

# LEGAL EDUCATION

## Chaos theory and an Active Legal Education

Perhaps the best recognised manifestation of chaos theory is the Mandelbrot set, the brilliantly colourful, intensely detailed magnification of images that demonstrates the infinite process of repetitive patterns in nature. Chaos theory is about complexity derived from simplicity. It is about non-linear systems, about systems that develop wildly, randomly, but ultimately with a recognisable although eternally unpredictable pattern.<sup>1</sup>

Chaos theory's great challenge to traditional science and mathematics is the suggestion that complexity cannot be given order by reference only to theories and hypothetical propositions. Sense can only be made of scientific and natural phenomena if those phenomena are watched, used, and played with; they must be taken, toyed with, and subjected to trial and error until there is a tangible appreciation of the endless permutations and combinations of any set of variables.

The lesson is that while academic reasoning has pushed relentlessly towards comfortable and definitive solutions, the truth lies in insoluble, infinite possibilities. When experimentation has led to a definitive answer, it is in fact only a best approximation; the truth is that, in practice, a theory will always vary in its application or result.

In a seminal work in the development of chaos theory, Robert May wrote: 'it may be observed that in the chaotic regime, arbitrarily close initial conditions can lead to trajectories which, after a sufficiently long time, diverge widely. This means that, even if we have a simple model in which all the parameters are determined exactly, long-term prediction is nevertheless impossible.'<sup>2</sup>

Chaos theory says simply that the world is very, very complicated, and can only be understood if proper account is taken of the endless complexity of human and natural interaction.

### Unpredictability in science

Chaos theory does not suggest that this understanding is achieved only by

empirical method; clearly there must be a synthesis of theory and practice. In science the development of this theory/practice method of inquiry began with Aristotelian natural philosophy, based principally on inductive reasoning from observed phenomena. After holding the pre-eminent position in scientific reasoning for centuries, this approach eventually gave way to Galilean *a priori* epistemology which heralded a new fusion of theory and practice.

Galileo, however, failed to appreciate that practice, by way of experimentation, can only in part bear out a theory; inevitable, uncontrollable and unpredictable variables were not accepted as a feature of experimentation until the development of chaos theory. When Galileo's experiments did not precisely reflect his theories he disregarded the error and maintained that 'near enough was good enough'. So anxious was he to provide a coherent all-embracing mathematical interpretation of the natural world, he was not open to the possibility that even the most minor departure of practice from theory could represent the true, if chaotic, state of affairs.

Scientists ever since have been fitting round pegs into holes that are fractionally and minutely not round, but they have seen this failure of fact to match theory only as a reflection of their limited command of the practice environment. They have generally not seen the divergence of practice from theory as an indication of the truth that there is no predicting, with absolute precision, how a thing may happen.

### Unpredictability in law

Lawyers, in fact, are infamous for relying on this very uncertainty when asked to comment on the likely outcome of a case: 'Well, it depends; hard to say really; we'll just have to see'. Lawyers are familiar enough with the uncertainty of law in practice, particularly with the way a court may adopt or adapt a particular rule of law. But lawyers don't understand the extent of this unpredictability until they have seen it, worked with it, suffered (and profited) from it. Unpredictability is a phenomenon of the *application*, not of the theory, of law.

### Teaching unpredictability

Is the notion of unpredictability antithetical to the teaching of 'rules' of law? Can the unpredictable applicability, or the predictable inapplicability, of legal rules be taught? Can the flexible, circumstantial, unreliable 'non-linear' nature of legal rules be taught?

Let's look again at the revelation of chaos theory. While I find much of Robert May's article on chaos theory incomprehensible, I understand enough of his general approach to be attracted by his claim that chaos theory should change not only the way physics is taught, but the way all systems defined by reference to rules ought to be taught. May made 'an evangelical plea for the introduction of . . . difference equations into elementary mathematics courses, so that students' intuition may be enriched by seeing the wild things that simple non-linear equations can do' (May, p.459). But he also noted that 'non-linear systems are surely the rule, not the exception, *outside* the physical sciences' (emphasis added) (May, p.467). 'Not only in research, but also in the everyday world of politics and economics, we would all be better off if more people realised that simple non-linear systems do not necessarily possess simple dynamical properties' (May, p.467).

Law as much as politics and economics is part of the 'everyday world', the world outside the physical sciences. Can law teachers do with their students as May called on physics teachers to do with theirs (May, p.467): introduce them to the bizarre behaviour of non-linear systems in their early education?

### Why bother

Some may prefer to ask not 'can it be taught in legal education?' but 'why should it be?'

It should be for just the same reason that it should be done in science and in every other discipline that manifests in the structure, functioning and operation of society. The genesis and the relevance of legal rules is the activity of people in society; to divorce theory from practice is to pursue a sterile

course of reasoning that is secure only in the comfort generated by its own parameters.

A theory of practice is an ever developing, changing thing: a rule is challenging and challenged when it is tested in practice. Ultimately, a rule or theory, subjected to the unpredictable rigours of practical application, is better understood.

Law cannot be handled in a classroom as mathematics can be handled on a calculator. Law's medium is society and the people who live in it; the application of law is available to law students only through the actual or simulated practice of law. This is not a plea for the teaching of 'practical' law or 'relevant' law for its own sake; teaching the practice of law is a different matter altogether. Nor am I proselytising for a critical legal studies approach. I am content that there are legal practices and rules, and that they do by and large provide a predictable framework for the operation of our legal system.

What I am looking to is the unpredictable complexity of the operation of those practices and rules, the endless permutations of a known set of variables operating in unknown circumstances. If abstract principles of law are to be understood for any purpose other than regurgitating them

in an exam, then they must be given a context: the social context from which they derive, for which they exist, and by which their utility and validity is judged.

### How it might be done?

Law is often taught in context; the question is one of method and degree. Perhaps most commonly, legal rules and their application are demonstrated by hypotheticals: *if A lends to B and C provides security for the loan . . .* These hypotheticals are invariably neutral, the 'simple model in which all the parameters are determined exactly' (May, p.466) that May challenges in his article on chaos theory. They provide no real context, but are merely demonstrative.

A simple means of giving the hypothetical some relevance, and thereby enhancing students' learning, is to recast it in real terms: *if the State Bank lends to the proprietor of a small business and the proprietor's mother provides security for the loan. . .* This is still short of introducing the non-linear variables of the actual operation of law, but it's closer. It creates a more active classroom. It prompts the student to see the legal rule as having relevance to the operation of the world; the student is then able more easily to introduce her own experience and knowledge into her

learning, taking a more analytical approach and creating a more active teaching process.

A fuller discussion of this approach to teaching moves from hypotheticals to problem solving, simulated exercises and finally to clinical method. It is clinical method that gives students the best comprehension of the dynamism and utility of law, precisely because it requires students to deal with 'the everyday world [where] simple non-linear systems do not necessarily possess simple dynamical properties' (May, p.467). Nevertheless, any teaching method that involves students in the dynamism and relevance of legal rules will lead them to a more intelligent and sophisticated comprehension of law.

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### References

1. See generally, Mowatt, J., 'The Erratic Pulse', (1994) 19(3) *Alt.LJ* 122.
2. May, R.M., 'Simple, Mathematical Models with Very Complicated Dynamics', (1975) 261 *Nature* 459 at 466.

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