

■ Research Article

Learning to Improvise, or Improvising to Learn: Knowledge Generation and 'Innovative Practice' in Project Environments

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This paper considers the links between knowledge management, improvisational working and project management, highlighting their confluence in a number of key dimensions and focusing on the way new knowledge is generated, shared, and applied within the project domain. The opportunities for improved management in contexts of ubiquitous novelty, ambiguity, and compressed time, particularly in project-based domains, are explored with reference to these key dimensions and recommendations for practice and further research suggested. Copyright © 2015 John Wiley & Sons, Ltd.

Organisations today are adapting and evolving in order to meet the challenges of survival and to meet the requirements of increasingly demanding customers. In the first decade of the 21st century, there is also considerable evidence that organisations are attempting to cope with turbulent and uncertain environments (Hitt, 2000) and in many cases, the tenets and principles of project-based management are assisting with the resolution of such issues (Cooke-Davies *et al.*, 2007; Swan *et al.*, 2010). Those organisations that resolve such challenges more effectively are perceived to have an improved chance of survival, and ultimate success. In these environments, innovation becomes critical to organisational competitiveness and productivity (Fenwick, 2003) and as flexibility is stressed, traditional managerialist concerns and practices are brought into sharp focus (Leybourne, 2006a). In these discussions the advantage to be gained from flexibility, and the adoption of less structured working styles, and the leverage of knowledge created and held both tacitly or explicitly (Polanyi, 1958) within the organisation are argued.

One response to this increased requirement for flexibility within organisations is a shift towards the aforementioned project domain (Eisenhardt and Tabrizi, 1995; Lynn *et al.*, 1996; Pich *et al.*, 2002), where activity is organised using the broad principles embedded in the project management (PM) lexicon of working styles. PM is defined the Project Management Association's *Body of Knowledge* (PMBOK©) as a temporary endeavour undertaken to create a unique product, service, or result, and the project is often used to apply an element of structure and process to organisational activity. However, although 'traditional' PM is seen as grounded within a documented 'plan, then execute' paradigm (as evidenced by, e.g. the PMBOK©), there is increasing evidence of an overarching interest in flexibility within the project domain, which often manifests itself in elements of improvisational activity, and an appreciation of the challenges of dealing with and resolving ambiguity and complexity within the confines of the project (Cooke-Davies *et al.*, 2007; Leybourne, 2010).

It could be argued that this shift away from the traditional project paradigm based on the PMBOK© towards a more nuanced and behaviourally driven means of leading and managing project based work is more akin to the work of 'mechanics'; who follow process and repetition, being replaced by 'artists';

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who use flair, creativity, and expertise to move beyond traditional models of achieving. This aspect of the evolution of project-based management is developed later in this paper.

Aligned with its use in supporting organisational flexibility, PM is also increasingly popular as a platform for the learning that is required for continual change in a turbulent environment (Swan *et al.*, 2010). In PM methodology, this focus on learning follows execution of the project, and involves a 'post-implementation review' phase, where 'lessons learned' can be considered. In the 'learning phase', the knowledge developed both individually and collectively by the project manager and team throughout the project lifecycle can be identified, articulated, codified, and prepared for sharing for the benefit of future project managers and project activity. However, tacit knowledge is notoriously difficult to capture (not least because it is difficult to articulate), and it is perhaps for this reason that there is a documented tension within organisations between the desire to carry out the learning phase of an executed project, and the desire to move resources to the next initiative (Leybourne, 2002). This tension causes temporal pressure and ultimately negates the opportunity to capture data that might assist in future project-based initiatives (Sense, 2007).

