Unraveling Complexities 2010

Chanelle Carr-Janif

Learning Portfolio Part 1

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PREFACE

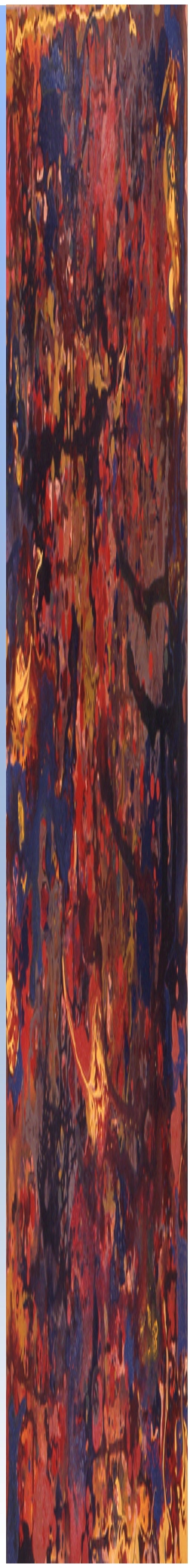
"Have you ever been curious about the sciences of complexity?" ~ *Melanie Mitchell "Complexity: a guided tour"*

The following is the first of my two - part Learning Portfolio. It is limited to 3,000 words so it is generally quite brief. It is (I hope) logically structured and easy to follow. It is often conversationalist, which I believe indicates the reflective nature of this assignment.

The reflections are those of how I perceive the course, and I would not be surprised if someone sat in the same lecture yet drew entirely different conclusions from it. However this is one of the greatest strengths of this course – It allows us to draw on our diversity of approaches and backgrounds as a means of solving problems that cannot be solved by one approach alone.

This is a perfect example of 'collective' as defined by Melanie Mitchell in *"Complexity: a guided tour"* the essence of that being; individuals who work in a simple manner, but who collectively perform complex functions. Here that complex function is solving a complex problem.

Chanelle Jayne Carr-Janif
Friday 20 August 2010



UNRAVELLING COMPLEX PROBLEMS

WEEK 1

"The more that you read, the more things you will know.
The more that you learn, the more places you'll go."
~ Dr Seuss

REFLECTIONS

Reflections – Panel

I will keep my reflections on this week brief, as we are not yet considering the substantive content of this course. I am however excited by the notion of the course in general. I have a couple of friends who didn't last year and thoroughly enjoyed, it. They said while it was a lot of work, they thought it was worth it and it allowed you to explore ideas that you couldn't in any other course.

As an avid debater I am very keen to explore different ways of thinking and understanding different points of view. This is a skill I really want to refine in my university education, as I believe it will equip me to deal with challenges in my future.

I wonder why it took so long until such a course was created, and where the idea came from? I am also curious as to whether any other universities run something similar, and if not whether they are thinking about taking one up after hearing about ours.

Reflections – Tutorial

This week we focused on housekeeping issues mainly and understanding the purpose of the course. We also reflected on the reading, 'Understanding what universities are for'.

What I find most interesting is the concept of the university as a business as opposed to an educational institute. I think ANU is quite unique in how much money it actually puts back in the education of its students. I have been privileged to sit on a couple of education boards and have learnt where our HECS money actually goes, and my understanding is that vast majority (much more than other universities) goes directly back into the students learning.

Question

"What did students' last year perceive as the greatest strength, and area most in need for improvement in the course?"

I think this is an important to draw on past experiences of others to understand what you are getting yourself into. Not everything is perfect and with inaugural programs there will always have kinks (I did the VC Leadership Program last year and we gave feedback on how it could be improved, which was adopted).

