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# **The role of organisational memory for learning in project management using lessons learned**

**A thesis presented in partial fulfilment of the requirements  
for the degree of Masters of Business Studies**

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## Abstract

The notion of learning from experience framed as lessons learned (an output of project management practice) stored in organisational memory has been little discussed in the literature. Prolifically discussed is organisational learning to build capability through generative learning to achieve what an organisation desires. Organisational memory is the fundamental result of organisational learning to store the knowledge from the past that is 'brought to bear' on the activity to hand by means of acquisition, retention, search and retrieval processes. It is argued the storage of lessons learned in human memory and the sharing of lessons learned between projects significantly contributes to project success at the personal level, but not at the organisational level despite lessons learned shared generically. This argument is supported by the strong suggestions of systematic problem solving to get at the 'root' cause, continuous improvement embedded in practice through benchmarking, quality management, flexibility in using standardised tools, the moderate suggestion of an Organisational Memory Management System (OMIS), and project strategic support. These were the findings from a survey of 47 project practitioners at two Project Management Institute (PMI) meetings, and seven semi-structured interviews where participants perceived the organisation they worked in characterised organisational learning practices. These findings raise questions about the competitive advantages for the organisation by using lessons learned, a moderate to weak finding in this study, and the recent initiative by most participants to implement an OMIS system. It is recommended project practitioners make lessons learned an everyday project management practice to build capability to advance organisational learning, or else the lessons learned will be pushed aside by time constraints and the pressure to move onto new projects.

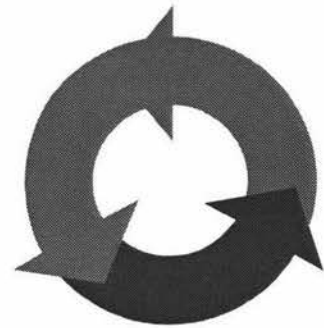
**Key Concepts:** Lessons learned, organisational learning, and organisational memory



## Preface

### MISSION STATEMENT FOR THE LEARNING ORGANISATION

The world changes and we cannot stop it, our products will change, our markets will change, our customers will change, and some of our employees will move on-we hope to greater things.



But these things will not change

We will learn faster than our competitors

We will learn across our organisation from each other, and from teams

We will learn externally from our suppliers and our customers

We will learn vertically from top to bottom of our organisation

We will ask the right questions; and use action learning

We will anticipate the future and create scenarios to learn from it

We will practice what we learn, and learn from practice

We will learn faster than our environment changes

We will learn where no man or woman has learned before

Therefore, we will survive and prosper

(Fulmer, Gibbs, & Keys, 1998, p. 1)



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*I dedicate this learning to my son Ritchard Eli.*

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# CHAPTER ONE: LESSONS LEARNED AND ORGANISATIONAL LEARNING

*Winston Churchill noted that those who do not study history are condemned to repeat its mistakes. Organisations that do not learn from their experiences absolutely will repeat blunders that they have made before (Frame, 1998, p. 244).*

## 1.1 Introduction

The business climate has shifted from Winston Churchill's time in the first part of the twentieth century of relative stability, to a climate of continuous change in the twenty first century. When once the focus was the industrial economy, now the focus is the knowledge economy. The drivers behind this shift are technology, globalisation, complexity, and interdependence (Senge, 1999). In the twenty first century, project management must survive this shift and capitalise on the learning from experience if the desire is to build and sustain organisational competitive advantage. The issue is whether project practitioners are building on project success and learning from project failure.

Project success and project failure are the lessons learned, or those things learnt from experience (Juran, 1988). Project experience is the tacit knowledge that when acted upon and shared transform into explicit knowledge or a lesson learnt (Nonaka & Takeuchi, 1995). The Project Management Book of Knowledge (PMBOK) describes lessons learned as the "causes of variances or the reason behind the corrective action chosen" (Duncan, 1996, p. 58). Lessons learned generate new knowledge, and when stored, builds a project knowledge base for future projects (Kotnour, 1999).

The organisational memory generated by the storage of lessons learned is "the fundamental result" of learning (Sinkula, 1994, cited in Lukas, Hult & Ferrell, 1996, p. 240). Learning is characterised by Argyris (1999) as single or double loop. Single loop learning is when individuals detect error and make changes but preserve the status quo. Double loop learning occurs when individuals detect error and resolve the error by changing the existing paradigm. Central to double loop learning is the learning cycle, first coined by Dewey in the 1930s. In organisational research, Kim (1993) adapted the learning cycle to the OADI\_SMM learning model to better understand organisational memory and learning. It mimics other learning models in a continuous cycle of observe, assess, design, and implement, but differs to consider the sharing of tacit knowledge through mental models (SMM). This is important



because lessons learned are the tacit knowledge traditionally stored in human memory (Juran, 1988; Kim, 1993; Simon, 1991). When lessons learned are shared, new knowledge is generated to transform the tacit into explicit knowledge at the collective level expressed as know-why (Nonaka & Takeuchi, 1995).

In project management, lessons learned are an output of the 'assess' stage of the learning model. The project team reflects on the agreed plans and results to determine the successes and failures and subsequently make a decision to produce a lesson learned (Kotnour, 1999). Lessons learned are manifest in organisational memory, which can be defined as "the knowledge from the past" (the contents of organisational memory), and the "means by which knowledge from the past is brought to bear on present activities" (the processes of organisational memory) (Stein, 1995, p. 22). Organisational memory is the consequence of organisational learning, yet organisational memory can impede organisational learning (Lukas et al., 1996; Stein, 1995). Organisational learning requires the social sharing of mental models alongside the formal content of organisational memory (Argyris, 1999; Kim, 1993; Stein, 1995).

Organisational learning is valid learning by individuals in the organisation (Schein, 1997). Valid learning is "continuously going back to reality" where the organisational members become both "doers and thinkers" (Stata, 1989, cited in Senge, 1992, p. 350). It is an organisational competency evident by the capability to transform the learning from experience into skilled action (Argyris, 1999). When the organisation develops the "tools and processes for conceptualising the big picture and testing ideas in practice," it is said to be a learning organisation (Stata, 1989, cited in Senge, 1992, p. 351). The organisational members learn collectively as a total system in a systematic manner to generate change to produce the desired results (Schein, 1997; Senge, 1992).

The rich organisational learning research has little explored organisational memory for learning from experience using lessons learned. The exploration of this study is timely for three reasons.

- In a post-industrial knowledge era, organisations' are characterised by uncertainty, worker mobility, and a plethora of information (Davenport, De Long & Beers, 1998).
- Lessons learned are traditionally stored in the minds of individuals (e.g., Kim, 1993). The non-sharing of lessons learned, or the absence of organisational memory

constrains organisational learning and hence productive and effective performance (e.g., Huber, 1991).

- Lessons learned are the value added, difficult to imitate work experience component of human capital from which to build competitive advantage (e.g., Nonaka & Takeuchi, 1995). In Japanese management, tacit knowledge is a widely recognised source of competitive advantage, a concept gaining ground in Western management (e.g., Nonaka & Takeuchi, 1995).

The words 'information' and 'knowledge' are used interchangeably throughout this thesis, although used as much in context to the discussion as appropriate. This approach is based on Huber (1991), who uses information when referring to data that gives meaning to reduce uncertainty, or to indicate circumstances that are not inferred. Data that is codified and provides some shared meaning is referred to as knowledge.

## **1.2 The research problem and the research questions**

The initial need to know about lessons learned grew out of a project closure meeting when asked what 'lessons' were learnt. At the same time, a strong interest in organisational learning was emerging. Over time, the need to know mushroomed into a proposal to explore the construct of lessons learned and organisational learning. The process took on a complexity between the research problem, the situation, the method of choice, and the personal learning generated (P. Ramsey, personal communication, May 11, 2000).

The workplace problem was to understand what lessons learned meant and why they were asked in a situation far removed in time and space from the actual project task of 'doing.' The personal interest in organisational learning and professional practice in project management created a need to explore the dynamics of lessons learned. It seemed logical to integrate organisational memory, given it is fundamental to organisational learning and constitutes the tacit and explicit organisational knowledge (Ramsey, personal communication, October 4, 1999; Sinkula, 1994 cited in Lukas et al., 1996). The need to know about lessons learned generated into several questions:

1. What is the demographic and professional background of persons practising project management?
2. What is the learning aim (s) or goal (s) for project management practitioners?



3. What is the extent of use of lessons learned in New Zealand project management?
4. What are the behavioural aspects of lessons learned:
  - How are lessons learned used?
  - Why are lessons learned used, and why are lessons learned not used?
  - When are lessons learned used during the project?
  - What happens with lessons learned once created?
  - Are lessons learned shared intraproject, interproject, and intra-organisationally?
5. Do project management practitioners use effective or non-effective organisational learning strategies that enhance or impede project management learning practices?
6. What are the properties of organisational memory?
7. How are lessons learned manifest in organisational memory?

The questions assume organisations that characterise learning organisations will value systematic collective learning and use organisational memory. It is conceptually hypothesised the greater the use of effective organisational learning strategies, the more likely that project practitioners (directors, managers, leaders, coordinators), will report a belief that personal and organisational ability to achieve a successful project has significantly improved at the personal and organisational levels in the past 12 months. Project success is the ability to meet or exceed project stakeholder needs and expectations within time, scope, and quality (Duncan, 1996).