There are, however, significant opportunities for project teams and organisations to learn from previously executed project-based activity, the successful execution of which could lead to the generation of 'emerging best practice' (Leybourne, 2006b). Successful improvisation could produce innovations that improve performance beyond the improviser's immediate project, and the knowledge generated through improvisation is then utilised for the benefit of future organisational initiatives, fulfilling a requirement for continuous improvement in processes and procedures. However, the 'stickiness' of knowledge as a barrier in the transfer of best practice is well theorised and researched (Szulanski, 1996), and Matthews (2005) and the theorising of Field (2004), also show that although organisational members invest much in developing new knowledge, only in limited circumstances is this knowledge utilised in the wider organisation.

This highlights a 'contested space' in the project domain between 'process' and the improvised activity that may produce 'emerging best practice'—the very behaviour which results in innovation in the project is that which deviates from prescribed process. This contestation leads to a reconsideration of the very nature and generalisability of 'best practice' across projects. 'Best practice' suggests exploitation of knowledge created in previous projects when improvisation connotes exploration, experimentation, and knowledge creation in order to maintain effectiveness in the face of constant change. In essence, the value of discussion across the fields of Project Management, Improvisation and Knowledge

Management is the opportunity to critique the very possibility of a transferable best practice in projects.

This paper's focus on the way new knowledge is generated, shared, and applied within projects profits from theoretical and empirical advances in the fields of improvisational work, project-based learning, and knowledge management. The paper addresses some of the issues that emerge at the interface between 'best practice' and improvisation in project management, drawing advantage from these recent theoretical developments. The paper follows a traditional structure where initially the growing literature on the convergence of project management, improvisational work, and knowledge management is reviewed, and an analysis of the outcomes offered. Following on from this review, the generation, utilisation, and institutionalisation of project-generated knowledge is considered, and particular attention given to the problematic concept of 'best practice'. A wider discussion of the benefits (or otherwise) of these approaches are then documented, and the paper concludes with a summarised narrative of the analysis, together with a consideration of areas for further research.

The unravelling of decades of traditional 'command and control' management requires that organisations make the shift to embracing the 'informal' in their resolution of ambiguity and uncertainty, and the knowledge generated from improvisational activity can assist in this, helping to transcend the difficulties of organisational transition to the management of future realities. The primacy of intellectual freedom and knowledge creation, development, and manipulation in today's organisations points to future where the formal is being replaced by the informal in many areas.

IMPROVISING AND LEARNING IN PROJECTS

The literature in the field is reviewed here in four sections, with improvisational work, project-based learning, and knowledge management initially being considered separately. The review concludes with an analysis of the overlap or convergence of these areas, and the implications of this for modern management. Although some of the areas here are considered the level of an overview, it should be accepted that this is a paper that is fundamentally embedded in the PM domain, although there are overlaps with other management areas and domains.

Improvisational work

Improvisation is defined as '*the degree to which composition and execution converge in time*' (Moorman and Miner, 1998b: 698), thereby indicating a shift away from planning, and a reliance on action. There has been a growing interest in improvisational work over

the last fifteen years, with the initial impetus generated by a workshop at the 1995 Academy of Management conference, the outcomes of which were documented in a special issue of *Organizational Science* (Volume 9, No 5) in 1998. The earlier antecedents of improvisational work hark back to Karl Weick's ground-breaking (1979) output on organisational 'sense-making', although the constructs of improvisation were initially documented by Moorman and Miner (1998a, 1998b), and a later 2001 paper by Miner, Bassoff, and Moorman. Indeed, during the late 1990s there was a rapidly expanding literature in this area.

Some of the outcomes from this evolving literature employ metaphors to explain the way improvisation is used, for example adopting and applying ideas from jazz performance (Barrett, 1998a, 1998b; Eisenhardt, 1997; Hatch, 1998, 1999), and from improvisational theatre (Crossan, 1997; Yanow, 2001; Kanter, 2002). Later work used grounded theory approaches to consider the temporal aspects of improvisation, particularly the pressure to achieve complex tasks to a demanding or compressed timetable (Brown and Eisenhardt, 1997; Moorman and Miner, 1998a, 1998b). This work is building the foundations to allow empirical research of a more positivist nature—for example: Akgun and Lynn's (2002) work on the links between improvised new product development and speed-to-market. Consideration has also been given to the interactions between improvisation and learning (Miner *et al.*, 2001; Chelariu *et al.*, 2002), improvisation and entrepreneurial activity (Baker *et al.*, 2003; Hmieleski and Corbett, 2006) and the ways in which tacit knowledge (upon which intuition, and therefore improvisation, may draw) is acquired (Koskinen *et al.*, 2003), and the role of experience in the acquisition of tacit knowledge (Cooke-Davis, 2002).

