

# Learning At The Edge Of Chaos<sup>\*</sup>

Paul Kleiman<sup>†</sup>

<sup>†</sup>Higher Education Academy, UK

## Abstract

In June 2011, in the UK, the government's 'White Paper' on the future of higher education in England was published (BIS 2011). At its heart is a paradigm shift from a largely publicly funded system to a privately funded system via significant increases in student fees. So, what might we do, in higher education, in our attempts to negotiate our way through what many find to be an unfamiliar, discomfoting, increasingly complex landscape? This paper argues that one of the things we might usefully do is to strive to understand the complex and often chaotic nature of what confronts us. In their most recent annual survey of 1500 CEOs in 60 countries, IBM (2010) found a significant change in what those CEOs considered to be the greatest challenges and the qualities they valued most highly. For the first time, those CEOs now saw *dealing with and managing complexity* as their greatest challenge, and they identified three factors that might provide them with the best opportunity to capitalise on that complexity: creativity, operational dexterity and reinventing customer relationships or 'developing customer intimacy'. However, one is unlikely to see 'developing student intimacy' in any of our institutional mission statements.

*This article, with some additional material, is based on a keynote address presented at the AISHE Annual Conference 2010, Dublin.*

---

\* Invited article. URL: <http://ojs.aishe.org/index.php/aishe-j/article/view/62>

## 1. Introduction

We live in a time of chaos, as rich in the potential for disaster as for new possibilities.

*Margaret Wheatley (2006, p.ix)*

It is perhaps an understatement to say that, in relation to higher education, we are living in interesting times. The original “May he live in interesting times” is often cited as an ancient Chinese curse, though most Chinese scholars will not recognise the 'curse' as Chinese, because if it is of Chinese origin, it has somehow escaped mention in all of the ancient Chinese literature. However there is a Chinese proverb, 'It's better to be a dog in a peaceful time than be a man in a chaotic period' that also has some resonance in these times.

This piece is written during a period of particularly momentous upheavals. Once again, following the international banking crisis of 2008-9, we face a series of national and possibly international economic crises. The impacts of these various crises, and the effects of the various actions taken to deal with them, are felt everywhere, and higher education systems are not immune. The shapes and forms of higher education are being severely shaken and stirred as the tectonic plates upon which they have been built shift dramatically beneath them.

In June 2011, in the UK, the government's 'White Paper' on the future of higher education in England was published (BIS 2011). The paper is a direct response to the enquiry led by Lord Browne (2010) which heralded a transformation in the way UK higher education is funded. At its heart is a paradigm shift from a largely publicly funded system to a privately funded system via significant increases in student fees in pursuit of ensuring a sustainable (and affordable – by Government) system.

The shift to the student taking the primary financial responsibility is accompanied by a strong focus on the 'student as customer and consumer' and the need for institutions to regard them and respond to them as such.

Possibly the single most radical recommendation in Browne's report, and one that was immediately accepted by the Government, was the almost complete withdrawal of the government's annual block grant of c. £3.9 billion that supported and underwrote teaching. What public money for teaching remained in the system was to be focused on the 'STEM' subjects (Science, Technology, Engineering, Medicine) resulting in the complete removal of the teaching grant for the arts humanities and social sciences.

Stefan Collini (2010), in a widely read and circulated article in the London Review of Books that provoked a ministerial response, stated: “This is more than simply a 'cut', even a draconian one: it signals a redefinition of higher education and the retreat of the state from financial responsibility for it” (p. 23).

In that article, Collini went on to say (p. 23):

Essentially, Browne is contending that we should no longer think of higher education as the provision of a public good, articulated through educational judgment and largely financed by public funds (in recent years supplemented by a relatively small fee element). Instead, we should think of it as a lightly regulated market in which consumer demand, in the form of student choice, is sovereign in determining what is offered by service providers (i.e. universities).

So, what might we do, in higher education, in response to what Wes Streeting, the former President of the UK's National Union of Students, recently called "the introduction of market chaos"<sup>1</sup>, and in our attempts to negotiate our way through what many find to be an unfamiliar, discomfoting, increasingly complex landscape?

The use of the word 'might' in the question above is intentional. The eminent drama teacher and educationalist Dorothy Heathcote used to say that the most important word in education is the word 'might'. Demand of a child 'What *is* the answer to this question or problem?' and it closes down the possibilities. But ask 'What *might* be the answer?' and it opens up those possibilities, and encourages curiosity, creativity and creative approaches to problem-solving.