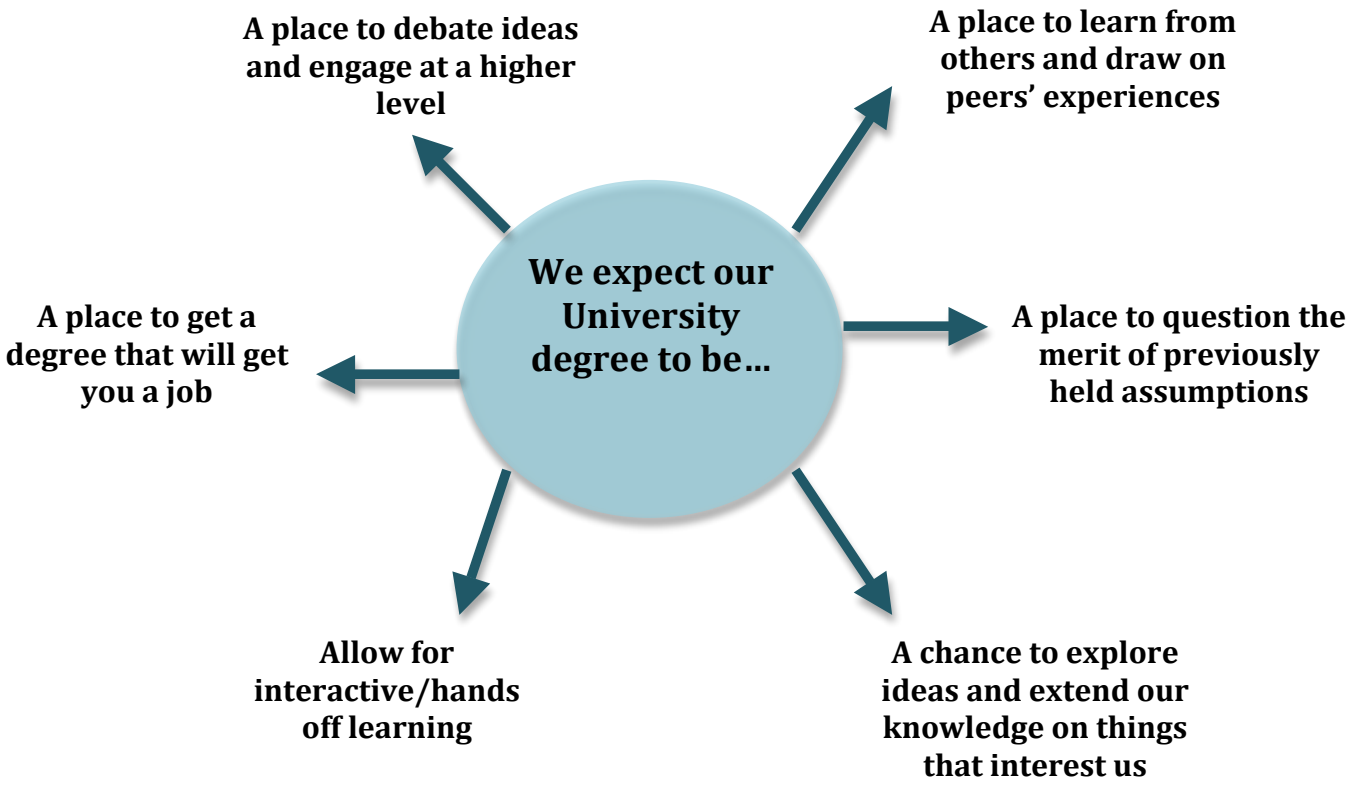
CONNECTIONS

With Law

This is made in my tutorial ticket for this week. But to extend - I think that the law is full of complex system, it certainly involves a variety of stakeholders, different processes and is plagued by problems which cannot be defined as a whole, yet are still difficult to solve in isolation. *(E.g. Terrorism Laws - people object to them, however when asked why, find it difficult to express beyond lofty ideals of liberty. You can break it down you can look at individual aspects – e.g. expansion of executive power)*

Beyond the Classroom

The discussion 'What are universities for' was one I had the week before O week with the new Academic Scholar Team for Burton and Garran Hall. In order to assist the academic learning of our college, we brainstormed what were our initial expectations for university. We have since used those ideas to create academic speaker series, learning communities, study groups, language tables etc. The ideas are presented here:



TUTORIAL TICKET

Thursday 22 July 2010

In 100 words or less give an example of an issue that involves great complexity from the academic area you intellectually most identify with and the insights this academic area has to offer in understanding this issue.

Criminal Law is an example of a complex issue. Law as an academic area offers an insight into what constitutes a 'crime'; and puts into practice theoretical definitions of 'offences' It also provides the framework under which 'criminals' are dealt with; creating consequences for their actions. Criminal law considers the procedural requirements that need to be in place to deal with this multifaceted area, including police powers, laws governing was evidence is admissible and who bears the burden of proving who is right.

WICKED PROBLEMS

WEEK 2

"I'm wicked through and through"
~ Wicked (The Musical)

REFLECTIONS

Reflections – Panel

This lecture was important to me, as I was curious as to why complex thinking is so vital to our education? Steven identified the key issues; that ignorance is unhelpful and human progression relies on us taking analysis to the next level. I believe the approaches discussed will provide a good base for the rest of the course.

I think Geoff's session was really useful, and I really liked the way he engaged people without picking on them – like when he said 'someone in this area give me an answer'.) It made me I reflect on ways I would run my own tutorial (discussed bellow):

Reflections – Tutorial

The activity that involved defining key terms from the preliminary readings proved more difficult than I thought, it brought to light the idea that concepts are often hard to pinpoint. I later reflected that this could be extended to complex problems in general - the nature of them means that they are hard to define (which is what was suggested by the wicked problem reading).

Again, I thought about ways I would facilitate my own tutorial. I think the course themes lend themselves to some debating activities, like stakeholder analysis and creating a debating argument (which involves creating multi-layered analysis) linked to complexity through the casual layered analysis approach. See bellow:

Assertion: That all people should pay taxes	**WHY?**
Level 1: Because people need to give back	**WHY?**
Level 2: Because we live in a civil society, that is premised on giving back from the society you benefit from	**WHY?**
Level 3: Because that is the only way to have a functional society that promotes less crime, is better off economics and higher education	**WHY?**
Level 4: Because the Government is the only way to do that, because it's role is on distributing money and protecting individuals. The market can't do that because it's only focus is making money	

Question

"Do you think theories of complexity are in fact intuitive?"