More recently, recognition has been given to the use of improvisation within project-based work (Kanter, 2002; Leybourne, 2002; 2006a; 2006b; 2007a; Leybourne and Sadler-Smith, 2006; Gallo and Gardiner, 2007). Generally speaking, this body of work considers improvisation in terms of an association with urgency, where there is a need for action and little or no time to plan, or to generate and examine alternative courses of action. Within this research however, the focus is on deviation from what is originally agreed, but often the improvisational nature of any solution is due to a need to meet delivery targets that are temporally distant, indicating that bricolage is not always the predominant requirement. Later literature has linked improvisation with complexity and the resolution of ambiguity, especially within the project domain (Cooke-Davies *et al.*, 2007; Leybourne, 2010).

In defining improvisation and linking it with intuition, it may be useful to start from its Latin root, *improvisus*, meaning 'unforeseen'. It therefore follows that unforeseen means or at least includes

'unplanned' activity. There is also an assumption that within the execution of those fundamentally unplanned actions, a degree of expertise is present. Dreyfus and Dreyfus (1986), in a study into the phenomenology of expertise, suggest that experts in any subject achieve a level of proficiency whereby they improvise constantly. As Montuori (2003: 249) states: '*they know the rules, but do not have to think about them. They have developed the ability to act spontaneously and intuitively without needing to refer to rulebooks*'. This is certainly recognised in the improvisation literature, with intuition being accepted as a recognised construct.

The original definition of improvisation as: '*the degree to which conception and execution converge in time*' (Moorman and Miner, 1998b: 698), highlights the temporal aspects of improvisational activity, although later definitions also link with the concept of bricolage, in that they emphasise the need to achieve with available resources. The inference here is that improvised work is usually executed to resolve an unforeseen issue or requirement, and time to mobilise additional resources is usually not available. Empirical research has exposed the fact that project managers improvise constantly to resolve changing requirements and environmental turbulence (Leybourne, 2002, 2006a, 2006b), notwithstanding the 'plan, then execute' paradigm embedded in the various *Bodies of Knowledge*.

Project-based learning

A major strength of the traditional PM lifecycle (Adams and Barndt, 1988) is the learning and feedback activity provided by the 'post-implementation review' phase. This phase is intended to capture the strengths and weaknesses of the activity within a particular project, and analyse, codify, and disseminate such data to improve future project-based activity. It is accepted that this traditional 'waterfall' model of PM exemplified by the Adams and Barndt (1988) project lifecycle is falling out of favour, and that new models such as 'Agile' are becoming more widely used (Chin, 2004; Highsmith, 2004; Leybourne, 2009). Notwithstanding this shift in PM techniques, the more contemporary styles of PM still incorporate learning loops that are intended to expose and share positive and negative learning from project-based activity. Indeed, 'agile' PM incorporates these into every iteration of the process.

It is however acknowledged (Sense, 2007) that there is a significant tension between the rhetoric of the idealised intentions of the 'learning' phase of the project life-cycle, and the reality of intentions dashed by temporal pressure and resource-based constraints. One result of this is a cursory attention to learning from projects in many organisations, with the result that much knowledge remains in tacit form.