One of the things we might usefully do, and which those who make and decide educational policy are frequently criticised for signally failing to do, is to strive to understand the complex and often chaotic nature of what confronts us. In their most recent annual survey of 1500 CEOs from a range of companies and organisations (including higher education) in 60 countries, IBM (2010) found a significant change in what those CEOs considered to be the greatest challenges and the qualities they valued most highly. In all the previous annual surveys, the greatest challenge was perceived as 'coping with change'. But, for the first time, those CEOs now saw dealing with and managing complexity as their greatest challenge, and they identified three factors that might provide them with the best opportunity to capitalise on that complexity: creativity, operational dexterity and – echoing the increased focus in higher education on the student as customer and consumer – reinventing customer relationships or 'developing customer intimacy'. However, one is unlikely to see 'developing student intimacy' in any of our institutional mission statements.

---

1 Panel discussion at the Higher Education Academy Annual Conference, Nottingham, UK, 6<sup>th</sup> July 2011.

## 2. Complexity

The IBM survey identifies complexity as the greatest challenge facing organisations, and there has been a growing interest in how the theories and models that derive from Complexity Theory and Chaos Theory may help us to understand better what is happening to and inside our systems of higher education.

Complexity theory is a theory of change, evolution and adaptation, often in the interests of survival. It signifies a complete break with the traditional linear, positivist, computational paradigm that has been the dominant scientific paradigm for c. 300 years. That paradigm, as Jonassen et al. (1997) describe, is one in which educational systems are understood as, essentially, closed systems which are the sum of their parts (learners, curriculum, technology, teachers, etc.). The performance of the whole system can be regulated by controlling these parts, with the objective of achieving a state of equilibrium. Knowledge, in this paradigm, is perceived as an external, quantifiable object that can be transmitted to and acquired by learners, and in which the “effectiveness of educational systems is a function of the effectiveness and efficiency of the transmission process” (Jonassen et al. 1997).

It can be argued that it is a paradigm that has, to a large extent, served us well, and that our educational systems are doing a better job than ever at what they were designed to do. However, what is required now and for the likely future is for our educational systems to do things they were *not* designed to do.

Complexity severs any link with straightforward cause-and-effect models, linear predictability, and reductionist, atomistic, mechanistic, analytically fragmented approaches to understanding phenomena such as learning and teaching. It replaces them with organic, non-linear and holistic approaches, in which the *relations* within interconnected networks – and the quality and dynamics of those relations and interconnections – are the key elements in the life-cycle of those phenomena (Morrison 2006; Wheatley 2006).

Central to complexity is the notion of the complex adaptive system, and educational systems – whether at the macro-level of national systems or at the micro-level of student-tutor interaction – exhibit many features of complex adaptive systems, “being dynamical and emergent, sometimes unpredictable, non-linear organizations operating in unpredictable and changing external environments” (Morrison 2006, p.3).

Complex adaptive systems, due to their dynamic and sometimes chaotic and random self-interaction, cannot be reduced to simple parts, which relate to each other in very predictable ways (Harshbarger 2007). This has some profound implications for the manner in which we might approach the planning and design of our programmes of learning

For example, if we accept that we are operating within a complex adaptive system, then it becomes clear that writing things like “*on completion of this module the student **will be able to** (a, b, c,....etc.)*” is really creating a hostage to unpredictability. But as that is the form of language that is expected and accepted by the validation and regulatory frameworks that we work within, that is what we write.

Recalling Dorothy Heathcote's sage advice, some of us *might* wish to write: "*on completion of this module the student might be able to do this, and they might be able to do that, and they might be able to create/produce/write about something really interesting that had not been considered*". But that, of course, would *normally* not get past a validation panel.

Like the word '*might*' the word '*normally*' is a similarly powerful word in education. There are instances where, often through a combination of will, confidence, and serendipity, an innovative pedagogic proposal manages to break through the standard customs and practices.

### 3. Off Balance Butterflies

There are a number of ideas and elements associated with complexity and, although they are all interconnected, there are two that I wish focus on in relation to education.

The first is the notion of disequilibrium and feedback, and the second is probably the most well-known notion linked with chaos and complexity in the popular imagination: the idea of the 'butterfly effect', or, to give it its proper term, 'sensitive dependence on initial conditions'. It is the idea that a small disturbance like the flapping of a butterfly's wings can induce enormous and unpredictable consequences elsewhere.