### **1.3 Key assumptions and methodological choices**

The study assumed academic and ethical sanction. Central to this assumption was negotiation with, and approval by a PMINZ branch committee to survey branch members and interview volunteers from the survey. On a professional basis was the assumption of flexibility in professional work to complete this thesis in one academic year.

This research follows a “QUAN+qual” design sequence (Miles & Huberman, 1994; Morse, 1999, p. 61), chosen in line with current paradigmatic thinking. The research population are 47 project management practitioners at two branch meetings of the PMINZ. The methodological choices are the triangulation of a survey, a self-assessment learning questionnaire for the interview participants, in-depth semi-structured interviews, and an extensive literature review. Combined in one study, the quantitative data and qualitative responses from the survey provide conceptual insight and richness to the qualitative information from the in-depth interviews. The goal was to develop a ‘thick’ ‘systemic’

understanding of how things worked in project management using lessons learned characterised by organisational learning (Jick, 1979; Miles & Huberman, 1994).

The organisational learning and organisational memory literature provides the background to the methodology. Organisational learning is predominantly explored using qualitative case studies and in-depth interviews to gain insight into the real world learning of participants through researcher observation and inference (e.g., Argyris et al., 1985, 1999). Less often used is the quantitative survey instrument to derive espoused practitioner theory. An example is the survey by Kotnour (1999), to explore the use of lessons learned in an organisational learning framework at a PMI branch meeting in the USA.

Organisational memory research predominantly employs qualitative case studies and survey instruments. Huber (1991) suggests employing a survey and qualitative tools to explore the memory structure, the processes, and the consequences of organisational memory for organisational performance. Simon (1991) adds any organisational memory research should explore content, access, acquisition, and intra-organisational knowledge transfer.

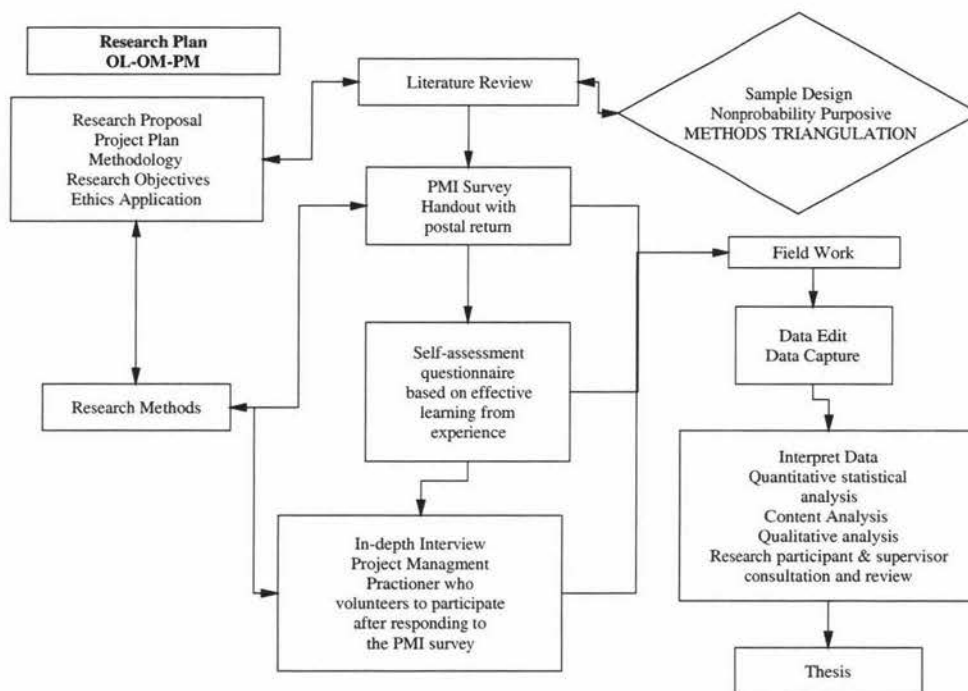
## **1.4 Research plan**

The thesis is organised using project management principles and practices. The scope of the research is limited to the research objectives. During the course of the thesis, an opportunity arose to present a paper at the 2000 PMINZ annual conference. The paper was accepted along with a workshop, and refers to the literature review of this study (Appendix III). A summary of the research findings was presented at a PMI branch meeting, by invitation at an organisation, and by paper document to the research participants.

A Gantt chart logically sequences the tasks in line with the traditional scientific research process (Appendix III). The research is divided into five phases: initiation, planning, execution, control, and closure, with key events summarised into milestones. The project plan documents the scope, objectives, stakeholders, deliverable's, milestones, priorities, constraints, risks, resources, and timeframe, to enable the monitoring of progress.

The research plan relates to the tasks illustrated in Figure 1, and the milestones documented in the Project Plan. The thesis commenced on the 20 September 1999, and ceased on the 31 January 2001 with closure by academic acceptance. Before the pilot test in March 2000, an

academic peer review by the Department of Human Resource Management, Massey University provided ethical approval (Appendix III). The survey recruitment extended over two months. It began on the 15 May 2000 and ceased 31 July 2000. Interviews were conducted between late May through early August 2000.



**Figure 1 Research plan**

## 1.5 Structure of the research report

The thesis is divided into nine chapters. This chapter has introduced the thesis. It clarified the research problem and the research questions, presented the key assumptions and methodological choices, the research plan and the structure of the report. The literature review follows in Chapter Two. It frames the problem and positions the study within the literature, and identifies relevant concepts, methods, techniques, and assumptions surrounding lessons learned, organisational learning, and organisational memory.

Chapter Three discusses the methodology. The methodology details the research objectives and hypotheses, the research instruments, the rationale behind the methodology, the pilot test, and the ethical principles. Chapters Four, Five, Six and Seven present the research findings. Chapter Four profiles the research population, and Chapters Five, Six, and Seven present the quantitative and qualitative findings about lessons learned, organisational learning, and

organisational memory. The discussion about the findings follows in Chapter Eight, and Chapter Nine presents the conclusion, a summary of the research, the dynamic complexity of lessons learned, recommendations for project management practice, the research strengths and limitations, and the implications for further research. The Appendices contain the tables, forms, and management detail.

## CHAPTER TWO: THE LITERATURE REVIEW

*"A learning organisation requires a new kind of capability – the ability to move lessons learned from experience and experiments across boundaries. A few organisations have developed this capability; many have not (Ulrich, Jick & Von Glinow, 1993)*

### 2.1 Introduction

The literature review describes the historical background of the problem, the research studies, and describes and explains the arguments, dichotomies, concepts, constructs, and methodologies used to inform this study. It leads on from the introduction about the study, the research overview, the scope, and assumptions relevant to this work. The purpose of the literature review is to provide an in-depth retrospective of the lessons learned, organisational learning, and organisational memory of the relevant literature. Its benefit is the theoretical groundwork to explore the role of organisational memory for generative learning in project management using lessons learned. Three sections discuss the concepts lessons learned, organisational learning, and organisational memory. The summary draws the review together, places the literature into context, and concludes with the research problem.

The ABI/Inform and Proquest electronic databases, the Massey University library catalogue, the worldwide web, email, face-to-face conversations, and journal articles personally held, provide the sources for the literature review.

### 2.2 Lessons learned

First, the scene is set to place lessons learned in context; next is the exploration of a range of empirical findings and literature about lessons learned, third are the relevant attributes of project management, and lastly is an exploration about the relationship between organisational learning, organisational memory and lessons learned.

#### 2.2.1 Setting the scene

Successful projects date back 2000 years. It is in the past 30 years where project management has grown as a profession formally acknowledged by the founding of the PMI in 1969 in the USA (Lientz & Rea, 1998; PMI, 1999). PMI is a non-profit organisation with over 60,000 members globally (PMI, 1999).

Project management's origins are in "contract administration and task management" (Morris, 1998). Traditional project management focused on completing a task on time, in budget and to specification in a top-down decision-making environment closed off from organisational action (Morris, 1998; Olonoff, 2000). In contrast, modern project management encompasses the organisational environment in which it operates, integrating the principles of disseminated decision-making (Frame, 1995). Project management is change management. It is the "application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project" (Duncan, 1996, p. 6). The purpose of a project is to create a "unique product or service" that has not been done before in exactly the same way (Duncan, 1996, p. 4).

A project is "performed by people, constrained by resources and is planned, executed and controlled" (Duncan, 1996, p. 4). It has a "temporary and unique" nature with a definite start and finish (Ibid. p. 4). A project is a dynamic system characterised by complexity, problem resolution with cause and effect "separated significantly in time and space" (Wheelwright & Clark, 1992, p. 285). There are multiple interdependent components and feedback processes, non-linear relationships, and use of conceptual and procedural knowledge (Stermann, 1992).

As part of a revised project management philosophy, modern project management uses the principles and practice of nine knowledge areas to manage project integration, scope, time, cost, quality, human resource management, communication, risk, and procurement (Duncan, 1996). The nine knowledge areas are specific to the PMBOK as recommended project management standards of practice (Duncan, 1996). The PMI recommend five knowledge areas in which to produce a lesson learned: integration, scope, time, cost, and communication (Duncan, 1996). The five systematic project phases of initiation, planning, execution, control, and closure integrate the nine knowledge areas to systematically manage both operational and strategic change (Duncan, 1996). A current trend in project management is its increasing application to realise corporate strategies and initiatives (Cleland, 1999; Crawford, 1998; Stermann, 1992).