I get this idea from the Black Swan reading in particular which suggests that just because it never happens in the past does not mean it is not possible. I think it is important to identify the ideas behind these theories, and it is my initial reaction that they are actually quite innate (as children we question almost everything, and believe impossibilities), but have been eroded by societal expectations.

CONNECTIONS

It seems pointless to connect the ideas presented this week with the overall theme *unraveling complexity* (when this was essentially the actual topic). Rather, it is more useful to draw connections between what I learnt today about complex problems and my discipline.

The Law as a Complex System

The law is an excellent example of a complex problem as it is characterized by many stakeholders (i.e. government, judiciary, civil society, police force, criminals, victims etc) who have differing desired outcomes.

This forces me to ask myself whether we have achieved a model of justice that balances all these competing interests? Arguably, evidentiary loopholes that allow criminals to walk free, the high proportion of aboriginals in our jails and even the new terrorism laws suggest we have not got the balance perfect quite yet.

However, it is not enough to simply identity faults, you have to try and consider the solution to – the course title suggests that I should be unraveling complexity not just identifying it. To do this I have to decipher what the problem actually is. This is difficult; I can identify them on a micro level, but as a whole pointing the fault in our justice system is difficult – beyond the naïve assertion that it does not always get things right.

This makes me think me think of the 'Typology of Problems' table used in today's tutorial, which denotes that in the most 'wicked' of problems neither the solution or problem is known, and there are multiple parties conflicting in values and interests.

TUTORIAL TICKET

Thursday 29 August 2010

Preliminary Reading 1: Melanie Mitchell – A Guided tour of Complexity
This looks a way to understand and tackle complexity. It does this through the view of science but acknowledges that it can be drawn on across all disciplines. I found it quite anecdotal at times, but that made it a more appealing read.

I think what is most interesting about Melanie's book is the idea she raises that it is changing the way we view living systems. It seems that the study of complexity is something quite new and it makes me consider whether reoccurring world problems will be solved more effectively with a generation who have been taught to think through levels of complexity. I think this course provides us with a unique skill.

Wicked Problems
It presents the concept of 'wicked problems', which is essentially a problem that has so immediate or ultimate solution, are unique, can be considered a symptom of another problem, can be explained in many ways, has no opportunity to learn from trial and error and can occur in almost every discipline.

The thing I took away most from the Wicked Problem reading was the firstly the 'idea' of them, that there is a category for problems such as this and they are in fact measured and identified.

Secondly, the typology of problems table, which presented a means by which to classify your wicked problem. However in trying to use I was presented with some difficulty. I found that there was often overlap between levels 2 and 3 of the diversity section, as often parties with conflicting values/interest ALSO often only have some of the relevant knowledge.

Black Swan
This deals uncertainty as a consequence for complexity, that when you study complexity you are forced to deal with uncertainties. The example of the black swan is that people did not think black swans existed because they had only ever see white swan, so they were adamant that such a creature could never occur. The fact was that they did.

Essentially, when unraveling complex problem be aware of the unexpected. Don't reply on the past to determine the future.

N.B: This makes me think of the Alice in Wonderland (Lewis Carol) Quote:

Alice laughed. "There's no use trying" she said "one can't believe impossible things"

"I daresay you haven't had much practice" said the Queen. "When I was your age I always did it for half-an-hour a day. Why sometimes I believed as many as six impossible things before breakfast"

ENGINEERING

WEEK 3

"A scientist discovers that which exists. An engineer creates that which never was."
~ Theodore von Karman

REFLECTIONS

Reflections – Panel

I was initially overwhelmed by the information being presented at me, particularly the idea of modeling and using 'classes', 'associations' and 'multiplicities'. However what I took away is the inter-disciplinary nature of engineering and how it is a tool to solve any problem. The example being most discussed was the Climate Change problem and role of geo-engineering in the future.

Reflections – Tutorial

The tutorial focused comprehending of Engineering as a whole, and particularly looking at the individual approaches taken, e.g. the bottom up approach, modularity etc. I thing would I took most away from this tutorial was an understanding of tools that I can use to unravel future weeks' case studies. It also taught me to consider the way I approach problems, i.e. the idea of macro/micro understandings.

Question

"Were engineers involved at all in dealing with the financial crisis"
As we discussed that engineering assists in unraveling the complexities of all fields. It seems that one of the biggest complexities of recent times was the financial crisis; it would be interesting to see whether anyone considered Engineers as able to assist. I think this is particularly important in the context of "will it happen again?" when engineers work in systems and identifying parts of the system that don't work.

