Advances in Project Management Series[1]

The Complexity Dialogues: 'Complicated' and 'Complex' – the management difference

Prof Darren Dalcher, Moderator
Director, National Centre for Project Management
University of Hertfordshire, UK

Panelists: Dr. Kaye Remington
Reverend Michael Cavanagh

In this article we resort to a different type of discussion about the pervasive issue of complexity. The article features a dialogue that attempts to distil our knowledge about complexity in projects and its resulting implications and challenges. The participants are Dr. Kaye Remington, Revd. Michael Cavanagh, and the moderator is Professor Darren Dalcher.

Darren: Complexity is increasingly viewed as a common feature of life in a technology-infused era. It often means different things to different people and can be said to be in the eye of the beholder. However, one of the fascinating aspects of complexity is the interaction and interconnection between the simple and the complex, and the richness of patterns and ways of thinking that it enables.

Complexity is itself a complex notion. The Oxford Dictionary defines complexity as the state or quality of being intricate or complicated thereby mixing the concepts of complicated and complex. Managers are increasingly called upon to deliver complex projects in environments that are reckoned to be complex and hence the distinction between the two is important. In order to advance the discussion we need to make sense of the difference between complicated and complex, especially in the context of projects.

Michael: If you know what you're up against, projects might be 'complicated', but that's not the same thing as 'complex'. We can manage **'Complicated'** using the standard 'First Order' PM toolset. But Project **Complexity** increases exponentially against unpredictability, and it demands a 'Second Order' management approach – applying systems thinking, experiential learning, appropriate contracting and most of all, flexible and courageous leadership. [2]

[1] *The Advances in Project Management series includes articles by authors of program and project management books published by Gower in the UK. Series editor is* ***Prof Darren Dalcher****, editor of the Gower Advances in Project Management series of books on new and emerging concepts in PM. For more on Gower project management, visit http://www.gowerpublishing.com/default.aspx?page=2063.*

[2] Just for clarity - First order is essentially process-based – EVM, Prince 2, CMM-I, Lifecycle Management etc. Second order concentrates more on deliverable fitness for purpose, the elements mentioned above - system thinking, experiential learning , pragmatic contractual models, managing for outcomes (as

In themselves, these are not complex – just different – demanding a different set of behaviours and personalities. Unfortunately, in most cases, they aren't adopted until the first order methods are proved not to work, and by then it's too late.

Kaye: Many people now acknowledge that some projects are beyond complicated. Complicated projects are challenging and very difficult but ultimately able to be delivered in a form that is acceptable to the key stakeholders, even if the final format has digressed substantially from original expectations. Complex projects are more than just difficult to manage because it is not just about getting the right brains together around the table and nutting out the solution to a challenging problem. That kind of project stimulates thinking and motivates people to work together and achieve a result. In some cases problems are intractable, there are no known or acceptable solutions, or if there are there are so many competing viewpoints that there is a very low potential for satisfactory compromise. Projects like these remain locked in and often don't get beyond the definition stage. If they are jettisoned into implementation the result is often useless and costly.

One of the major issues confronting those of us who are interested in these intractable or complex projects is - how do we know we are there?

Projects are social endeavours involving humans in all our variety. Perceptions of difficulty are specific to the individuals and based on the depth and breadth of their experience and cognitive ability. What is difficult for one group is easy to a more experienced group. What emerges as a complex project for one group might be difficult but manageable for another group.

Michael: One aspect of this which I find really interesting, given what you say about 'getting the right brains together around the table' is what kind of brains these might be. I tried to resist a pun about 'right brain' thinking, but I suspect there is some mileage in looking at the issue from such a viewpoint. Left brain thinkers tend to be good at applying process rigorously and with attention to detail; they prefer 'ordered' situations where the way ahead is clear; they make progress in sequential, linear steps. On the other side, we find people who are creative, comfortable with uncertainty – possibly sometimes away with the fairies, far detached from reality- and most of all, allergic to reading the instructions or following rules. Which is exactly what you need at a Second Order level.