Complex adaptive systems, such as a learning/teaching situation, are like eco-systems: they are constantly changing and evolving, and their complexity means that the ability of human agents to control them in any meaningful, purposeful way is non-existent. Such systems are adaptive in that they are self-evolving, agile and, importantly, inherently unpredictable.

The evolution of a complex adaptive system is fostered by disequilibrium and feedback. Equilibrium is a condition in which all acting influences are cancelled by others, resulting in a stable, balanced, or unchanging system i.e. a system in stasis. This might lead one to believe that disequilibrium is a negative attribute. However, as Wheatley points out, "the search for organizational equilibrium is a sure path to institutional death, a road to zero trafficked by fearful people" (Wheatley 2006, p.76), and that to stay viable, open systems need to keep themselves off-balance, maintaining themselves in a state of non-equilibrium. A successful complex adaptive system frequently creates or deliberately seeks out feedback and information in the form of perturbances or disturbances that might threaten its stability and knock it off balance, thus producing the disequilibrium that is necessary for growth.

Such systems tend to 'self-organise' around changes, and small changes can have big impacts: the *butterfly effect*. So when we start tinkering – with the best possible motives, of course – at programme review time, with such things as module content, learning outcomes, assessment criteria etc., we may have little or no idea of the possible consequences, and it is highly likely that the requirement – in the search for certainty and agreement – to draw a definitive line of determination between any single action or change and its consequences will fail.

## 4. Between Stasis and Chaos

The diagram below illustrates the 'complexity continuum' between stasis and chaos. Based on the work of Ralph Stacey (Stacey et al. 2000) and Paul Tosey (2002) it illustrates how a system's search for, or need for, equilibrium in the form of certainty and agreement produces stasis. It also shows how the further one travels away from certainty and agreement, the nearer one approaches a state of chaos. Right on the 'edge of chaos' is an area I have called the 'zoo' or 'zone of optimal operation'. It is the point at which a system is poised just before it moves into an actual chaotic state and it is where "the components of a system never quite lock into place, and yet never quite dissolve into turbulence, either" (Waldrop 1992, p.293).

It is there, right on the edge of chaos, where creativity is most potent. It is also an area where levels of energy and emotion are high, where risk-taking, excitement and exhaustion co-exist in a ferment of activity. It is characterised by encounters with uncertainty, anxiety, doubt, chance, error and 'muddling through' (Stacey et al. 2000). Tosey describes it as:

*... like a good party; lively, lots of flowing conversations, and fun. A party in stasis would be safe, but probably boring and stilted; one in chaos might be thrillingly anarchic, or perhaps offensive or dangerous. In chaos, a system could self-organise into a higher level of complexity, with novel forms of relationship emerging, or it could disintegrate. (Tosey 2002, p.18)*

