decide that confessing all to their respective guards is the best way of minimising their losses irrespective of what the other does. The same pay off matrix also sees them getting only two years if they both stay silent, which is the optimum solution and as previously argued this is the unstable saddle point. This is an outcome that can happen, but it is unlikely and difficult to sustain especially if the game is to be played repeatedly. Thus if one prisoner decides to speak and the other stays silent when the game is replayed, the prisoner that suffered by staying silent will most likely decide to speak as he has suffered loss and may be in no mood or no position to suffer further loss. It results in the strategy of tic-tac; thus to achieve the optimum outcome in repeated games of the prisoners dilemma you do what your opponent does. If he co-operates with you, you do the same. If he competes with you, you do the same, but you try and compete harder to make sure he is aware of the consequence of his action and if you have any doubt about the intentions of the other, you go for competition.

The prisoner dilemma assumes the rationality of the players as they both seek to minimise their losses, and for this it came to criticism from John Nash who developed it. He suggested that perhaps people are less rational than game theory supposes, and thus the unstable saddle point of mutually co-operating

can be more easily achieved than the mathematics suggests. However, the fallacy behind this is that the two most rational groups of people in society are economists and psychopaths, who faced with the prisoners dilemma will almost certainly end up trapped in the stable saddle point. The ultimate psychopaths are corporations whose needs have come to dominate industrial democracies. By their very nature corporations care only for themselves, they feel no pain and have no emotions for any one else or anything else. They lacks all the subtleties that make for normal human discourse and interaction within a society, yet societies are dominated by satisfying their needs. As nations become subservient to corporations these too must also behave psychopathically, thus we see climate change and nuclear disarmament talks being played out exactly as predicted by game theory with all parties behaving hyper-rationally by collectively opting for the worst case situation of continued competition, resulting in the worst case outcome.

The problem for today's global society is that the prisoners dilemma is being played out, not with just two psychopathic players, but with multiple psychopaths. If in an ideal hypothetical world where the climate change game is being played for the first time and all nations collectively choose to adopt a zero carbon economy they would achieve the optimum but unstable saddle point. Then by the tic-tac strategy, all nations would continue opting for the zero carbon economy in subsequent rounds as they see it in the their best interests and see everyone else doing the same. However, it takes only one player to succumb to self interest and opt for a high carbon economy and with the tic-tac strategy, others nations will copy the transgressor and choose to move to high carbon economies making the optimum solution impossible to guarantee in the long term.

The best measure of the difficulty of achieving this is to assume that on the first round the choices are made at random, if all players opt for the choices of a zero carbon economy demonstrating good intent and trust, then by the tic-tac strategy all subsequent rounds are played the same. The chance of the first round resulting in all nations agreeing to move to the optimum of a zero carbon economy is $1/2^k$ where k is the number of nations. Even taking a best case optimistic approach of assuming that we should only consider the interests of the G20 group of industrial nations and ignore everyone else, then the chance of getting the unstable saddle point is 9.5×10^{-7} , which is impossibly small. Adding just one extra nation into the negotiations reduces the already small probability of achieving the optimum outcome by half. In reality there are 196 nations on the planet, all of which are faced with the decision of either continuing to burn fossil fuel or to rely on everyone else to move simultaneously to a zero carbon economy. The chance of all 196 nations agreeing is the unimaginably small value of 9.9×10^{-60} . For all practical purposes it is effectively zero; it is on a par with the chance of selecting an individual atom at random from the all the atoms that make our planet.

But, the game being played on planet earth is more complicated as nations must simultaneously play games for climate change, nuclear disarmament and economic superiority at the same time and these are deeply intertwined. Nations

can only secure critical resources if they are economically competitive which requires them to ignore climate change; nations can only build nuclear weapons if they have large economies and industries to support the cost of these and in an world made unstable by climate change and resource shortages nuclear weapons continue to be regarded as the ultimate guarantee of security regardless of the illogicality of this. It is impossible to move away from the position that these three games are intimately linked, yet what our segmented industrialised thinking continues to lead us towards is that the problems in these three areas can be solved simultaneously and individually. However, because of the linkages between them, then all three games must achieve the optimum but unstable saddle point at exactly the same time and remain there through repeated rounds of negotiations, so the chance of this happening in a single round where each game is played is the equal to product of the probabilities of each game, which we can state as:

$$Probability = \frac{1}{2^k} \frac{1}{2^n} \frac{1}{2^m}$$

where k is the number of nations engaged on climate change negotiations, n is the number of nations engaged on nuclear non proliferation talks and m is the number of nations engaged in economic and resource competitions. Taking the reasonably optimistic scenario of k being limited to 98 to represent only half of the world's nations; n being limited to 10 to cover the P-5 nations along with the new nuclear powers and a few prospective nuclear nations such as Saudi Arabia and the number of nations being involved in economic and resource struggles is again limited to only half the world's nations so m is 98, we get the probability of achieving all three goals simultaneously of 9.9×10^{-63} . This immeasurably small value is the probability of life surviving on the planet given the current approach we are taking of tackling all critical issues on a segmented and individual basis and hoping that they are simultaneously successful. The chance of our complex civilisation surviving is even less. This calculation may seem a bit crude, but even if it is overstating the risk by a factor of a billion, the chance of success is still immeasurably small. Even these bleak odds may be an overly optimistic assessment as the three games that we have simplified the world's dilemmas to can be broken down into various sub-games amongst which there are further subtle interactions. Thus the economic games can be considered to be an amalgam of games such as the International trade agreements, OPEC, EU and North America free trade acts amongst others all of which require competition and force blocks of nations to compete against each other. Within the security sphere, as well as agreeing on nuclear talks, negotiations are also needed on conventional arms, terrorism and covert surveillance which will all interact. It is these incredibly small probabilities that we are being asked to believe are achievable.

In 2011, prior to the climate change talks in Qatar, I challenged John Ashton who was the UK Special Representative at these and acting on behalf of the UK Foreign office to push for nuclear weapons to be put on the climate change

negotiating tables. He responded with the comment², *“that if he wanted to derail the talks, this would be the best way of doing so.”* He was somewhat missing the point that the existing system that he is supporting is doomed to fail.

The above analysis is a measure of the dangerous trap that we are in; a multi-party prisoners dilemma played with a multitude of perfectly rational psychopaths within the framework of a large number of interlocking games all being played at once and against a strict and non negotiable time frame imposed by inexorably rising levels of atmospheric CO₂. So complex is the relationship between the economy and the environment that the list of interlinking games and feedback effects is as long as anyone wants to make it. It is paradoxically a function of our highly interconnected and developed global community that has provided the richest nations with so much wealth. It is also a crisis that the tightly focused education systems and the individualistic ethos that we need in order to survive in an industrialised society prevent us from developing the intellectual tools necessary to develop the complex solutions.

It is difficult to know if we do not see the complexities in front of us because they are not pointed out, or because they are too difficult to communicate, or because they are too uncomfortable to acknowledge. Most likely, it is a combination of all three. But recognise these we must, because we are all trapped in these dangerous games and we all play our part. We must also relieve ourselves of the dangerously folly of thinking if we should do good then those around who are incentivised to do harm will also do good. But the challenge of integrated thinking is what we must collectively rise to, otherwise we will continue on a path that has an impossibly small chance of success.

²Emails with John Ashton, the UK's special representative on climate change
<http://www.nucli.biz/#!emails-with-john-ashton/curc>