CONNECTIONS

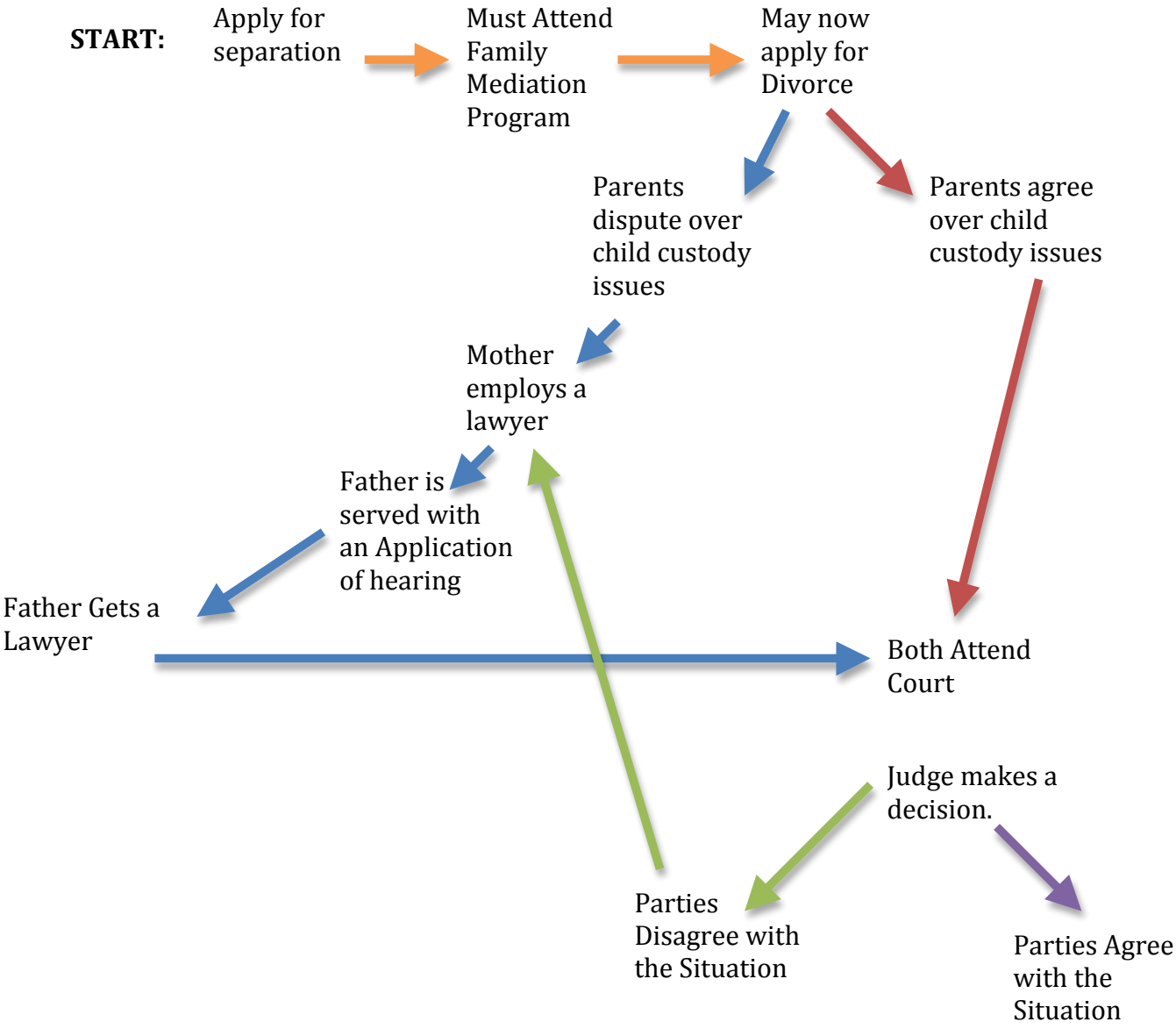
With Unraveling Complexities

I saw engineering as proving me with the tools and concepts to unravel and deal with complex problems. Systems engineering was in fact designed to assist

in “comprehending and managing complexity”. Hence better connections come from applying those tools:

With the Law

An example of a complex system is applying for a divorce when there are children involve. However the process becomes more manageable if you systematically engineer it. When the system is viewed as a method (which is what system engineering aims to do, it not only becomes easier to follow, but also easier to isolate sections where faults occur.



TUTORIAL TICKET

Thursday August 5 2010

Reading One: Engineering

Engineering is the combination of science and creativity. It uses systems and formulas to create concepts and physical things (like machinery). There are subdivisions within the discipline, for example computer engineering.

It is interlinked with other disciplines, for instance Art with the use of methods and formulations in Architecture and design, in Medicine with the chemical makeup of medicine.

In thinking about my discipline, the law uses engineering methodology to create the legal structures such as court hierarchies and legislative processes.

Reading Two: Systems Engineering

This is an interdisciplinary approach to Engineering and is basically the idea that complex projects should be designed and managed. The aim is to formalize approaches and in doing so be able to better the approaches.