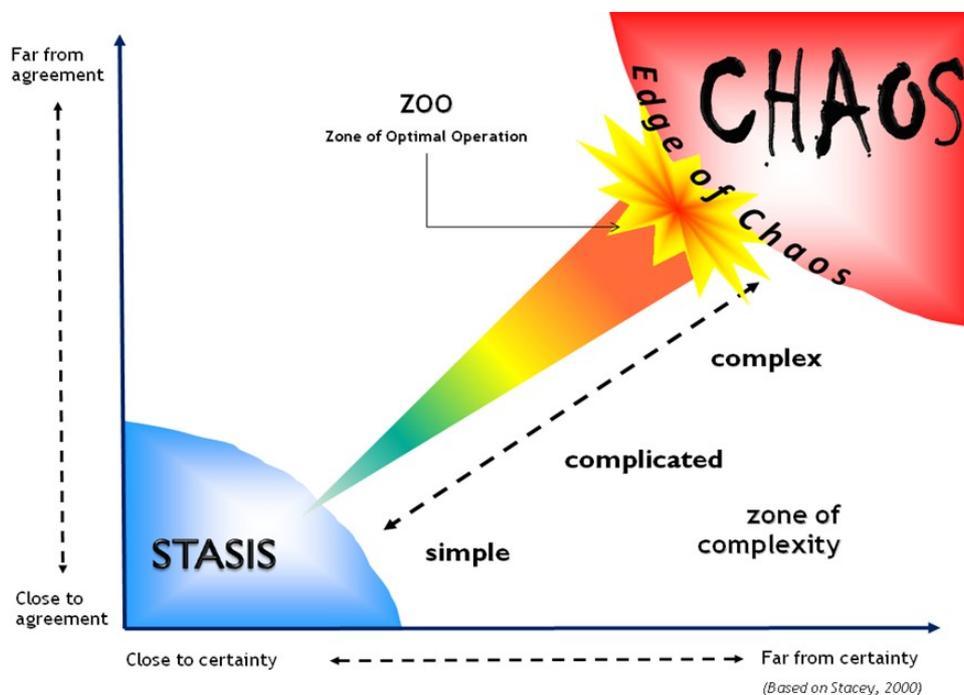


Figure 1

The problem, for higher education systems (as in many other systems), is that there is a constant 'gravitational pull' towards certainty and agreement: towards stasis. That pull exists at all levels, from the macro level of educational policy to the micro level of module learning outcomes, and it requires and takes up a lot energy to resist it. Working at the *edge of chaos* also requires and takes up a great deal of energy, and it is perhaps understandable that many colleagues choose, reluctantly, not to resist that gravitational pull towards certainty and agreement. Some earlier research into the conceptions and experience of creativity in higher education amongst university teachers (Kleiman 2008) found that a number of the lecturers interviewed (across a range of subject areas) perceived their pedagogic creativity to be constrained by the systems and environment in which they were working. A number also found that the practices and expectations of their own colleagues were significant inhibiting factors. As Trowler (HEA 2010, p.7) points out: "Universities are characterised by organised sets of social practices – recurrent patterns of behaviour that are 'engrooved' and quite difficult to change. Changes often falter and practices 'snap back' to old models".

So, at a time when there is a growing consensus that post-industrial economies will be increasingly based on creativity, and business leaders recognise that, in order to succeed, they need people in their companies and organisations who are able to operate successfully in highly complex and rapidly changing environments, some higher education systems appear to be irrevocably tied to models and paradigms of learning and teaching (and the systems that support them) that are designed for a far less complex, more stable, predictable world.

## 5. Time for a "C" Change?

Elizabeth Long Lingo and Stephen J. Tepper who, for a number of years, have been amongst those promoting the idea of the Creative Campus, identify a number of factors that may transform higher education. Though written from a US perspective, those factors are certainly present in the UK system, and may be present in other European HE systems.

The first is the 'business' or 'economic' case, and the demand for creativity and creative skills in order to stay competitive in the global economy. To do so we will need to draw on our ability

*... to tell stories, create visually compelling messages and designs, come up with new ways to organize and synthesize information, and invent programs and businesses to solve complicated social problems or tap emerging markets (Lingo & Steven J. Tepper 2010, p.2)*

The second factor they identify is that "students are arriving on campus brimming with creativity and curiosity...they are active learners and problem solvers who demand new ways of learning" (p. 3). Students are, frequently, creatively productive in a whole range of 'little c' activities outside and beyond the formal university environment (Pachucki et al. 2010). We need to develop innovative ways to enable, record and reflect on those creative activities in such a way that the students (and potential employers) can see that their accomplishments and successes have been achieved 'because of' rather than 'despite' their chosen courses of study.

The third factor is the escalating costs of higher education and the new competition from for-profit, private universities. One can add to that, particularly in the UK context, the significant shift from a largely publicly funded system to a privately funded system. Now, more than ever, the 'value' question is being asked of higher education. Lingo and Tepper (Lingo & Steven J. Tepper 2010, p.3) argue that "the notion of a creative campus—where students and faculty members work together, face to face, to solve problems, improvise, and experience new and non-routine ways of learning and engaging with each other" might well offer an effective 'antidote' to both the increasingly antiquated traditional university and what they call the 'Convenience College', and they observe that some institutions are "nibbling at the edges of this vision". Rather than a nibble, perhaps we need to take a large bite!

## 6. To Boldly Go

Alongside complexity and creativity, the report from IBM on the trends and challenges facing the leaders of companies and organisations identifies *operational dexterity* as a key factor in being able to operate successfully. It is also clear that the ability to move quickly and boldly is an attribute infrequently to be found in higher education institutions. They are rather like oil tankers: they carry precious cargo that is essential to the functioning of the world, but they are large and slow to turn, with a plethora of procedures and processes to go through before altering course.