This type of tacit learning tends to lead to an understanding in organisations that is based on 'experience', and that the organisation looks on such individuals as '*experienced managers*'. However, such learning is only held at the individual level, and is not shareable. The goal of organisations, and particularly those that have pursued the ambition of becoming 'learning organisations' (Senge, 1990; Pedler *et al.*, 1997), is to convert or 'codify' this tacit knowledge, with a view to sharing it either formally or informally for the benefit of other organisational actors. Theoretically, this shared knowledge can then be used to revise and update organisational processes; however empirical work in knowledge management reveals the notorious difficulty with the conversion and effective use of knowledge through codification and dissemination (Fahey and Prusak, 1998; Storey and Barnett, 2000; Malhotra, 2002).

Knowledge management

Knowledge has been a principal force of production for recent decades (Lyotard, 2004). This recognition has been operationalised in recent years through the development of knowledge management (KM) as a practice and a theoretical agenda of increasing sophistication, connected to disciplinary influences as diverse as philosophy and complexity theory.

Emerging as a 'hot topic' in the 1990s, knowledge management initially presented knowledge as relatively unproblematic (Spender, 1996: 65) and little rigorous investigation of the epistemology underpinning theory and practice was undertaken (Blackman and Henderson, 2005). Instead, practice remained informed by constructions of knowledge which underlined its value in extraction and dissemination, and of learning as the transfer of such codified knowledge from expert to novice, aimed at standardisation and consistency. Centred on the development of information and communication technologies and the consultancies inherent in their implementation, these approaches encouraged a 'narrowly managerialistic focus' (Swan and Scarbrough, 2001: 913) a response supported by 'globalisation, ubiquitous computing and the knowledge-centric view of the firm' (Prusak, 2001: 1003).

In this 'technocratic' paradigm (Earl, 2001: 218) the primary concern for organisations is the improvement of business performance through the identification and accurate, efficient transfer of knowledge held within the organisation's boundary. The use of the 'transfer' metaphor reflects a structural view of knowledge – where codification and dissemination of knowledge are seen as reasonably straightforward distributive activities involving a conversion of tacit knowledge to explicit knowledge and the relocation of knowledge to areas of need. Individually developed and held

knowledge, although difficult to articulate, must be made explicit in order to be leveraged by the organisation in Nonaka's (1991) work. This 'technocratic' knowledge relies on a process whereby '...it is extracted from the person who developed it, made independent of that person, and reused for various purposes' (Hansen *et al.*, 1999: 108).

Successive developments focused on the value of 'tacit' knowledge in organisations—knowledge embedded and embodied Nonaka's (1994) contribution in this period highlighted the interplay between tacit and articulated knowledge rather than the transfer between the two. In these later developments knowledge is recognised as more elusive, more problematic and more personal.

Communities of practice also gained prominence in the discussion about facilitation of knowledge transfer in organisations at this time (Lave and Wenger, 1991) and tools were focused on networking individuals for knowledge sharing and provision of knowledge repositories where knowledge elicited from individuals could be stored.

Contemporary advances in knowledge management theory (including those that encompass complexity theory (McElroy, 2000; Stacey, 2001, 2003a; Kennedy, 2007) accommodate the possibility of knowledge emerging outside of the directive or plan of activity, and suggests methods for facilitating and mobilising this knowledge.

The next age of knowledge management has evolved out of the recognition of the complexity and elusiveness of knowledge, its situatedness, plurality, and entwinement with human understanding and interaction. The value of knowledge for organisations and their members is increasingly linked with its construction within rapidly changing, often ambiguous and very specific contexts as well as in social settings. Knowledge is discussed in the literatures as held between individuals and collectives as well as organisational processes and systems in stock as well as flow.

Recognition of the personal yet collective nature of knowledge is leading to consideration of personal and sociological needs of individuals and collectives in knowledge genesis and learning. Practice-based studies contribute an epistemological view in which knowledge is seen to be created through activity in work in socio-technical systems (Gherardi, 2009a). Additionally, the influence of political, structural, and cultural organisation environments on the phenomenon of knowledge and its availability and use to the organisation are similarly brought to the fore in 'third age' (Snowden, 2002: 100) or 'the new knowledge management' (Firestone and McElroy, 2002: 2).