### **2.2.2 What is known about lessons learned**

Juran (1988), a total quality management researcher, describes learning from lessons learned as "the result from decisions and actions that have brought good and bad results" (p. 308). Lessons learned are those things learned from experience, or the outcome from decisions and actions of past successes and failures (Juran, 1988). As a project management output, lessons



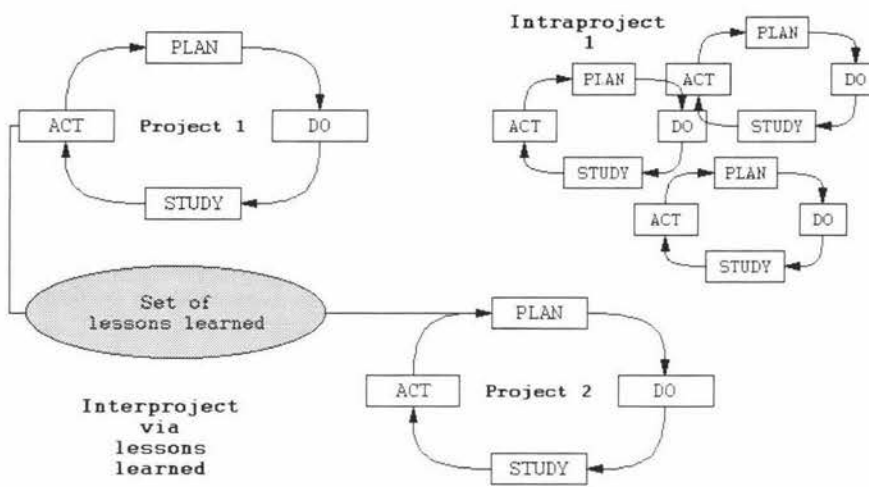
learned “identify the causes of variances, and the reasoning behind the corrective action chosen” (Duncan, 1996, p. 81). Subsequently, they ‘bridge the results’ “to and from the end-users to conduct concurrent evaluation” throughout the project life cycle to gain valuable insight at the post-project phase (Cleland, 1998, p. 50). Abramovici (1999) posits they are an active component of project management to mitigate risk, plan, train, and measure quality.

A recent survey at a PMI branch meeting in the USA found 79 percent of project managers completed a lesson learned (Kotnour, 1999). They produced a lesson learned to deliver a successful project, deliver a series of successful projects, and to build capability. The objective for Kotnour (1999) was to develop a learning framework for project management based on the plan-do-act-check (PDCA) cycle used widely in quality management. Deming first introduced the PDCA cycle to the Japanese in the 1950s as the Shewhart cycle (Senge, 1999). It is a “never-ending cycle of experimentation that structures all quality improvement efforts” (Ibid. p. 36). Kotnour (1999) stressed the need to share experiences to learn about the successes and failures to apply at the intraproject and interproject levels in continuously changing environments where individuals invariably work across multiple projects.

In addition to the ongoing store of information for future projects, lessons learned are a “tool and mechanism for learning and sharing,” and an opportunity for the project team to reflect and understand the project results (Ibid. p. 34). Abramovici (1999), a director of product assurance and a project practitioner, argues the effective management of lessons learned requires collection, understanding, and action, specifically in a multi-project environment in large organisations.

Traditionally lessons learned are stored in human memory or mental models (Juran, 1988). Mental models store the know-how and know-why that make up the major component of organisational knowledge (Kim, 1993, p. 45). When stored in human memory they are invisible and intangible, and become organisational assets only when individuals share mental models (Kim, 1993). The sharing of mental models is the active component of organisational memory. It is only “relevant to organisational learning” when the “organisation chooses to remember from its experience what it pays attention to and how it chooses to act” (Kim, 1993, p. 45). The routine sharing of mental models embeds into current thinking and over time becomes a standardised practice (Kim, 1993).

Intraproject learning is learning ‘within’ projects, while interproject learning is learning ‘between’ projects (Kotnour, 1999). Both intra and interproject learning are interdependent learning cycles (Kotnour, 1999), based on the PDCA quality cycle, which Kotnour (1999) changed to the PDSA (plan, do, study, act) cycle (Figure 2). Intraproject learning produces living lessons learned for interproject learning to provide a “routine, ongoing store of information that are integrated for interproject” lessons learned (Kotnour, 1996, p. 36).



Source: Kotnour (1999)

**Figure 2** Intraproject and interproject learning cycles

When lessons learned are shared, individuals, and subsequently organisations, know what is what. According to Cooper (1998), this avoids erosion of competitive advantage. Lessons learned stored in human memory however, is open to bias, memory lapses, and non “systematic quality analysis” (Juran, 1988, p. 312).

The literature also cites several other limitations to learn from experience, share, and disseminate lessons learned. First is the myth that all projects are different and there is little to learn from other projects (Cooper, 1998). Second, successful project managers may only manage a few major projects in their careers with little time to build experience and capability (Cooper, 1998). Third, in research about product and process development projects, Wheelwright and Clarke (1992) found organisational learning was not a natural consequence of projects as projects were inherently complex, with an ongoing ‘push’ in organisations to move quickly from one project to the next. Fourth, there is often failure to define who the stakeholders are at planning, and fifth, no time, or motivation to read lessons learned by stakeholders (Abramovici, 1999).



Abramovici (1999) argues lessons learned can transcend these difficulties by the timely documentation, formal capture, and dissemination of project management experience. They require specific organisational effort “to do work now” for future benefit (Juran, 1988, p. 314). Further, Abramovici (1999) recommends the content of lessons learned include project success, project failures, suggestions for alternative solutions and improvement ideas. Lessons learned require diffusion at the organisational level, be standardised across projects, and grouped by subject. The exception is customer sensitive data recommended to be restricted to relevant persons (Abramovici, 1999; Frame, 1998).

The traditional project phase to acquire lessons learned is at project closure as part of a review process (Frame, 1998). The review ideally covers the technical, general management, and customer related issues to highlight the “strengths and weaknesses associated with the project effort” (Ibid. p. 243). Some authors in the project management literature advocate the acquisition of lessons learned throughout the life of the project (Abramovici, 1999; Frame, 1998; Kloppenborg & Petrick, 1999). These authors recommend using lessons learned at the initiation phase of new projects, during multi-phase projects, when developing risk management contingency plans, for training and development input, and as part of the continuous quality improvement process.

### **2.2.3 Organisational strategy, project success and competency**

Projects are the building blocks to realise the organisational strategy (Bennett, 1994). According to Crawford (personal communication, July 17, 2000), the “performance of the organisation is the performance of its projects,” as successful projects build successful organisations realised by competent and capable project management practitioners. The challenge for modern project management is to ensure projects support the strategic direction of the organisation in a globally based competitive market (Cleland, 1999). The strategy of the organisation is the determination of the long-term goals and objectives along with the courses for actions and allocation of resources (Chandler, 1969). Projects ideally need strategic fit with the organisational goals and objectives and function in synergy with the mission statement (Bennett, 1994).

Strategy works within the organisational structures inclusive of the lines of control and communication. In the post-industrial knowledge economy, organisational structures are transforming from the traditional hierarchical, bureaucratic structures of the late nineteenth

and twentieth century, to flatter forms and those integrating cross-functional requirements (Nonaka & Takeuchi, 1995). Structured work flows and rigid communication lines of the traditional organisational structure worked in the once relatively stable and certain business environment. In the current complex, turbulent, and uncertain business environment, structured and rigid lines of communication impede the continuous cycle of information within and external to the organisation (Sugarman, 1997).

In a post-modern world knowledge has no control boundary, as knowledge is, and will be controlled more by communities (learning, professional, subject e.g., the project management online web communities of practice), than by legislation (Crawford, 2000; Sugarman, 1997). The challenge for the hierarchical organisation is to manage the preservation of knowledge that overtime tends to “rigidify” with increasing “difficulty to learn new things” (Mills & Friesen, 1992, p. 149). In contrast, flatter organisations have wider spans of control and multiple communication flows. This makes it easier to generate and “digest new knowledge” and promote effective learning (Ibid. p. 149).

Traditionally projects function effectively in organisations with management systems in place to facilitate project management (Duncan, 1996). Project practitioners and academics Ford and Randolph (1998), maintain the organisational challenge in a highly competitive global environment is to manage the “increasingly limited resources,” and at the same time meet customer requirements within cost, time and budget (p. 88). They argue these challenges are met by cross-functional organisations that take advantage of the traditional hierarchical focus, and the flexibility and responsiveness of the ‘projectised’ and matrix structures. Cross-functional structures ease reassignment of “human and financial resources quickly” to meet the dynamically changing external and internal environments (Ibid. p. 88). The matrix organisation sits on the continuum between the functional organisational structure and the projectised organisation.

Slevin and Pinto (1988, cited in Ford & Randolph, 1998) developed a Project Implementation Profile and identified by regression analysis, ten project success factors using project performance as the dependent variable “across the project life cycles” (p. 104). These success factors included a clear project mission statement, communication with clients, and top management project support.