I think this is particularly relevant to my discipline as we have many legal processes, e.g. setting the bar, applying for a court order, applying for bail, interpreting the constitution, all of which could benefit from systems engineering in review. Perhaps when parliament reviews laws they should systematically engineer as a way of identifying the key fault areas?

Reading Three: Small World Scale-Free and Beyond

The way I understand it is that when looking at a complex problem, one approach is to take each individual underlying principle and analyze it by itself. I think this links with the definition of collective in the Melanie Mitchell reading last week – individual parts which together can perform complex systems.

Reading Four: Software Development Models

There are many models aimed at streamlining the development process, you choose what is most appropriate to each set project. Here are two:

1) Waterfall Development: a process with 6 phases that must be followed rigidly, I'm unaware of it's exact benefits – arguably that it is very thorough??
2) Spiral Development Model: It is focused on risk analysis, my understanding is there are four parts. My understanding is that you need to pass out four parts of each stage of the process before you can move onto the next.

Reading Five: Top Down & Bottom Up

The Top Down approach involves breaking down a system, to it's individual parts. mu understanding at this time is that it is the same as what was discussed in reading three (but I could be wrong as Engineering confuses me a little).

Bottom up involves using each individual piece to build the bigger picture. Using individuals systems that are linked to view it in it's entirety. Often referred to as the seed model because it starts small and grows in to something big.

Reading Six: Separation of Concerns
This involves separating each part of a program into distinct groups that over lap as minimally as possible. The goal of it is to create system in which parts have optimal functionality independently of other parts. the idea behind it is that it is easier to understand and the failure of one system does not mean the failure of another.

I think of this in terms of the provisions of services and Victorian Gas Crisis of 1999, if the all systems of energy were not developed by separation of concerns then people would have had not access to power. Rather the effects were limited to gas alone and people could still get heating through things like electricity and solar energy.

Reading Seven: You Tube
This is pretty interesting. I think it comes down to a new concept of modularity, which recognizes that there is a need for modules to group together as opposed to the traditional separation of concerns formula. It is nuanced and possibly better because it focuses on relationships between things rather than the things themselves.

Often Separation of Concerns can be ineffective and inflexible, and would be better solved by recognizing the overlap and working with it.

COLLAPSE OF EMPIRES

WEEK 4

"Ideas have unhinged the gates of empires"
~ Paul Harrish

REFLECTIONS

Reflections – Panel

I learnt the importance of recognizing that history is characterized by a series of stakeholders with competing interests; consequently one event can have many explanations. (As demonstrated by the "210 reasons for the collapse of the Roman Empire" slide). It brought to light how multifaceted history is and how often we have to question what we are taught as 'facts'. This was extended on in the Jenkins reading, which expressed the concept that you may have one past but many histories.

Reflections – Tutorial

The tutorial was broken into two parts - collapse & resilience. We also drew links with complexity, which I reflect and extend on below. I was most intrigued by the activity we did on protecting empires from collapse. I now wonder whether the ideas we developed (re. saving the aboriginal empire from collapse) are practically achievable, and whether the Australian Government has even considered the concept that a Aboriginal Empire could collapse?

Question

"Do you think that history studies university students should have to do a unit on the ideas we were presented today?"
I think this question is important, as I was forced to reconsider a lot of my own thoughts about history today and I would think that those who study it at a higher level should be exposed to that too. Especially if they end up recording history, they have to recognize that are one piece of an extended puzzle.