Contemporary perspectives in KM reveal a breadth of perspectives and practices and an increasing interest in the nature of knowledge (Blackman and Kennedy, 2009) and the various ways in which it constructed, collected, manipulated, and

institutionalised in the support of more effective projects and organisations.

Convergence

At the intersection of improvisation, project management and knowledge management are a number of core themes to which each of the three separate home disciplines contribute particular understandings and representations and through which a richer understanding of the phenomena become apparent. These areas are demonstrated in Figure 1. First, the three disciplines have a contemporary focus on knowledge development and definition, problematising the nature of knowledge, assuming a constructivist posture and directing attention to the value inherent in practice-based learning. Second, the three draw attention to the organisational imperative for innovation, highlighting the opportunity for knowledge creation and dissemination through the development and sharing of innovative practice and products. Finally, at the confluence of these three areas lies a question about 'best practice', its definition, emergence, and authority in contexts of persistent novelty, information density (or paucity), and condensed time.

These areas of confluence offer an opportunity for more effective practice, both in project management and in knowledge management. The improvisation literature, with its focus on adaptation, creative thought, bricolage and the tools developed within this disciplinary interest, such as scenario planning, allow managers and management scholars to

challenge the rational and teleological view of management practice. Where improvisation intersects with knowledge management, sense-making, social networks, and organisational routines are highlighted and provide a differentiation in perspective from those view of knowledge management that focus on the commodification and transfer of knowledge. Where improvisation intersects with project management, the project manager's role in exploration and adaptation in projects, the intuition involved in effective project delivery and the ways in which managers respond to compression of timescales become visible.

When the three disciplinary areas are considered in concert, the topics at the intersection tend to cluster into three distinct themes; knowledge; innovation; and best practice. These three themes are considered below and their contribution to effective project and knowledge management are discussed.

Knowledge

The three fields in this study increasingly occupy themselves with the question of knowledge. Epistemological discussion is introduced in attempts to clarify what is recognised and valued as knowledge within organisations and projects, and constructivist views are prominent. The role of the organisational member in constructing knowledge within a social context and in the practice of work lead to a reconsideration of the ways in which learning is undertaken and knowledge is created.