I have a feeling this may be at the root of the difficulties we have observed in complex project management. We do not select for such behavioural attributes at the beginning of a career in PM. The typical promotion path for a Project Manager goes from small subsystem management, taking on overall responsibility for increasingly large projects, possibly gaining BoK qualification from a professional body along the way, successfully delivery of highly complicated product – and then being asked to manage a sackful of wild cats, a project for which they are totally unequipped. Let me emphasise that this is **not** a criticism of left-brain-inclined Project Managers – we couldn't live without them,

---

opposed to requirement) and 'leadership' flexibility. N.B. It does not replace process rigour – it complements it.

and a world built by right-brain people would be a disaster – if it got built at all! But what I **am** suggesting is that the development process for people who will be behaviourally suited to manage complex projects should be very different, right from the start.

When the key stakeholders know, not just what they want, but also what they need, and can specify that precisely, a conventionally–trained Project Manager will deliver successfully against the most complicated requirement specification. When they don't know what they will need (even though they usually think they do) to deliver a desired outcome, and the task is given to a left-brain PM, the chances are it'll end in tears.

Darren: Michael points out that project complexity increases exponentially against unpredictability. Kaye asserts that projects are social endeavours, adding that what is difficult for one group may be easy to another.

1. So, how do we link these two positions?

2. We could conclude that complexity is socially constructed (or is in the eye of the beholder), but what does that tell us about knowledge and unpredictability given Michael's formulation?

3. Kaye talks about intractable problems, which sound similar to wicked problems. She also points out the variations in people and their relationship to situations. But why do you talk about these problems in terms of 'managing' them (or the inability to do so)? Should we be talking about 'leading' instead? Or 'guiding'? Wouldn't systems thinking, experimentation, feedback, leadership, flexibility and other good ideas thrown in be sufficient to chip away at the intractability of the problem?

4. Given that Michael has identified two positions, namely right-brained and left-brained project managers, might we be missing out on other potential positions? Indeed, is there a 1.5 order project manager? How about developing 3rd order project managers for truly intractable projects?

Kaye: One of the real challenges for those of us who are interested in complex projects (which usually involve wicked or intractable problems) is that we are dealing with a highly dynamic landscape (forgive the appropriation of a term from complexity science). A major contributor to the dynamism is the vast variation in how people see and cope with the issues (or enact leadership behaviour).

I used the word manage in common usage rather than in a 'management' sense. Perhaps guide might be a better word but I am not so sure about that either. Often leaders designate cope rather than manage or even guide! Leadership during uncertainty is fluid. It becomes critical if leaders don't get this point. Leadership is a multi-dimensional concept when we are dealing with complex projects. I often talk about leadership layers. Many people take leadership roles and those roles change, often popping up and then retreating as the need arises. The intersection between the layers is as important as what is happening at any leadership level. Leadership (PM's, sponsors, clients, boards etc.) needs to know when to step back and when not to interfere. When the project is in a highly emergent state things are happening very, very rapidly. However most intervention tends to be local and not systemic because 'the

leader' will only have a limited perspective of the system. The intersection between the leadership layers is critically important to give 'the leadership' a better or broader view of the system. We can never 'see' the whole system in which our project floats but a broader view prevents PM's from 'putting out local spot fires' (I am Australian and we know a lot about bush fires) which might have ramifications in other parts of the system that the PM or leader designate cannot 'see'.

For these kinds of projects we need to establish and support frequent, deep conversations between all the leadership layers (board levels right through to teams) so they can respond systemically and, if necessary, very quickly. Often leaders who make bold and rapid decisions are seen as decisive when really they are only behaving rashly. They 'shoot from the hip'. At a moment in time when people are desperately looking for leadership they will latch onto this quasi leadership behaviour as if it were a saviour. This so-called decisive 'hero' leadership behaviour looks impressive but is rarely effective in the long term. It is almost impossible for one person to have a large enough view of the system to be able to make effective decisions.