Despite these and other empirical studies, the concept of project success is a widely interpreted concept (Duncan, 1996; Kerzner, 1998; Morris, 1998). Project success is “vexed, as what one interprets as successful, another thinks is a failure” (Crawford, personal communication, July 17, 2000). In the 1960s, technical competence defined project success, and in the 1980s, success was measured by project timeliness and meeting the project budget (Kerzner, 1998). The current interpretation of project success by the PMI is the “meeting or exceeding of stakeholder needs and expectations,” within budget, time and quality constraints (Duncan, 1996, p.6). Projects can provide optimal value or achieve its objectives and yet fail because a specific tool may not have worked (Lientz & Rea, 1998; Morris, 1998).

Competent project practitioners are pivotal to the success of a project (Crawford, 1998). Competency is a multi-dimensional construct encompassing the input of knowledge and qualifications, and the skills and abilities to do a task that a person brings to a job, the processes or a person’s capability to do a job, and the output or performance expected within the industry or organisation in which the individual works (Crawford, 1998). Usher (1997, cited in Nunan, 2000) describes competence as a “predominantly observable behaviour” (p. 50). An individual may have attained a “competency-based qualification” but may lack the broad skills to perform effectively (Ibid. p. 50). Related to career development is career motivation, which Waterman, Waterman, and Collard (1983, cited in Noe, Hollenbeck, Gerhart & Wright, 1997) suggest has three aspects: “resilience, insight, and identity” (p. 421). Resilience is the extent to which employees cope, and insight is awareness about the “strength and weaknesses” of “skills,” “interests,” and the way these relate to career goals (Ibid. p 421). Identity is an employee’s personal perception about the value of the work they do (Ibid. p 421). Employees with “high career insight set career goals” and participate in career development (Ibid. p 421).

The PMI use an input competency measure referred to as the Project Management Professional (PMP) qualification. To reach certification level, a person must either have an undergraduate degree, and three years of documented project management experience in all nine project management knowledge areas, or seven years of documented experience. Once the person is accepted for certification, they must pass the PMP Certification Examination (PMI, 1999). To maintain certification there must be an ongoing obligation to “demonstrate professional commitment to the field of project management” (Ibid. p. 2).

### 2.2.3 Lessons learned, organisational learning and organisational memory

The literature about whether project management practice and organisational learning can coexist is growing in popularity observed by the increasing number of project management journal and practitioner articles and conferences (Olonoff, 2000). In a review of the project management literature, Olonoff (2000) argues both project management and organisational learning is singularly important business trends that can coexist when certain criteria are met. Project management assumes “the ability to plan and allocate known resources” in contrast to the learning organisation, which assumes an “uncertain world” where flexibility, openness and innovation are inherent to its philosophy (Ibid. p. 62). Each discipline “will place demands upon the other” (Ibid. p. 64). An organisational learning philosophy adds value through ‘real’ project learning by sharing knowledge, while a project management discipline, imposes “realities” on the “sometimes abstract world of knowledge management” (Ibid. p. 64).

A recent case study of a large New Zealand organisation explored the barriers to organisational learning in project management practice. A major finding was little “desire” by project management practitioners “to share with others” in a culture that espoused organisational learning (Dougan, 1999, p. 1). Dougan (1999) referred to culture as “the values of learning, sharing, and learning acquisition, and mechanisms for the sharing of learning” (Ibid. p. 1). The core barrier to sharing was the failure to transfer organisational learning principles successfully from a general management to a project management environment. Other barriers to organisational learning in project management practice included unawareness by project team members of project review points where learning could be captured, stored, or disseminated even with capture systems in place, and unknown search know-how to find interproject learning by project managers. Project managers also perceived they were too busy to share and use learning, and found retrieval of detailed project documentation difficult (Dougan, 1999). Dougan (1999) recommended project learning be scoped into project resources and tools to facilitate knowledge management systems either through technology, or by face-to-face and technical-person contact.

Learning and knowledge are fundamental to the strategic direction of the organisation (Allee, 2000). Allee (2000) collaborated with Xerox to implement a knowledge strategy where “sharing and best practices and installing responsibility for sharing knowledge” were part of “ten knowledge-focused strategic” domains to build organisational capability (Ibid. pp. 1-2).

Allee's (2000) work with large organisations found knowledge and learning a social process embedded in conversations and work activities.

Tacit knowledge through work activities, for example, exemplifies the lessons or the experience on the job, and when purposively acted on and shared, transform into lessons learned (Allee, 2000; Kim, 1993). In modern organisations, project management practitioners have multi-media global tools to transfer project learning (Allee, 2000). Yet, in an extensive review of the literature, Olonoff (2000) found minimal practice of creating new project knowledge that was "potentially everywhere" within and external to the organisation (p. 63). Olonoff (2000) posits a "knowledge orientation is an important aspect of organisational learning," and that learning organisations are masters of knowledge creation because they create, share, use and re-use knowledge (p. 61). Olonoff (2000) recommends project leaders take responsibility to facilitate project learning at the team level.

The focus of the project team is to deliver a product or service within a given time frame (Duncan, 1996). Project practitioners share a commonality of principles and practices and they need to know what others know who do similar work (Allee, 2000). They can be likened to a community of practice or a community who learn certain competencies, identify with follow project practitioners, experience similar meaning in their work, and learn or practice similar principles (Wenger, 1999). Communities of practice socialise formally through work interaction (Choo, 1998; Galagan, 1993; Pan & Scarbrough, 1999). Senge (1998, cited in Fulmer et al., 1998) refers to communities of practice as "learning communities" or a "living community of people who have certain shared responsibilities" (p. 2). Groups of people learn collaboratively through joint experimentation, open reflection, and shared insight (Galagan, 1993; Ryan, 1994). They work, learn, and innovate together in an integrated social and technical way.

The PMI is an example of a global community of practice whose members constitute a wide range of industries. They are an analogy to organisational members who do project work within an organisation who may gather informally to share experience. With reference to communities of practice, Allee (2000) makes three relevant points for learning. First, "knowledge cannot be separated from the communities that create it, use it, and transform it," second, in a mobile workforce people tend to identify with their professional identity rather than with an organisation, and third, communities of practice are "powerful vehicles both for sharing knowledge and achieving business results" (Allee, 2000, pp. 4-7).



Sharing knowledge and building capability is the core of organisational learning (Senge, 1992). The challenge for project management is to share and use the lessons learned within organisational and project complexity (Senge, 1992). According to Senge (1992), complexity is of two kinds, detail, and dynamic. 'Detail complexity' is for example, the multiple project variables project practitioners must manage within a continuously changing internal and external environment (Senge, 1992). Conversely, 'dynamic complexity' is where cause and effect of situations are inconspicuous and where the effects from interventions are not obvious over time (Senge, 1992). Detail complexity is likened to a set of operating procedures, while dynamic complexity is where an action in one project has certain consequences with a "very different set of consequences" in another project or organisation (Senge, 1992, p. 71). Put differently, detail complexity is the trees in a forest, while dynamic complexity is the whole forest (Senge, 1992).

The effort to understand complex project systems entails understanding "dynamic complexity not detail complexity," because leverage lies in "seeing interrelationships rather than linear cause-effect chains, and seeing processes of change rather than snapshots" (Ibid. pp. 72-73). Allee (2000) recommends using a systems lens to see the 'forest' (organisation), where a tree (project) fits, by merging the traditional mechanistic project systems with human 'self-organising systems.' Seeing the whole 'forest' allows understanding of how things work together amidst the dynamic human and technological relationships in modern organisations (Allee, 2000). Senge (1992) suggests systems thinking, once understood, "simplifies life" by helping to see how actions "can reinforce or balance each other" through feedback processes in structures that recur again and again (p. 73). In systems dynamics thinking, causal loop diagrams (CLDs) illustrate the reinforcing (R) and balancing (B) processes to see structures in action, and find the "leverage in those structures" to solve issues or strategically plan (Senge, 1992). Reinforcing processes illustrate growth, while balancing processes illustrate resistance or limiting factors (Goodman, Kemeny & Roberts, 1994). The CLDs are the building blocks that represent systems behaviour (Goodman et al., 1994).

## **2.3 Organisational learning**

Organisational learning is learning to build capability to achieve desired results (Schein, 1997; Senge, 1992). A learning organisation collectively learns as a total system (Schein, 1997). It is an "ideal" vision, one that Senge (1992), a prescriptive organisational theorist, describes "as

a group of people working together to collectively enhance their capacities to create the results that they truly care about” (p. 1). Shared learning exponentially generates new learning, which brings about individual and organisational capability to change (Senge, 1992). This section discusses the practical and theoretical organisational learning literature published in the past several decades built on empirical studies in organisations globally.

First explored are the prescriptive learning models, the cognitive processes of learning, continuous improvement and learning, product innovation, and knowledge creation. Next explored is the academic perspective about the paradox of organisational learning, its meaning, benefit, and productive learning capability.

### **2.3.1 Setting the scene**

Organisational learning embeds into multi-disciplines in academic and prescriptive theory (Argyris, 1999; Dodgson, 1993). The academic literature focuses on organisational learning, while the practical literature focuses on the ‘idea’ of the learning organisation (Argyris, 1999). Both prongs examine the organisational capability to transform learning from experience into “effective action” (Ibid. p. 14). The prescriptive literature assumes that learning transformation is possible through certain roles or “enablers” such as policies that if created, will produce intended consequences (Ibid. p. 14). In contrast, the academic literature sceptically argues that barriers to effective organisational learning are the consequence of real world actions entrenched into organisational behaviour (Argyris, 1999).