Fortunately, higher education is full of intelligent, creative people who understand all too well – through their own day-to-day experience – that learning and teaching is complex and, sometimes, chaotic, and that the systems and processes that we create around that experience, or have created for us, are not always best suited to dealing with that complexity. It is also clear that the professional act of teaching with the still significant but also significantly decreasing autonomy attached to this role, provides fertile conditions for people to be creative in order to confront those complexities and to really enhance students' learning.

There are numerous examples of creative, bold, exciting initiatives in higher education learning and teaching that challenge the status quo (the equilibrium) and operate at or certainly head towards 'the edge of chaos'. But they frequently occur in isolation, and are not sufficiently supported or embedded. As Samuel Beckett wrote in *Waiting for Godot*: "the light gleams an instant, then it's night once more." (Beckett 1971, p.89)

One initiative, in particular, serves as an example. The UK's Higher Education Funding Council (HEFCE) funded a major, five-year scheme which established 81 Centres of Excellence in Teaching and Learning (CETL) in universities in England (74) and Northern Ireland (7). One, creative arts-focused CETL, was established in a highly-respected, research-intensive, 'traditional' university. The director of the CETL was brought in from outside academia: a bold move in itself, as she was relatively and refreshingly unencumbered by such things as history, precedence, protocol, etc. One of the major projects she initiated was the development of a pilot MA in interdisciplinary arts practice. The aims of the course were to explore and extend the boundaries of various arts disciplines, and all aspects of the course were designed to be innovative – the curriculum, the delivery, the assessment.

As with all courses, the proposal had to go through the university's validation processes, and there were intense discussions about what might or might not be acceptable, especially given the 'conservative' nature of the university. As it turned out, the director of the CETL stuck to her guns and, much to the surprise of some colleagues, the university validated a course which included a number of modules called '*Adventures*' and '*Further Adventures*' in which the course participants – a mixture of recent graduates and mature, part-time students – gathered on a Friday and worked intensively through the weekend on various experimental projects and exploratory assignments with artists, directors, film-makers, composers, etc.

The details of that initiative have been described elsewhere (Newell 2010), but there are two important lessons to be learnt in relation to this article. Firstly that, as academics working inside the system, we frequently censor or stop ourselves from challenging 'the system' i.e. "there's no point in trying to do 'x', as that'll never be approved". We have become immured in our own discourses and practises, and we've created a hall of mirrors in which each iteration of a course or programme reflects and replicates the previous one.

Secondly, and importantly, this course — and other similarly innovative and orthodoxy-challenging courses and projects (including a module where medical students created a devised piece of experimental dance theatre and received the same credit for it as their peers doing clinical electives) — ceased to operate at the same time as the CETL funding ended and is no longer available. However, its archive of work, the life-changing experiences of those who were involved in it, and the stories that surround it, are a testament to a bold, successful but short-lived experiment at the edge of chaos (CETL(NI): The Centre for Excellence in the Creative and Performing Arts, Queen's University Belfast<sup>2</sup>).

The above is just one example of the many and various initiatives that aim to place creativity at the centre of campus and academic life. However, the creative turn in higher education remains largely a series of ad hoc experiments.

If creativity is about change, transformation, and working at the edge of chaos then, in order to occur in a meaningful or sustainable way, it needs to become an intrinsic part of a larger complex adaptive system in which the people, the systems, the procedures, the processes, and the environment are, in that clichéd phrase, 'fit for purpose' or, better, 'fit for creative purpose'.

Paradoxically, the current economic crisis, and the tectonic shifts occurring in higher education may offer an opportunity – perhaps born out of necessity – to grab the creative, transformational bull by the horns and start developing, building and nurturing the people, systems and environment that help to really sustain a creative eco-system in higher education.

---

2 <http://www.qub.ac.uk/cecpa/>

So, finally, rather than concluding with a neat summation, I would like to end by posing some questions:

- What *might* we do to design and create knowledge enhancing and life enhancing learning experiences for our students and for ourselves?
- What *might* we do to create curricula that enable our students to confront with confidence the complexities and uncertainties that face us all?
- What *might* we do to create our very own adventures in learning and teaching at the edge of chaos?

## 7. References

Beckett, S., 1971. *Waiting for Godot*, London: Faber (first published: 1956).

BIS, 2011. *Students at the Heart of the System*, London: Department of Business, Innovation and Skills, HMSO.