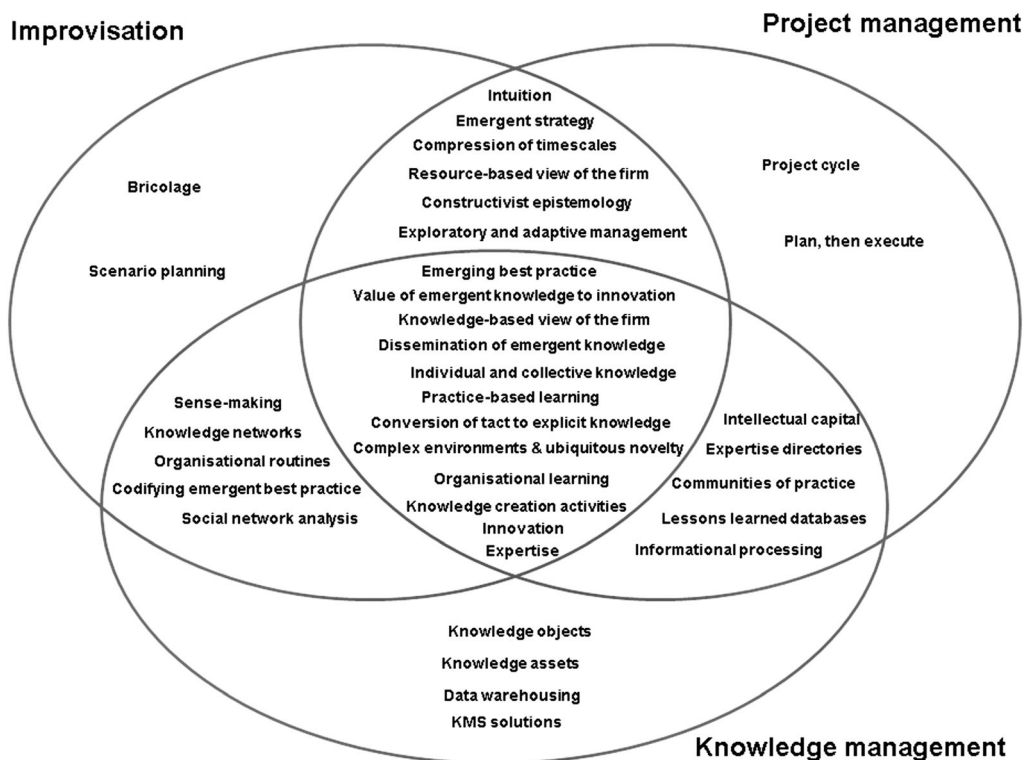


Figure 1 Converging themes—knowledge in complex projects

Not only is the rhetorical question: 'how do we know what we know?' critical to opportunities for knowledge development and institutionalisation, but justifications about the claims of knowledge and for the purposeful application of that knowledge are increasingly problematised. 'What counts' as knowledge has an impact on what knowledge is shared and what is hoarded (Kennedy and Corliss, 2008) and whilst practice-based learning and the often tacit knowledge it delivers have not held prominence in project management approaches, the recognition of its use within and across projects is increasingly recognised. There is a growing assumption that useful knowledge comes from experiencing, and there is evidence that the improvising project manager draws on a personal library of successful interventions that have been applied in different scenarios (Leybourne, 2002). Project managers use a combination of rationalist theory, intuition, and logic, and adjust the detail of the intervention to meet current criteria and requirements. However, the knowledge is often difficult to articulate and in many cases 'sticky'—difficult to generalise to other projects.

The project has been accepted as not only an effective framework for delivery (Pellegrinelli and Bowman, 1994; McElroy, 1996; Grundy, 1998), but also as a means of generating learning (Sense, 2007; Cooke-Davies *et al.*, 2007; Swan *et al.*, 2010). Julian (2008) demonstrates that often Project Management Offices act as a facilitator of cross-project learning within multiple communities of practice within organisations, and also suggests that knowledge transfer between and across projects can be understood in terms of many interlinked socially situated and constructed practices. However, it is this very definition of knowledge as socially constructed and practice-based which sits uncomfortably alongside the notion of 'best practice' and of 'transfer'. The improvisation and innovation critical to effective project management in complex environments is antithetic to the tenets of the PMI BOK—which is widely accepted as documenting the tenets of good project management.

Discussion of the transfer of knowledge is problematic in contemporary epistemological constructions in knowledge management, in innovation and increasingly in project management. If knowledge is something that is constructed in practice and in context (Gherardi, 2009b), is held within individuals and collectives through nets of interaction (Stacey, 2003b) and at once forms and is formed by activity (Engestrom, 2001), then the notion of transfer is an insufficient and perhaps inappropriate objective for the development of knowledge within and between projects.

Discussion of 'knowledge stickiness', progresses from the recognition that knowledge is difficult to 'transfer' from the site of development to other sites, but that transfer is critical to the transfer of best

practice across projects (Szulanski, 1996). 'Transfer' is used '... to emphasise that the movement of knowledge within the organisation is a distinct experience, not a gradual process of dissemination' (Szulanski, 1996: 28), and yet contemporary perspectives are at odds with the structural connotations of the transfer metaphor.

The 'stickiness' of knowledge may well be related to the nature of knowledge itself. Certainly, Szulanski (1996, citing Winter 1995) conceives transfers of best practice as 'replications of organisational routines' (p. 28), yet valuable knowledge in environments of flux is not that which facilitates replication, but that which facilitates creation—practice-based innovations that are constructed within a social context and developed to meet the requirements of novel, information dense (or poor) and urgent problems.