### **2.3.2 Learning**

Learning from experience is the core of this thesis. A dictionary definition of the concept learning is “the act of gaining knowledge” and to learn is “to gain knowledge by experience to acquire a skill” (Gordon, 1982, p 640). In an organisational learning context, this definition is part learning. Learning to acquire a skill is procedural routine learning or know-how (Kim, 1993; Zack, 1999). Learning new knowledge is conceptual learning or know-why. The conceptual interpretation of the experience is a point of discussion in organisational theory and psychology (Dodgson, 1993).

Understanding the individual process of learning is essential to understand the collective process of learning (Garvin, 1993; Kim, 1993; Kloot, 1997; Roth & Kleiner, 1998; Senge, 1992). Learning research is evident in psychology and education, for example, Piaget’s work

on cognitive-development, Lewin's work on action research, and Freud's work in psychodynamics' (Kim, 1993).

Recent work in organisational learning research includes learning histories by Roth and Kleiner (1998) where the organisation tells its' own history to learn to reflect on its' own experience. For example, an organisational learning history helped a "butane production team at an oil refinery" to improve performance around "continuous learning" (Ibid. p. 43). Continuous learning is about applying four fundamental competencies: personal mastery, mental models, building shared vision and team learning (Senge, 1992). An individual exhibits personal mastery when they have the capability to close the gap between the reality and the vision (creative tension) to create the desired results (Senge, 1992). Mental models store the bulk of organisational knowledge framed through a personal perspective about the world (Kim, 1993). The sharing of mental models advances collective learning, which shapes organisational direction and process through a shared vision (Senge, 1992). At the team level, collective learning enables individuals in teams to be more than the sum of their parts, and in doing so, create synergy (Senge, 1992). Together, these competencies develop the 'fifth discipline' of systems thinking where systematic and collective learning create the synergy to achieve the desired results (Argyris, 1999; Senge, 1992).

Learning is also about unlearning or the discarding of old routines, a concept first introduced by Hedberg (1981, cited in Easterby-Smith, 1997, and Huber, 1991). Discarding old knowledge can occur in two ways. The first way is a process of incremental unlearning where old non-relevant knowledge makes way for new relevant knowledge. The second way is when market conditions change rapidly and the organisational strategists question old views. Easterby-Smith (1997) refers to this process as abrupt unlearning. When unlearning does not occur, the new knowledge is stored over old knowledge and hence inhibits its retrieval.

Organisational learning is competent when there is the capability to know-how to close the gap between the desired result and the current problem, and know-why in a way to generate new learning and change (Argyris, 1999; Ross, Smith & Roberts, 1994). At the organisational level, all organisations are capable of learning but do so at different levels and different paces. This was the finding of a qualitative study using focus group research with geographically dispersed human resource professionals by Calvert, Mobley, and Marshall (1994).



Nevis et al. (1997) reached a similar conclusion about the idea that all organisations learn but do so at different levels and different paces. In a two-stage intensive case study of service and manufacturing organisations and thirty 500 Fortune companies in the USA, they found four common themes. First, all had systems to support learning, second, learning conformed to culture, third, learning styles varied between learning systems such as the way the organisation gathers and uses knowledge, and fourth, the generic processes of ease or difficulty for learning to happen facilitated or inhibited learning. They argue learning based on experience enabled by processes and capacity, maintained and improved performance.

In later action research, DiBella and Nevis (1998) found learning conformed to culture when knowledge and “behaviours about values were continuously shared” (p. 15). They found facilitating factors and learning orientations enabled the capability to learn. Facilitating factors are “structures and actions that affect how easy or hard it is for learning to occur,” and the extent of effective learning that occurs (Ibid. p. 24). For example, the “scanning imperative” facilitates the acquisition of knowledge by “way of sensing developing problems or opportunities and acting on them” (Ibid. p. 64). Learning orientations are the learning styles that describe the learning processes, for example, a “knowledge reserve” by individuals may impede knowledge dissemination or provide a media for sharing (DiBella & Nevis, 1998, p. 64).

### **2.3.3 Prescriptive approaches to organisational learning**

This prong of the literature targets practitioners. The multi-disciplines include organisational development and psychology, the production management orientation, management science, organisational culture, organisational communication, and systems dynamics (Argyris, 1999; Dodgson, 1993; Easterby-Smith, 1997). The disciplines are not mutually exclusive, as each overlaps in part with the other in terms of practice within the organisation. At the same time, each discipline contributes beneficial ideas and ideals along with the limitations for organisational learning. The multi-disciplinary approach better enhances the use of the appropriate types of research methods, topics and theoretical stances (Argyris, 1999; Easterby-Smith, 1997). The challenge is to draw together the multi-disciplinary approaches, which are complex and fragmented in research purpose, perspectives, and theoretical threads (Argyris, 1999; Dodgson, 1993; Easterby-Smith, 1997).

## ***Organisational development and psychology***

Organisational development and psychology concerns the learning processes of the human resources within the organisation (Easterby-Smith, 1997). Argyris (1999), an organisational learning researcher, suggests the opportunity to develop and enhance organisational capability to perform competitively rests with the organisational members who learn to question, experiment, adapt, and innovate. Individuals learn by cognitive adaptation and generation, which Argyris (1999) describes as a process of single or double loop learning empirically based in Model I and Model II theory.

At the organisational level, learning is an organisational competence, an idea that is gaining ground academically and in business practice (Argyris, 1999). Competent organisational learning is the capability by the organisation to discover and correct error and know when they are unable to discover and correct error. Capability is doing something better than others, or having the “skills, knowledge, and personal qualities” for renewal, change, and effectiveness (Ross et al., 1994, p. 512).

### **Model I and Model II theory**

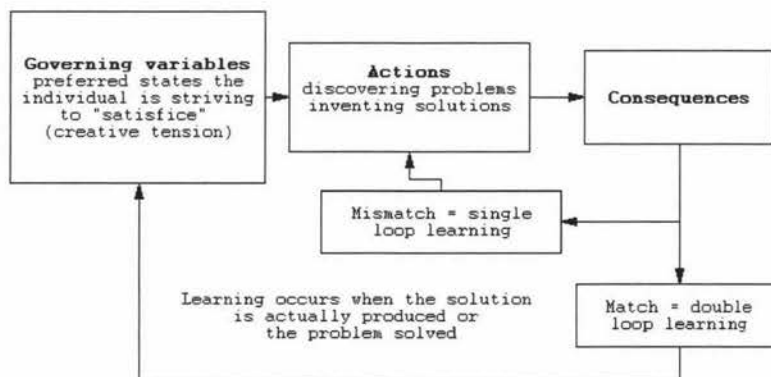
Model I “theories-of-action” and Model II “theories-in-use” explain the causes of individual and organisational learning behaviour (Argyris, 1999, p. 56). The theories-in-use describe how individuals behave, while theories-of-action are espoused beliefs. Individual behaviour expresses the tacit knowledge characterised by effective and ineffective management practice. Organisations learn when management change individual tacit behaviour into ‘skilful’ routines that achieve desired results.

In action research carried out in large global organisations, Argyris (1999) found the effective management of tacit routines was ‘rare.’ A consequence was learning gaps because error reinforced the status quo and mistakes reached the point where they became embarrassing and undiscussable. Argyris (1999) refers to this behaviour as defensive routines, activated because of the need to prevent embarrassment or threat. Defensive routines are the result of routines learnt and embedded early in life (Argyris, 1999). Childhood routines translate into defensive organisational routines when individuals implement tacit theories-in-use to survive professionally.

In a paper on project management leadership, Kloppenborg and Petrick (1999) associated counterproductive project group dynamics with defensive routines. They proposed defensive routines de-motivate teams, inhibit effective learning, lower quality and inhibit continuous improvement. Kloppenborg and Petrick (1999) attributed the cause to individuals who use defensive behaviours to avoid sensitive issues, attribute blame to organisational politics for problems, and shift responsibility from themselves to others.

### Single and double loop learning

In early case study research, Argyris (1976, 1982, cited in Argyris et al., 1985) found most individuals were unaware they practiced Model I theory, characterised by the practices of winning not losing, achieving what one intends, and negativity concealment. This tends to bias learning to the “existing paradigms, product or service” with a focus on current methods or tools to “improve what is already known” (DiBella & Nevis, 1998, p. 50). Single loop learning corrects an error and matches intention with actuality but fails to question the underlying structure (Figure 3). In action learning research with large global organisations, Dibella and Nevis (1998) found that if learning was directed at “creating new paradigms, product or services with a focus on knowledge that challenges the assumptions about what is already known or done,” then learning was double loop (Figure 3).



**Figure 3 Single and double loop learning**

Double loop learning, a concept first coined by Argyris (1976), is enhanced by practicing Model II theories-in-use implicit in individual mental models (Argyris, 1999). It is characterised by the ‘governing variables’ of genuine dialogue, open informed choice, and self-commitment (Argyris et al., 1985; Argyris, 1999). The challenge for management is to help individuals transform espoused theories into theories-in-use by “learning a new set of skills and a new set of governing variables” (Argyris, 1999, p. 60).

Kim (1993) refers to double loop learning as conceptual; “it creates changes in frameworks, which leads to new ways of looking at the world” (p. 46). Double loop learning “produces new or revised routines that are executed in lieu of old ones” (Argyris, 1999; Kim, 1993, p. 46). In qualitative action research, Argyris et al. (1985, 1999) found single and double loop learning occurred on a continuum. Individuals illustrated single-loop learning competence, but general incompetence at double-loop learning. The difficulty Argyris (1999) found were the required competencies and skills to challenge and change current knowledge.