Re: left and right brain thinkers. Of late I have doing some work around cognitive integration. Most education focusses on cognitive differentiation (the ability to decompose, analyse, and dissect problems) - so-called left brain thinking. A few people are truly creative thinkers - so-called right brain thinking - architects and designers are trained to think creatively. Leaders who seem to be able to function very effectively in complex environments are cognitive integrators. This involves both left and right brain thinking and a bit more. It means being able to analyse and differentiate, stand back, perceive the problem systemically and then put it all together in a different way - not necessarily solve the problem as originally presented but re-frame the problem. The exciting thing is that we can help them to become better at cognitive integration.

All this is the subject of my next book!

Michael: I think this takes us on to leader education and the development of what one of my heroes, the wonderful Geoffrey Vickers, describes as a person's 'Appreciative System'. Funnily enough, this is part of **my** next book! I'm looking at Experiential Learning as a way of developing 'Wisdom' – as opposed to just 'Knowledge' – where 'Wisdom' is an emergent property of the (irrational) combination of ostensibly unrelated knowledge sets, and gives people the depth of appreciation that allows them to 'see through' problem situations and, as Kaye suggests, reframe them and douse the bush fire. (I'm Irish and we know a lot about rain).

I've been working alongside a couple of client organisations recently who are beginning to see the need to incorporate elements of a 'Liberal Arts' curriculum in their Project Management and Engineering Leadership education programmes. *"Our Engineers are, without question, world class"*, one Academy Director told me – and their achievements underline the truth of that – but *"the trouble is that Engineering is all they know about"* was how he continued. I'm doing quite a bit of mentoring of such as these at the moment – and when I get them to read a novel (something they would never have dreamed of doing) they are amazed at the broader insight that non-fiction can provide and illuminate in a real-world situation.

Equally, I've met all too many creatives who need to understand that sometimes following textbook instructions to the letter (or even reading them at all) can in fact be a short cut to success.

Perhaps this should be the fundamental purpose of cognitive integration education as an imperative for all who aspire to Complex Project Management – to establish a system to turn both 1st Order- and 2nd Order-behaviourally-equipped PMs into the 3rd Order people we need!

Kaye: Honestly I am really wary of such terms. Not because of the way they were conceived but in the way they inevitably come to be used by others and taught as qualifications by trainers

Consultants and trainers are out there at the moment 'teaching' **short courses** in what they call 'complex PM' - usually offered as an add on to basic PM. I have interviewed people who are supposedly qualified in 'complex PM' who think that managing an extension to their garage is complex (drawn from a real example). Well it is to someone who has not done any building but to an architect/engineer like me a garage extension is a hiccup.

Michael: I totally agree – we've seen this so many times before – TQM, Knowledge Management, BPR – all good useful things, but oversold, misused and discredited as 'fads'. We mustn't allow Complex PM to go the same way.

Kaye: I think this conversation raises a number of dilemmas:

1) An individual's or a team's perception of what is complex depends on their experience. Lack of experience can indeed be a causal factor in a project behaving as a complex project. Lack of appropriate experience can result in a relatively simple task becoming a complex project.

2) How an individual (and also a team) responds to uncertainty depends on individual thinking styles and team dynamics. A dominance of linear logical thinking or process-oriented thinking or poor team dynamics can also contribute to a relatively simple task becoming a complex project. Changing people's thinking patterns (particularly when under stress which occurs during uncertainty) is not an easy educational task and in some cases it might be impossible. If it is possible our experience with leadership groups suggest adult learners require about 12 months regular exposure to learning, specially constructed simulations, project experience with intensive coaching in order to achieve change in thinking styles and approaches to about 70% of participants.

3) How do we in the workplace 'measure' complexity in a pro-active manner so that organisations can assess the expected level of complexity and assign appropriately experienced PM's and structure the project accordingly at executive level to support the teams. How to we measure uncertainty? You might say that is what we do all the time when we do risk assessments so if we accept that level of uncertainty we might be able to extend our thinking to find ways of making useful assessment of potential emergent behaviour.