Kant asserts (1958 edition) that we must have knowledge of subject areas in order to recognise, identify, and explain observed phenomena, in order to hypothesise a solution by deduction. We also take account of the fact that people know more than that demonstrable knowledge that they actually acknowledge or display, as there is a considerable 'tacit' knowledge base (Polanyi, 1958; Nonaka and Takeuchi, 1995) that we as individuals, and as project managers, are able to draw on. Baumard (1999: 4) suggests that we all possess: *'different types of knowledge and... [when applied, these] lead to the analysis of various patterns, deliberate or spontaneous, which organizations follow whilst struggling with ambiguity'*. It follows that ambiguity is a social construction, in that what is ambiguous for one social actor or group of social actors may not be ambiguous for another, and that often project managers (who are the principal social actors in this scenario) apply their particular set of knowledge-based solutions according to their individual or group knowledge base.

Improvisation

With the emergence of literature linking complexity and ambiguity with project-based work (Cooke-Davies *et al.*, 2007; Leybourne, 2010), a 'contested space' is opening up where debate is generating new views about how project management should be viewed. Innovative practice is at odds with accepted best practice (which is about reproduction), and the tensions between the historic 'plan—then execute' paradigm and the emerging behaviourally based and more improvisational styles of project-based management are generating debate and conflict. This is causing both academics and practitioners to consider different ways of conceptualising project-based work, and understanding and evaluating the outcomes from its effective execution.

In the introduction to this paper we introduced an analogy that suggested it would be useful to think

in terms of basic 'tools driven' PM as being executed by PM 'mechanics', whilst project managers with extensive experience, which may translate into skills and knowledge that assists in resolving issues of ambiguity and complexity within the project domain, could be considered as more akin to PM 'artists'. If this is a reasonable (albeit new) differentiator of PM skills, then project 'artists' will display their artistry drawing on a tacit and explicit knowledge base generated by experience and practice, demonstrating a level of skill and expertise that sets them apart from the project 'mechanic'.

Improvised work is a significant part of project artistry. It is accepted that project managers improvise (Leybourne, 2002; 2006a; 2006b; 2007b), and that such techniques are a useful way of assisting with or resolving ambiguity and complexity within projects (Cooke-Davies *et al.*, 2007; Leybourne, 2010). Given the turbulence of current project and organisational environments, such skills are in demand, and can assist organisations in navigating the emerging complex landscape towards the perceived future.

Best practice

The development across discussion in the fields of Project Management, Improvisation and Knowledge Management conspire to undermine the very possibility of a transferable best practice. What can constitute best practice when projects are designed for and defined by the relentless change characteristic of contemporary work environments? This view is compounded by the fact that projects are defined as 'unique' (part of the definition of a project contained in PMBOK®, 2009), suggesting that knowledge generated in one project is not directly relevant to other projects.

Szulanski describes the three most important origins of stickiness are knowledge related—the lack of absorptive capacity of the recipient, causal ambiguity, and an arduous relationship between the source and the recipient.' (Szulanski, 1996: 36). Perhaps, however, the origin of stickiness is the nature of knowledge itself – socially constructed, practice-based and tacitly held. This issue links with the context of project—the ubiquitous novelty of project contexts, goals, teams, constraints, and resources. The complex interaction of so many diverse actors with knowledge that is situated and socially constructed suggests that 'transfer' is inappropriate if not impossible. 'A transfer begins when both a need and the knowledge to meet that need coexist within the organisation, possibly undiscovered.' (Szulanski, 1996: 28) yet in complex and changing environments, a clear match is unlikely and opportunities for novel approaches are constrained in the presence of 'best practice' assumptions/goals. Best practice as a goal becomes one which itself constrains the opportunity for the emergence of best possible practice in new projects.