CONNECTIONS

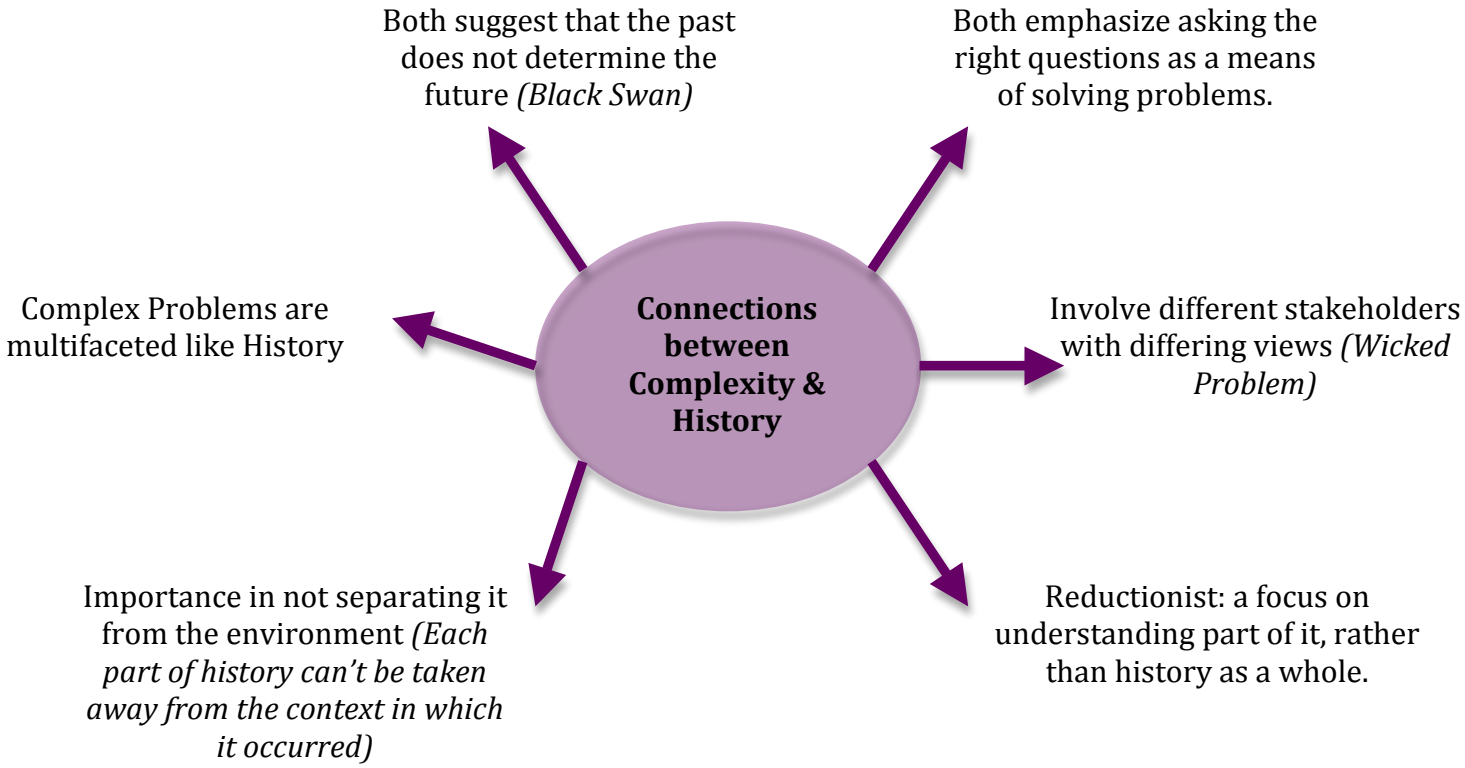
With Contemporary Issues

This week's case study made me consider the National Curriculum Debate, and the issues they have had surrounding the history component. I remember reading about the controversy over what all Australian children would learn as what happened in our past, and particularly the stolen generation. At the time, I didn't largely see the issue, thinking surely children should just learn the facts. But I had never considered what about the differing reasons for the facts? Just

like the explanations for the collapse of the Roman Empire, the reasons for the stolen generation would vary immensely.

With Unraveling Complexity

As presented via mind-map:



TUTORIAL TICKET

Thursday 12 August 2010

Write down at least 3 key points from Kennedy and Black on how histories are written and links between these points and unraveling complexity.

1. Kennedy draws on the idea that history is ultimately multifaceted, and while it seems that much can be retraced to economic ongoings it does not determine every event or is the sole reason for success and failure. *This links with 'unraveling complexities in the way that complex problem require you not to simply look for one solution, or blame an even on one part – bur rather understand that there are many aspects at play in creating the 'complexity'.*
2. Kennedy also says that in telling history it seems that people want more detail, more background in order to have a greater understanding. *In unraveling complexities it is my opinion that having greater information, greater background and more details allows you to grapy with complex problems at a higher level and have a greater likelihood of understanding them.*
3. Kennedy's text also alludes to the fact that time can go on and people can overlook one piece of the puzzle. I.e. people had written about history for decades yet no-one had provided the economic analysis his text provides. *This links with unraveling complexity because it shows that even when you think you have worked out all the parts of the complex problems, or all the subsections of the issue – the likelihood is that you have missed something that someone with a different mind would be able to provide.*

Based on your reading of Pomeranz (2005), state 2 contemporary systems/ societies that could be termed empires, with reasons.

1. I think that 'European Union' as an entity could almost be described as an empire, as it exerts influence on all many nations states and control them in different ways. It is selective in who is part of the empire (see the Turkey issue for e.g.) and continues to grow more and more powerful. It is different from traditional empires in the sense it is not one country taking over more – but if you view the EU as separate from each individual country – as it has distinct goals and views then it could arguably be an empire.
2. Similarly (thinking outside the square a little) corporations that continue to grow and expand across the world could be considered an empire, MacDonalds being the most obvious example of this. Again, Macdonalds adapts to different countries and rules each nation a little differently (e.g. Bachi McFlurrys in Italy). The article spoke about the US's military efforts an empire building, but the export of culture could also be brought under the definition of an empire.
3. N.B: If were thinking 'empire' in the traditional sense of the word; debatably China could be regarded as an empire encompassing Tiwan.