The difference between single and double loop learning is the discovery of a problem and inventing a solution, or striving to ‘satisfice’ the tension between what is desired and the current scenario (Argyris, 1999). An example is the problem solving process. Solving a problem that enhances learning is facilitated by the governing variables of “clear, concrete, consistent, congruent, and available” information; but constrained by “vague, unclear, inconsistent, incongruent and scattered” information that produces error (Schön, 1978, cited in Argyris, 1999, p. 84).

Another finding in the qualitative research by Argyris and Schön (1978, cited in Argyris, 1999), was that individuals who wanted to learn Model II theory-in-use could not do so in the early stages of learning even under a climate of open inquiry. Effective learning could only occur when structural changes allowed the collective sharing of knowledge between individuals who had responsibility to design and implement decisions to promote open inquiry, and continuous testing of new theories-in-use in embedded learning systems (Argyris et al., 1999).

### **Adaptive and generative learning**

Organisational learning can be adaptive or generative. Adaptive organisational learning is the core perception the organisation has about itself and the environment where skill attainment is to achieve an end (Senge, 1992; Barker & Camarata, 1998). Generative organisational learning is the organisation’s ability to question “perceptions about internal and external relationships” (Barker & Camarata, 1998, p. 444). It is the fundamental shift to do something innovative through intentional and continuous scanning of the internal and external environment (McGill & Slocum, 1993). Senge (1992) describes generative learning as the core meaning of the learning organisation, one that continually expands “its capacity to create its future” (Ibid. p. 14).

In case study research at British Petroleum, Dixon and Ross (1999) found generative learning was part of routine learning. British Petroleum derived lessons learned routinely from completion meetings where project team members and often customers, discussed experiences and closed off project phases or whole projects. When project knowledge was widely shared, disseminated, integrated, collectively interpreted, and acted upon with trust, then the total organisation changed systematically. Dixon and Ross (1999) observed individuals were empowered by shared knowledge and acted as both 'doers' and 'thinkers.' Observed benefits were self-generating productive organisational change enhanced by the contribution of multiple individual perspectives to make sense of simple and complex situations (Dixon & Ross, 1999).

### **Learning models**

Learning models are a popular concept to describe the learning process. Dewey, an educator, first introduced the learning cycle in the 1930s, and posited "all learning cycles between four basic stages: discover (the discovery of new insight), invention (creating new options for action), produce (producing new actions), and observe (seeing the consequences of those actions)" (Senge, 1999, p. 40). Completion and continuation of the cycle leads to new discoveries between the "world of thought and the world of action" (Senge, 1999, p. 40). Senge (1999) adds learning is not just an intellectual process or a change in behaviour, but an "interactive process linking the two in a spiral to continually expand our capabilities" (Ibid. p. 40).

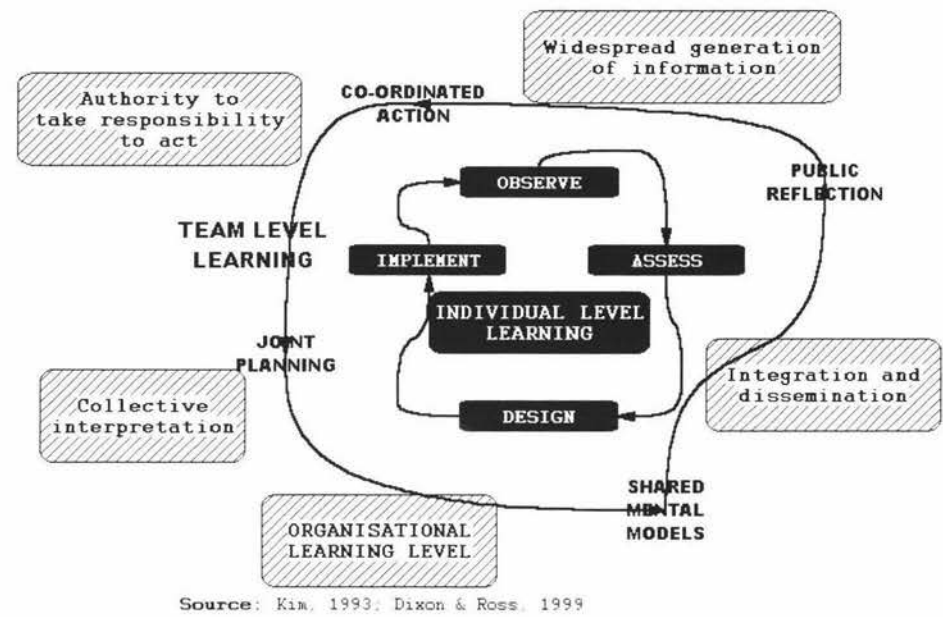
A popular learning model is the Kolb cyclical stages of do (experience), reflect (review of the experience), connect (conclude), and plan (decision about the course of action) (Honey, 1993; Honey & Mumford, 1989, cited in Mumford, 1997; Ross et al., 1994). Effective learning involves interdependence of each learning stage. This was the finding of a case study of student teachers to determine individual learning styles. Perry (1996) found most student teachers cycled through the four learning modes, were single mode dominant, and preferred one learning mode to another from which to learn.

In research to link individual and organisational learning, Kim (1993) adapted the learning cycle to depict the procedural and conceptual levels of learning. Kim referred to the cycle as observe, assess, design, implement (OADI), but found it did not consider the role of mental models and organisational memory for collective learning. To represent learning at the individual, group, and organisational levels, Kim (1993) transposed the OADI cycle into the



OADI\_SMM cycle: a continuous loop of observation, assessment, design, implementation, and shared mental models through organisational memory.

The OADI\_SMM cycle represents generative learning. It better identifies the types of mental models that manage organisational learning complexities, the processes of how mental models cope with this complexity, and knowledge sharing through human memory (Kim, 1993).



**Figure 4 Individual, team, and organisational learning cycles**

In project management, the application of the learning cycle is a means to the delivery of a successful project, a series of successful projects and building capability (Kotnour, 1999). The ‘observe’ stage is the planning by the project team to determine the nature of a problem and construct a resolution (Figure 4). The plan is the “set of expectations about the steps to take and the expected results” and represents the planning phase in a project (Kotnour, 1999). The ‘assess’ stage is where the project team reflects on the agreed plans and results to determine the successes and failures. The output is a lesson learned and is analogous to the control phase in project management. The ‘design’ stage is where the decision is made to close the loop to continue with or abandon the change process, and it is where the project practitioners use the lessons learned in future projects (Kotnour, 1999). The next stage is to ‘implement’ the plan, analogous to the project execution phase.

Figure four represents the OADI\_SMM learning model by Kim (1993) and learning at the individual, team, and organisational levels by Dixon and Ross (1999). In findings at British

Petroleum, Dixon and Ross (1999) observed private reflection became public when individuals openly discussed beliefs in a non-judgemental way. Collaborative planning effort was realised through deliberate shared common insight with learning outcomes either individual or joint. At the organisational level, this translated into organisational learning diffusion. Individuals routinely participated in different parts of the cycle at different times. The benefit was continuous improvement of individual and organisational capability.

### **Spiral of knowledge**

The transformation of individual to collective learning is implicit in knowledge conversion from tacit to explicit knowledge (Nonaka & Takeuchi, 1995; Kim, 1993). Nonaka and Takeuchi (1995) refer to knowledge conversion as an interactive dynamic spiralling process of knowledge creation. In extensive case study research in Japanese organisations, they found three key ways Japanese managers approach knowledge creation by “making tacit knowledge explicit” (Ibid. p. 12). First, there was “heavy reliance” on figurative language and symbolism” to “express the inexpressible,” second, knowledge dissemination required the sharing of personal knowledge, and third, “new knowledge was born in the midst of ambiguity and redundancy” (Ibid. p. 12).

Nonaka and Takeuchi (1995) observed figurative language and symbolism expressed through analogies or metaphors at Honda City when designers proposed a smaller and less expensive version of the Civic. For example, the metaphor of “Automobile Evolution” provided a symbol or imagination for individuals with different experience to understand intuitively what they could not say but could put together in new ways (p. 13). The designers made an analogy to distinguish between two ideas, a cheaper version of the Civic, or the logical progression of the organisation’s mission to develop something new (the Honda City) (Nonaka & Takeuchi, 1995). The example illustrates how personal experience and insight translates into collective insight, which Nonaka and Takeuchi (1995), says is “amplified” by group dialogue, discussion, experience sharing, and observation (p. 13).

Ambiguity and redundancy further enables the knowledge creation process. The designers were required to interpret the clarity of Honda City’s mission statement made ambiguous by confusion at the level of the product development team. Out of the confusion new ideas emerged from different interpretations of the mission statement. As well, the redundancy of repeated dialogue and communication by the designers about the development of the Honda

City built overlapping information, which Nonaka and Takeuchi (1995) argued helped articulate the hard to express tacit knowledge.