4) How do we as a profession support providers and how do accrediting bodies and employers distinguish between education which only provides basic training (1st order PM) and that which really equips people to handle complexity (what might be called 2nd order PM)? The latter requires a huge amount of life/project experience which cannot be provided in the classroom, even with the most sophisticated learning simulations.

So what is a complex project? The ontological question!

Michael: Funny how discussions like these always end up with Plato: is Beauty really in the eye of the Beholder? Is Complexity objective or subjective? If the former, in other words if there is an empirical, universal definition of complexity, it can be measured; if instead that which is complex for one person is simple for another, then it can't – but what we **can** do is measure the relevant experience - or, perhaps better – the 'appreciative system' of the beholder, in this case the Project Manager and her team, and the context in which they are working.

I have tried to address this in my recent work on Complexity Assessment[3] – I believe we have to consider two dimensions, which I term Complexity and Competence amplifiers (the latter could also be called Complexity Attenuators).

In my view, Complexity amplifiers – the aspects which drive complexity – can be categorised as follows:

- External dependencies and environmental changes
- Programme/ System Novelty.
- Scope, cost/ budget, duration instability
- Customer, Team, Supply chain instability and 'politics'
- Inter-system interactions
- Poor external communication channels
- Legal/ Regulatory/ Contractual/ Commercial restrictions and irrelevance
- Stakeholder mistrust
- Lack of outcome clarity and confidence/ potential outcome emergence

These are attenuated by a number of aspects – the Competence Amplifiers:

- Degree of complexity recognised & acknowledged
- Realistic contingency
- Adhocratic delivery leadership
- Through-life outcome appreciation
- Collaborative contracting/ regulatory models
- Appropriate organisational/ personal experience & competence
- Complex PM techniques/ scenario education and training

[3] http://www.amazon.com/Project-Complexity-Assessment-ebook/dp/B00C2HXX58/ref=sr_1_1?s=digital-text&ie=UTF8&qid=1367230503&sr=1-1&keywords=michael+cavanagh

- Truthtelling and Truthhearing

I don't claim that the above is comprehensive, but my aim was to produce something 'broadly right, but precisely wrong' – simple enough and cheap enough to be used at the very earliest stages of the lifecycle, in order to identify potential difficulty and the level of experience/ organisational structure necessary to mitigate that risk. The point being that if the degree of complexity isn't understood at project initiation, it will be too late to do anything about it later. Unfortunately, convincing 1st-order management behaviours that complex projects are different to complicated ones, and need to be managed accordingly using appropriate methods, is hugely difficult – especially when experience teaches us that by far the commonest project risk management approach is simply denial. If complexity assessment isn't made easy, it won't be done.

Darren: This has been a fascinating conversation and I would like to thank our two thought leaders Michael and Kaye. A discussion that encompasses Plato, Geoffrey Vickers, BPR, right brain thinking, leadership, wicked problems and dynamic landscapes must surely qualify as complex in its own right.

Poul Anderson observed: "I have yet to see any problem, however complicated, which when you looked at it the right way, did not become still more complicated."

Our discussion attempted to make sense of complexity and its relationship to project management. Context and contingency are critical to any conversation about management modes and the selection of the appropriate configuration for a particular setting. Traditional, or first order, project management is essential to managing projects in better understood and controlled environments. However, given that projects are social endeavours involving human stakeholders and participants, encompassing high levels of unpredictability and ambiguity, and featuring politics and dilemmas related to human relations, we also encounter complex undertakings that require a different type of leadership and skills that underpin successful completion. Such undertakings benefit from what Michael has termed second order project management approaches.