DEVELOPMENT

WEEK 5

"All that is valuable in society depends upon the opportunity for development accorded the individual"
~ Albert Einstein

REFLECTIONS

Reflections – Panel

The part that most interests me was the case study on Vietnam and the idea that the increase in living standards is highly dependent on individual choices. Having lived in Vietnam on and off for the 8 years, I was able to reflect on how that is mirrored on the streets of Vietnam.

I also found the challenges of global governance in development interesting. I think this is best shown Climate Change where the interconnectedness (as defined in the Berkes article) of non-equal players adds to the complexity.

Reflections – Tutorial

Today we focused first on what development is, the differing ideas people have about what aspect is most important and secondly the consequences 'complexity theory' has for development. I think the question of what aspect is most important requires a multi-layered analysis (which I discuss bellow). I was most engaged by the debate on whether Aus aid should adopt complexity theory; I've thematically summarized the issues bellow:

Theme	For Complexity	Against Complexity
1. Is the status quo acceptable?	• No, there is always room for improvement, and complexity is only way to get to hart of the problems. • It only fixes short-term not long term.	• Yes, all surveys suggest they are doing the right thing. • If they change tactics it may hurt the efforts already made.
2. Practicalities	• It's better for company in long term – can use on all projects. • It's about the	• Too many, it will cost a lot to implement. • Doesn't have time or money to do.

	principle and not the practicalities.	
3. What will be better for PNG?	• Need to ask question to create sustainability • It's better economically in long-run	• Short term wins produces immediate results for your money.

Question

"What impact is the 'micro-credit scheme' having in Vietnam?"
At a Legal Education Forum conducted by Aus-aid I attended over the winter break I was shown a video on the benefit on micro-loans, and have since been curious as to the actual assistance they are having. I think it is important as theoretically the concept could have a huge impact on developing sustainable economies.

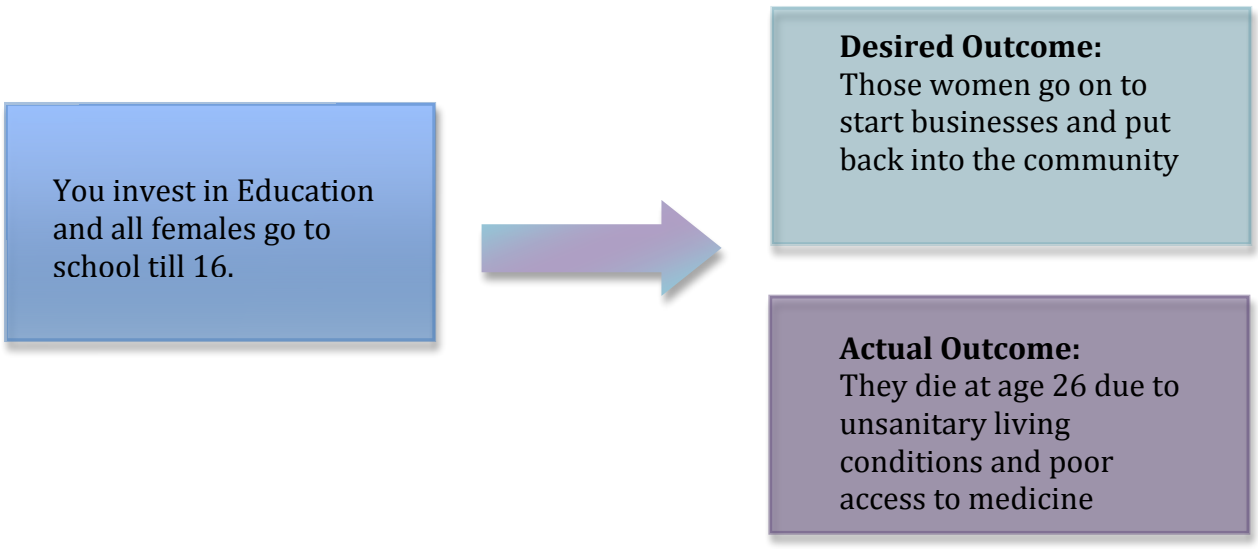
CONNECTIONS

With Unraveling Complexity

It best links with the idea you cannot remove a complex problem from its environment. Each developing country has it's own idiosyncrasies and the 'development' formula you use to success in one case, may fail in another.

Beyond Academia

I connected the discussion of preferencing one area of development with a debate I have done regularly: *"That we would support democracy over development".* While the tutorial clearly stood for the development it still required you to consider why one part of advancement should be preferenced over another. I supported health because everything else is premised on it. Simply put:



TUTORIAL TICKET

Thursday 19 August 2010

Part 1

What you think is the most important aspect of development?