Socialisation, externalisation, combination, and internalisation are implicit to knowledge creation theory (Nonaka & Takeuchi, 1995). The tacit to explicit process of knowledge creation is a “continuous and dynamic interaction” shaped by “shifts between different modes of knowledge conversion induced by several triggers” (Ibid. p. 70). Knowledge creation spirals through socialisation to build a “field interaction” facilitated by the sharing of tacit knowledge through mental models (Ibid. p 71). Next, “meaningful dialogue” triggers externalisation of the tacit to explicit knowledge through metaphors or analogies (Ibid. p 71). The action of “networking” triggers the combination of new explicit knowledge with existing explicit knowledge at the intra-organisational level, which Nonaka and Takeuchi (1995) argues, internalises into a “new product, service, or managerial system” (p. 71).

### **Tacit and explicit knowledge**

The continuous spiral of tacit to explicit knowledge creation is built at the group or team level made possible by individuals who serve as the agents for organisational learning (Argyris, 1999; Crossan, Lane & White 1999; Kim, 1993; Marquardt, 1997; Mills & Friesen, 1992; Nonaka, 1991; Scrivastava, 1993 cited in Lukas et al., 1996; Senge, 1992). Individuals acquire tacit knowledge routinely through “education, experience, or experimentation,” and organisations learn when the learning is retained and ideas continuously shared (Ulrich et al., 1993, p. 55).

Explicit knowledge is a well-recognised tool for competitive advantage and is expressed as intuition and expertise at the individual level, and experience, core competencies, culture, and organisational routines at the group level (Galagan, 1993). Conversely, tacit knowledge is not recognised widely in Western management as a tool for competitive advantage (Nonaka & Takeuchi, 1995). It is becoming increasingly apparent it is the value added component from which to build competitive advantage because it is unique and difficult to acquire (Nonaka & Takeuchi, 1995; Senge & Fulmer, 1993; Zack, 1999). It is the intangible cognitive dimension of learning embedded in mental models and know-how at the individual level, and in best practices and routines at the group level (Davenport et al., 1998; Galagan, 1993; Kim, 1993; Nonaka & Takeuchi, 1995; Pan & Scarbrough, 1999; Senge & Fulmer, 1993; Zack, 1999).



Zack (1999) explored tacit knowledge to describe and evaluate the link between knowledge and business strategy in case studies of more than twenty-five firms. Zack (1999) describes the tacit knowledge as that embedded into “complex organisational routines developed from experience,” which is “unique and hard to imitate” (p. 129). The uniqueness of tacit knowledge was found to lead to and sustain a competitive advantage. For example, Big6, an accounting and professional services organisation “providing knowledge-based services,” captured and shared knowledge about key activities across the organisation (p. 129). This enabled Big6 to sustain its competitive advantage by building on new knowledge “rather than reinventing the wheel” (Ibid. p. 129). Big6 managed its tacit knowledge by a computer system to track its’ employee’s experience and training to match their capabilities “to the knowledge and skills” required for future projects (Ibid. p. 130).

### **Experiential learning**

Experiential learning is the most powerful learning and is reframing tacit self-experience and learning at the individual, group, and organisational level (McGill & Slocum, 1993; Senge, 1992). The awareness of the “qualities, patterns and consequences of self experiences in reframed mental models enact understanding of these experiences” (Senge, 1992, p. 68). The difficulty of learning from experience is the inability to observe the consequences of individual or organisational actions when decisions extend beyond the ‘learning horizon,’ or the span of vision to assess learning effectiveness (Senge, 1992). This impedes higher effective learning because mistakes are repeated and defensive routines start to happen.

### ***Production management orientation***

Repeating mistakes implies a gap in learning from experience at the design and implement stage of the learning cycle (Garvin, 1994; Kim, 1993). At the core of Garvin’s (1994) findings when exploring the “general managers role and successful change processes,” is that continuous improvement requires a commitment to learning” (p. 19). Garvin (1993) cites five organisational learning skills or building blocks that make up a learning organisation:

- “Systematic problem solving through quality management.
- Experimentation with new ideas for continuous improvement.
- Learning from experience and past history or lessons learned.
- Learning from experience and best practice of others, or benchmarking.
- Transferring knowledge quickly and efficiently throughout the organisation” (p. 81).

Garvin (1993) argues organisations rarely practice these five skills consistently because they rely on ad hoc and isolated events. Effective learning is when all five skills are embedded into routine practice (Garvin, 1993/94). At the core of systematic problem solving is quality management. The PDCA cycle for example, encourages a systematic “process-orientated way of thinking and developing strategies” to involve organisational members at all levels of the organisation (Imai, 1986, cited in Showalter & Mulholland, 1992, p. 83).

At the practice level, real learning takes place when practitioners continually ask, “how do we know that’s true” by pushing beyond symptoms to “assess underlying causes” (Ibid. pp. 81-82). Garvin (1993) cites Xerox, where decision-making predominantly followed a six-step process to generate ideas, collect information, reach consensus, analyse and display data, and plan actions. Experimentation occurred when there was systematic scanning for and testing new knowledge. Chaparral Steel for example, send senior employees to other organisations and academic institutions to develop and understand “new practices and technologies to apply back in work practice” (Garvin, 1993, p. 83). Lessons learned are an embedded practice at British Petroleum to conduct post-project reviews, deriving lessons from field workers to report annually to senior management (Garvin, 1993). According to Garvin (1993), lessons learned can be a productive failure or an unproductive success.

A “productive failure,” as opposed to “unproductive success,” “is one that leads to insight, understanding, and thus an addition to the commonly held wisdom of the organisation” (Ibid. p. 86). “Unproductive success occurs when something goes well, but nobody knows how or why” (Ibid. p. 86).

Learning from the experience of others or benchmarking is a third effective organisational learning strategy. Benchmarking is a process to learn best practice outside the organisation. Motorola apply it to learning about customer expectations through conversations, and Xerox applies it to warehousing (Garvin, 1993). The advantage is “gaining an outside perspective” about the way things get done, not the results of processes (Ibid. p. 86).

The fifth building block is transferring information quickly and efficiently throughout the organisation. Garvin (1993) cites multi-media communication channels, but argues, “actively experiencing something,” is an effective organisational learning skill (p. 87). Training for example, when applied to “real-life work problems,” provides an opportunity to link conceptual knowledge with know-how (Garvin, 1993).

At the heart of the commitment to learning is the shift from a superficial know-how to a deeper understanding to know-why. Garvin (1993) suggests know-how is partial knowledge as it is an individual's know-how to do things. It is "rooted in norms of behaviour, standards of practice, and settings of equipment" (Ibid. p. 84). Conversely, individuals know-why when they gain a fundamental understanding of the "cause-effect relationships and accommodate exceptions, adaptations, and unforeseen events" (Ibid. p. 85).

### ***Organisational culture***

Culture is described as a "learned way of perceiving, thinking, and feeling about problems that are transmitted to members in the organisation" (Schein, 1984, cited in Walsh & Ungson, p. 63). The organisational culture is the way things get done 'around here,' which Schein (1996) suggests manifests at three levels. The first level is the "deep tacit assumptions that are the essence of the culture," and the second level is the "espoused values that often reflect what a group" publicly wishes and desires (Ibid. p. 14). The everyday behaviour is the third level. Schein (1996) describes this as "the complex compromise among the espoused values, the deeper assumptions, and the immediate requirements of the situation" (p. 14).

An issue arising out of a group culture within an organisation is the silos or communities of practice. In project management, silos can cause dysfunctional cross-functional teams "because the members bring their functional cultures into the project and as a consequence, have difficulty communicating with each other, reaching consensus, and implementing decisions effectively" (Schein, 1996, p. 5). Schein (1996) posits this is because of "the very meaning of the words they use will differ" (p. 5).

To promote organisational learning, it is argued the organisational culture requires the managing of the "cause and effect" of learning (Argyris, 1999; Easterby-Smith, 1997, p. 1086). Choo (1998) suggests group culture is evident by shared meaning based on a "common set of beliefs and values" that culminates in similar behaviour within a group" (p. 84). Culture integrates through a "shared framework of cognitive, behavioural, and affective responses" (Schein, 1985, 1991, & 1992, cited in Choo, 1998, p. 86). In organisations where employees are transient, there is no organisational-wide cultural consensus except at local levels where it is "temporary and limited to particular issues" (Martin, 1992, cited in Choo, 1998, p. 87). Culture may also exist at the sub-cultural levels in organisations that employ groups of diverse professionals (Choo, 1998).

### ***Organisational communication***

Communication is a multi-faceted interactive process of verbal and non-verbal message exchange between a sender and receiver. Organisational communication is traditionally associated with achieving the goals and objectives of the organisation (Barker & Camarata, 1998, p. 444).

In an organisational case study at a division of Kodak, Barker and Camarata (1998) explored communication relationships to sustain a learning organisation. They found the timing, amount, and the types of communication modes were important to share, transmit, and interpret learning effectively, especially in turbulent and unstable environments characterised by complexity and uncertainty. For example, organisational team learning was encouraged through open communication and sharing of information to “produce generative learning” (Ibid. p. 454). Email and meetings enabled the sharing and discussion of team successes and failures in a climate of open dialogue where members could build on other’s ideas to look at new ways to solve problems.

### **2.3.4 Organisational learning - the academic perspective**

The academic perspective focuses on the paradoxical nature, the meaning, benefit, and the productive capability of organisational learning. In contrast to the prescriptive literature, the academic literature is “value neutral” and highlights the gaps the prescriptive literature ignores (Argyris, 1999, p. 7).