Browne, J., 2010. *Securing a Sustainable Future for Higher Education: An Independent Review of Higher Education Funding and Student finance*,  
URL: <http://webarchive.nationalarchives.gov.uk/+/hereview.independent.gov.uk/hereview/report/>

Collini, S., 2010. Browne's Gamble. *London Review of Books*, 32(21), pp. 23-25.  
URL: <http://www.lrb.co.uk/v32/n21/stefan-collini/brownes-gamble>

Harshbarger, B., 2007. Chaos, Complexity and Language Learning. In *Language Research Bulletin*. Tokyo: International Christian University (ICU).  
URL: [http://web.icu.ac.jp/lrb/vol\\_22/Harshbarger%20LRB%20V22.pdf](http://web.icu.ac.jp/lrb/vol_22/Harshbarger%20LRB%20V22.pdf)

HEA, 2010. *Framework for Action: Enhancing Student Engagement at the Institutional Level*, York: Higher Education Academy.  
URL:  
[http://www.heacademy.ac.uk/assets/documents/studentengagement/Frameworkforaction\\_institutional.pdf](http://www.heacademy.ac.uk/assets/documents/studentengagement/Frameworkforaction_institutional.pdf)

IBM, 2010. *Capitalizing on Complexity: Insights from the IBM 2010 Global Chief Executive Officer Study*, New York, USA: IBM Corporation.  
URL: <http://www-935.ibm.com/services/us/ceo/ceostudy2010/index.html>

Jonassen, D., Hennon, R., Ondrusek, A., Samouilova, M., et al., 1997. Certainty, Determinism, and Predictability in Theories of Instructional Design: Lessons from Science. *Educational Technology*, 37, pp. 27-34.

Kleiman, P., 2008. Towards Transformation: Conceptions of Creativity in Higher Education. *Innovations in Education & Teaching International*, 45(3), pp. 209-217.

Lingo, E.L. & Tepper, Steven J., 2010. The Creative Campus: Time for a "C" Change. *The Chronicle of Higher Education*.  
URL: <http://chronicle.com/article/The-Creative-Campus-Time-for/124860/>

Morrison, K., 2006. Complexity Theory and Education. *Paper presented at APERA Conference, Hong Kong.*

URL: [http://edisdat.ied.edu.hk/pubarch/b15907314/full\\_paper/SYMPO-000004\\_Keith%20Morrison.pdf](http://edisdat.ied.edu.hk/pubarch/b15907314/full_paper/SYMPO-000004_Keith%20Morrison.pdf)

Newell, A., 2010. Doctors Can Dance. Dead Man Talking: Using Devised Theatre to Explore a Topical Issue in Bioethics (Keynote Talk, Webcast). In *Creative Thinking: Re-imagining the University*. 8th Annual Galway Symposium on Higher Education. Galway.

URL: <http://www.nuigalway.ie/celt/webcasts/AnnaNewell/index.html>

Pachucki, M.A., Lena, J.C. & Tepper, S.J., 2010. Creativity Narratives Among College Students: Sociability and Everyday Creativity. *The Sociological Quarterly*, 51, pp. 122–149.

Stacey, R.D., Griffin, D. & Shaw, P., 2000. *Complexity and Management: Fad or Radical Challenge to Systems Thinking?* London: Routledge.

Tosey, P., 2002. *Teaching at the Edge of Chaos: Complexity Theory, Learning Systems and the Idea of Enhancement*, York: LTSN Generic Centre for the Imaginative Curriculum Network, the Higher Education Academy (UK).

URL:

[http://www.heacademy.ac.uk/resources/detail/resource\\_database/id111\\_Teaching\\_at\\_the\\_Edge\\_of\\_Chaos](http://www.heacademy.ac.uk/resources/detail/resource_database/id111_Teaching_at_the_Edge_of_Chaos)

Waldrop, M.M., 1992. *Complexity: The Emerging Science at the Edge of Order and Chaos*, New York: Simon & Schuster.

Wheatley, M.J., 2006. *Leadership and the New Science: Discovering Order in a Chaotic World*, Berrett-Koehler Publishers (first published: 1999).

URL: [http://books.google.com/books/about/Leadership\\_and\\_the\\_new\\_science.html?id=560yJZt8n70C](http://books.google.com/books/about/Leadership_and_the_new_science.html?id=560yJZt8n70C)