I think it is difficult to distinguish was aspect of development which should be preference above others. However if I were forced to choose one I would argue for healthcare and more hygienic living standards. The reason for this is that all other areas of development are premised on people being alive and well to benefit from a development in trade, democracy, education etc. They will not be alive to benefit from this development without an investment in healthcare and medicine first. For instance, you may achieve development by ensuring that every female in a village stays in school until they are 18. Yet the flow-on effect that investment should produce (more money going into the country's economy as more people work/create businesses etc), is cut short by the fact that many of those females will die not long after they finish their education, if not before, because of poor hygiene, insufficient access to medicines, unsanitary living conditions etc.

Case Study

How do you think our Government understands 'development'?

I think our Australian Government sees it as a 'favor' we are doing. I get the impression from the reading that it is not an obligation, but rather something we should be "given a pat on the back for". I get this understanding from the tone of the article, for instance the prominent display of how much we are spending on it (i.e. the reading). I think this question is interesting to consider in regards to the Wicked Problems' Graph in week 2, as this seems a situation where there is a variety of different stakeholders with conflicting values. As I am sure how Australia views development would be different from the people of PNG themselves.

Part 2

Article 1: What are some limitations of the methods of development?

One limitation is that you cannot plan to develop a society. People's interactions need to be organic and you cannot predict whatever person will do. the other aspect is that often you want to save people, e.g. by giving them food, however you prevent the natural processes they would have to go through to make it themselves that allow them to develop into a developed country. For instance, not allowing them to sell food off for commercial gain.

Article 2: Did it bring any new thoughts to how you consider development? What might be some of the challenges involved in using complexity theory to address development issues?

N.B: (The file was corrupt – and didn't open). But I read the abstract – and implied the rest.

It made me consider development in regards to dealing with unexpected consequences. To explain, in science we look for patterns and thinks that have happened in the past (like last week in Empires), and so the idea is that we should do the same thing with development. Every country needed to develop at one stage or another, so there is an idea to use already proved models and put them in a new context (i.e. a different country) as a method of development. I think the problems

associated with this is that we often cant predict that future by just looking at the past. often when we are working with human nature the idea of predicable outputs does not always work.

CONNECTING BEYOND THE CLASSROOM:
A RELEVANT SEMINAR

Legal Education Forum – Development

Australian Law Students Conference, Adelaide, July 2010

I spoke above about attending a seminar on development over July, I think this obviously linked with the this weeks themes. In reflecting back on what I heard, the presentation did not reflect complexity theories. I think the presentation could have benefit from asking more questions, and understanding that different stakeholders can have different views.

Further there was little said on the topic of 'uncertainty', despite it being a major part of development. When dealing with human behavior, there are a multitude of extraneous variables (how people react, how they interact etc) and so uncertainty will always be a key player.

The seminar I saw focused primarily on; 'here is the problem and now here is the solution.' Having now studied 5 weeks of complexity I consider whether what they had identified as the problem ('Global Poverty' – as they put it) was in fact systematic of another problem. And that the solution (the millennium goals) is actually viable when it enforces the same goals on every developing nation despite their idiosyncrasies.

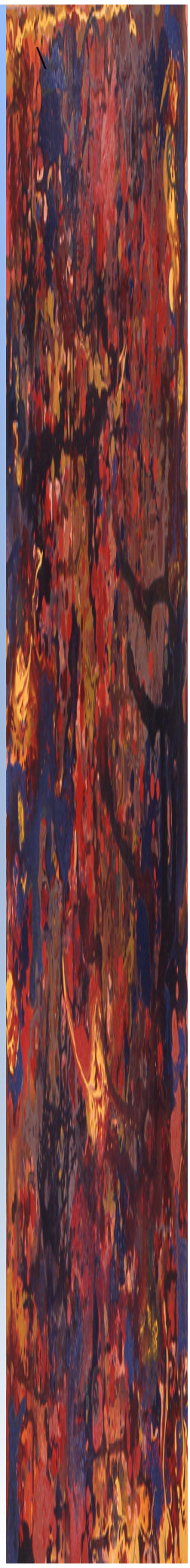
Burton & Garran Hall Speaker Series – Wicked Science

Burton & Garran Hall, ANU, August 2010

Here I herd from Pof. J Licinio MD & Dr. J Hope. I particularly liked the work of Dr hope who focused in things like atom lasers, quantum physics, teleportation, time travel, space travel etc.

I connected it by thinking about what we learnt in Week 3 Engineering about creating a system/formula and then applying it to create. I think the two are very interlinked, as I can imagine that something like space travel would require a streamline of processes and modeling to ensure that it is done right.

Complexity theory uses the tools created by Engineers to comprehend ideas that can be difficult to warp your head around. Ii think this connects well with Dr Hope's work as I found time travel difficult to wrap my head around and considered whether it would be easier if I were able to systematically engineer the concept!



The picture used throughout my Learning Portfolio is entitled "Molecular Complexity" and was painted by Dean J Sweatt; a neuroscientist and painter. It represents the complex natures of cells he sees everyday through his microscope. I feel it was apt to this Learning Portfolio as not only is it a display of a complexity, but it also uses a cross discipline approach (which is the focus of this course).