Unfortunately, because of PM's conceptual and traditional roots in the definition and reproduction of best practice approaches, that knowledge which is explicit and proven in previous projects is privileged. In these conditions, project managers seek to apply best practice, attempting to make previous solutions fit to their particularly project requirements. Where they improvise to produce innovations to meet project requirements, the subsequent knowledge is not likely to be valued within the PMBOK® and so is hoarded and protected by individual project managers and their teams. Through its attempts to institutionalise best practice through reproduction, project management's reliance on 'best practice' inhibits improvisation and limits opportunities for best possible practice and innovation in complex projects.

LESSONS FOR PRACTITIONERS

There are issues relating to the transfer of academically generated knowledge to practitioners that are problematic in any scenario. Often these issues are compounded or exacerbated in certain sectors, or when the practitioner audience is focused on results, rather than reasons.

Historically, the PM community has been accustomed to an evolving PMBOK® (Project Management Institute, 2009) that distils new and emerging practice over time, and disseminates it via and to project managers. The US PMBOK® is accepted as the leading publication in this area, and is limited to PMI members, and others who are prepared to purchase a copy. Notwithstanding the fact that PMI is arguably the largest professional institute globally (with over 435,000 members in June 2013), this method of dissemination makes PMI not only the principal conduit for new practice, but also the arbiter of what should be included in that new practice. It also limits the timely dissemination of new practice by setting the timetable for the updating of their PMBOK®.

There is however evidence that improvised work within projects is becoming more accepted and less surreptitious (Cooke-Davies *et al.*, 2007; Leybourne, 2002; 2007b; 2010), and that successful improvised activity within the project domain leads to new and more effective ways of delivering project tasks and activities. The practitioner as 'artist' is engaging with the benefits of improvisation, and the learning that can be generated, but is often reluctant to access this knowledge via academic journals and similar means of dissemination.

CONCLUSIONS

The confluence of preoccupations in the research areas of improvisational work, project-based learning, and knowledge management provides an opportunity

for the reconsideration of the role of 'best practice' in project management and highlights the possibility of project management approaches which validate and integrate practice-based learning and the subsequent knowledge that emerges from the practice of project management.

The creativity inherent in dealing with the novel problems which emerge in complex projects is increasingly prominent in discussions of project management (Leybourne, 2009). The improvisation required of managers and the innovative practice in which they engage leads to innovative project processes and products. The knowledge emerging from innovative practice is often held tacitly within and between project team members and although the knowledge may constitute best possible practice within the project's particular requirements, 'best practice' guidelines and benchmarks may not apply.

The intersection of these three fields of literature highlights contemporary interests in management, but more importantly, underlines the centrality of knowledge and its definition, creation, validation and utilisation in and through innovative practice. Analysis of the intersection reveals the value of innovation and practice-based knowledge within environments of continuous change and ubiquitous novelty. One contribution of this paper is that it prompts a reconsideration of the very notion of best practice and its transfer between projects.

Empirical research which investigates the veracity of practice-based knowledge in the successful delivery of complex projects would be useful in progressing the theoretical claims made in this paper. Similarly, research that investigates the extent to which project management principles can tolerate and benefit from the incorporation of improvisational activity and the validation of practice-based learning would also be valuable.

Organisations are undergoing, embracing, and coping with change more than ever before. The turbulent organisational environments of the 21st century are challenging organisations to be more efficient, more effective, and more creative, and to manage all three scenarios simultaneously. The learning that is generated from successful improvised work has the ability to assist in producing better project outcomes and more pertinent, project-based knowledge, but changes to assumptions about what constitutes 'appropriate' practice, 'valid' knowledge and effective learning must all be addressed if this is to occur.

This paper's focus on the way new knowledge is generated, shared, and applied within the project domain profits from theoretical and empirical advances in the fields of improvisational work, project-based learning, and knowledge management, and contributes to the debate on the tensions between process and improvised activity. The opportunities for improved management in contexts of ubiquitous novelty, ambiguity, and compressed time are available through this multi-disciplinary interest.

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