As Kaye points out individuals vary greatly in terms of their styles and responses. Different situations merit different conversations and approaches. Perhaps our biggest challenge requires the identification of the skills and competencies needed to develop problem solvers capable of addressing intractable problems and complex projects. Indeed, how do we begin to grow our third order project leaders? Before we can do that, we really need to develop a clearer understanding of what is meant by the label *complex project management*. This will encourage us to engage with complexity and understand the dynamic factors that amplify and mitigate its impacts. It also requires further dialogue about how we identify, develop, educate and train the next generation of project managers capable of continuing this conversation.

Editor's note: Darren Dalcher is the editor of the series of books on Advances in Project Management published by Gower in the UK. Information about the Gower series can be found at http://www.gowerpublishing.com/advancesinprojectmanagement. Kaye Remington and Michael Cavanagh are authors of books in the series recently published by Gower.

About the Authors

Darren Dalcher, PhD

Author, Series Editor

Director, National Centre for Project Management
University of Hertfordshire
UK

Darren Dalcher, Ph.D. HonFAPM, FRSA, FBCS, CITP, FCMI is Professor of Project Management at the University of Hertfordshire, and founder and Director of the National Centre for Project Management (NCPM) in the UK. He has been named by the Association for Project Management (APM) as one of the top 10 "movers and shapers" in project management in 2008 and was voted Project Magazine's "Academic of the Year" for his contribution in "integrating and weaving academic work with practice". Following industrial and consultancy experience in managing IT projects, Professor Dalcher gained his PhD in Software Engineering from King's College, University of London. Professor Dalcher has written over 150 papers and book chapters on project management and software engineering. He is Editor-in-Chief of *Software Process Improvement and Practice,* an international journal focusing on capability, maturity, growth and improvement. He is the editor of the book series, *Advances in Project Management*, published by Gower Publishing of a new companion series *Fundamentals of Project Management*. Heavily involved in a variety of research projects and subjects, Professor Dalcher has built a reputation as leader and innovator in the areas of practice-based education and reflection in project management. He works with many major industrial and commercial organisations and government bodies in the UK and beyond. He is an Honorary Fellow of the APM, a Chartered Fellow of the British Computer Society, a Fellow of the Chartered Management Institute, and the Royal Society of Arts, and a Member of the Project Management Institute (PMI), the Academy of Management, the Institute for Electrical and Electronics Engineers, and the Association for Computing Machinery. He is a Chartered IT Practitioner. He is a Member of the PMI Advisory Board responsible for the prestigious David I. Cleland project management award and of the APM Professional Development Board. Prof Dalcher is an academic editorial advisor for the *PM World Journal*. He can be contacted at d.dalcher2@herts.ac.uk.

Revd. Michael Cavanagh, MSc

Author

Michael Cavanagh has been an independent for over twenty years in a number of business sectors. In recent years, the focus of his consulting activity has been the use of systems thinking techniques to perform 'forensic' analysis of major project failure and the ways in which lessons can be derived and corrective process improvement implemented, deploying a combination of Soft Systems, the Viable Systems Model and a number of tools and methods developed specifically for the task. His book, published by Gower in 2011, introduced '2nd Order' programme management concepts and the need and justification for their application to highly complex projects. The book is aimed at both practitioners and senior sponsoring management. He has also recently published two Kindle eBooks, 'Ethical Issues in Complex Project and Engineering Management', and 'Project Complexity Assessment'. Michael is an ordained Anglican priest in the Church of Ireland and is currently responsible for the churches of the Kenmare and Dromod Union, Co. Kerry. Michael can be reached at michael.cavanagh@eircom.net.

Dr Kaye Remington

Australia

Kaye Remington, PhD is author of *Leading Complex Projects* (Gower Publishing, 2010) and co-author of *Tools for Complex Projects* (Gower Publishing, 2007). With over 25 years of senior management and project experience she is also a former Director of the Post-graduate Project Management Program at the University of Technology Sydney. Kaye now runs a small consulting firm that works internationally to help organisations to develop their capacity to deliver complex strategy and projects. Kaye Remington can be contacted at kaye@elefsis.org or visit her website at www.elefsis.org.