#### **The paradox**

Some prescriptive theorists argue organisational learning has no meaning (Argyris, 1999). The sociology literature assumes only individuals are capable of learning and view the idea that organisations learn as a misnomer. Other researchers such as Fiol and Lyles (1985, cited in Argyris, 1999), are not concerned with whether the organisation or the individual is the agent for organisational learning. They define learning as “the process of improving actions through better knowledge and understanding” (Fiol & Lyles, 1985, cited in Argyris, 1999, p. 7). Yet others such as Burgelman (1994, cited in Argyris, 1999), argue whole organisations learn through management or departments, the ‘collective entities’ that occupy high levels in organisational aggregation.

Argyris (1999) argues these perspectives fail to bridge individual and organisational experience and think of management at a high social level. Kim (1993) and Argyris (1999), suggest individuals and organisations learn differently and any theory of organisational learning must consider the actions and interaction between individuals, groups, and the organisation. The centrality of the interaction between these levels is “inquiry” which Argyris (1999) defines as the:

Intertwining of thought and action carried out by individuals interaction with one another on behalf of the organisation to which they belong in ways that change the organisation’s theories of action and become embedded into organisational artifacts such as maps, memories and programs (p. 9).

Individuals act and think ‘on behalf of the organisation’ because organisations are “political entities” (Ibid. p. 9). A collectivity forms when they do three things: first, make collective decisions, two, “delegate authority” for an individual to act for the collective, and three, define membership of a certain collective (Ibid. p. 9). Essentially, different disciplines vary about the role of aggregation for organisational learning. Argyris (1999) argues understanding the “intersections among individual,” group and organisational levels of aggregation provides a lens to “redesign the practices of organisational life,” as individuals make up the organisation, contribute to organisational performance, and the “performance of organisational learning” (Ibid. p. 10).

### **The meaning, benefit, and productive nature of learning**

Argyris (1999) treats organisational learning as a “normative ideal” where learning is viewed as a “value-neutral activity” as opposed to a neutral ideal (p. 10). Nevertheless, some authors challenge the “desirability of organisational learning,” arguing it is an activity that is value laden, reinforces the status quo, and supports managerial control (Ibid. p. 13).

Organisational productive learning is effective but sceptics argue it lacks “coherent and effective action” and “valid inference” (Argyris, 1999, p. 11). Prescriptive theorists maintain organisations serve as stages where individuals and groups act in self-interest incapable of interaction to learn holistically (March & Olsen, 1976, cited in Argyris, 1999). In response, Argyris (1999) argues learning is a cognitive capability per se, which recognises the interactive experiential and cognitive processes that contribute to strategic inquiry.



Other sceptics argue learning from experience in the 'real-world' is a doubtful proposition (Leavitt & March, 1988, cited in Argyris, 1999). The threat to 'valid inference' is that learning from experience is ad hoc and, at best, leads to marginal improvement. Another threat to learning is ineffective action. Kim (1993) suggests incomplete learning cycles fragment or situate learning to certain individuals and groups. Argyris (1999) likens fragmented learning to incomplete actions by individuals caused by organisational designs that systematically make individuals unaware of their underlying actions.

Argyris (1999) suggests organisational learning be seen as a "coherent agent" with the capability to act rationally to make sense of past history, conduct experiments and evaluate the results of actions (p. 11). In several case studies of large global organisations, Argyris (1999) found the levels of aggregation are inherent to organisational learning, as was productive and non-productive learning. Additionally there was persistence by organisations to adhere to traditional practice in face of new information to change.

## **2.4 Organisational memory**

Organisational memory has its conceptual foundations in collective memory originating in the late nineteenth century at the Durkheim school of sociology (Stein, 1995). Since that time the interpretation of organisational memory has varied depending on the discipline. Organisational memory constitutes the content of organisational memory, the processes associated with organisational memory and the consequences (Stein, 1995; Walsh & Ungson, 1991). It is a component of the organisational structure to enable the sharing of decision-making (Huber, 1991). This section explores these attributes of organisational memory and its significance for organisational learning.

### **2.4.1 Setting the scene**

The traditional focus for organisational memory was on information when March and Simon, in 1958 (cited in Walsh & Ungson, 1991), acknowledged that standard operating procedures were embedded in organisational memory. Later Argyris and Schön (1978, cited in Stein & Zwass, 1995) stated information systems memory was a critical component of organisational learning.

The information systems literature is rich in the attempt to make sense of organisational memory as a component of information technology and software applications development

(Anand, Manz & Glick, 1998; Shane & Schumacher, 1996; Stein & Zwass, 1995; Wijnhoven, 1999). Electronic information systems, such as GroupWare and an Organisational Memory Information System (OMIS), enable the capture, storage, retrieval, and distribution of an organisation's documented knowledge. Electronic organisational memory can contain "attributes of culture, history, and business processes" (Zack, 1999, p. 126).

Memory and memorising information are separate concepts (Lukas et al., 1996). Memory is "stored information," while memorising information is the human process of "encoding information" (Ibid. p. 240). Both memory and memorising strongly link with information management and information processing theory, or the processes, storage, and use of information (Anand et al., 1998; Huber, 1991; Moorman & Miner, 1997; Shane & Schumacher, 1996; Walsh & Ungson, 1991). The difference between memorising information and memory is its use and temporal attributes (Lukas et al., 1996; Walsh & Ungson, 1991). Individuals encode information into memory because of the learning activity. Through the active process of sharing, the development of organisational memory is made possible (Kim, 1993; Lukas et al., 1996).

#### **2.4.2 Organisational memory processes**

The acquisition, capture, retention, retrieval, maintenance, and search capabilities define the organisational memory processes (Huber, 1991; Kim, 1993; Kloot, 1997; Stein, 1995; Stein & Zwass, 1995; Walsh & Ungson, 1991). Stein (1995), and Stein and Zwass (1995) argue the processes "provide the means by which knowledge from the past is brought to bear on present activities, thus resulting in higher or lower levels of organisational effectiveness" (p. 26). Stein (1995) posits organisational memory is the capability to ensure organisational features persists over time within a social system. According to Walsh and Ungson (1991), organisational memory plays two broad organisational roles: first, the content contributes to individuals "efficient and effective decision-making," and second, it can reduce costs associated with "the implementation of a new decision" by retrieving the how and why of past decisions (p. 73).

Earlier organisational behavioural research by Huber (1991), suggests organisational effectiveness is not always achievable through learning, or results in organisational behavioural change. Huber (1991) argues an entity learns through information processing when there is a potential change in a range of behaviours. Information processing involves



four constructs or “logistical processes,” acquisition, distribution, interpretation, and storage of knowledge in organisational memory (Huber, 1991, p. 89).

At a similar time, Walsh and Ungson (1991) developed a ‘coherent’ theory about organisational memory with possible research agendas. They argue organisational memory has three imperatives: a “locus” or retention structure, the processes “by which information is acquired, stored, and retrieved,” and the “precise ways by which organisational memory is consequential to organisational outcomes and performance” (Ibid. pp. 61-62).

In a cross-sectional survey of research and development activity in the American manufacturing industry, Cohen and Levinthal (1990) found organisations were “sensitive to the characteristics of the learning environment in which they operated” (p. 149). They suggested an organisation’s ‘absorptive capacity’ depended on the learning from past organisational experience. Absorptive capacity is the organisation’s “ability to recognise the value of new information, assimilate it, and apply it to commercial ends” (Ibid. p. 128). Absorptive capacity is intangible with indirect benefits, and is more likely to be “developed and maintained” when it is a “by product of routine activities” that are related to the current knowledge base (Ibid. pp. 149-150).

In an organisational learning context, organisational absorptive capacity depends on the capability of its employees and their prior investment in acquiring new knowledge. Cohen and Levinthal (1990) found the organisations absorptive capacity is not simply the sum of its member’s absorptive capacity or knowledge acquisition. Absorptive capacity is dependent on the transfer of knowledge within and external to the organisation. It is putting “new knowledge” into memory and the retrieval and use of knowledge that develops memory (Ibid. p. 129).

In later case studies of two organisations to explore organisational learning and management control systems, Kloot (1997) found “four constructs integrally linked to organisational learning: knowledge acquisition, information distribution, information interpretation and organisational memory” (p. 56). Kloot (1997) based this assumption on the work by Levitt and March (1988) and Huber (1991), to define organisational memory “as the means by which knowledge is stored for future use” (p. 57).

Two issues threaten organisational memory as an information process mechanism: ambiguity and uncertainty. Ambiguity manifests from interpretation of retrospective tacit information that often has multiple meanings according to past individual or organisational experience (Choo, 1998). This assumption differs from research by Nonaka and Takeuchi (1995), where they found that out of the confusion of ambiguity new ideas emerged from multiple interpretations. Uncertainty manifests by designing memory process actions to enact in the future in a constantly changing internal and external environment.

The issue of uncertainty was the experience of one organisation where project knowledge was “hard to find and prone to disappear without a trace” threatening competitive advantage (Shane & Schumacher, 1996). In a development project to capture intellectual assets in a project management organisation, Shane and Schumacher (1996), found knowledge was inaccessible and problems were inherently difficult to solve. They attributed these issues to the project management environment, arguing projects are inherently complex and use linear problem solving in a non-linear fast changing environment. Because of the structural limitations of project management, the proposed design of the electronic memory system enabled social and technical issues to interact and incorporate tacit and explicit knowledge.

### **Acquisition and capture**

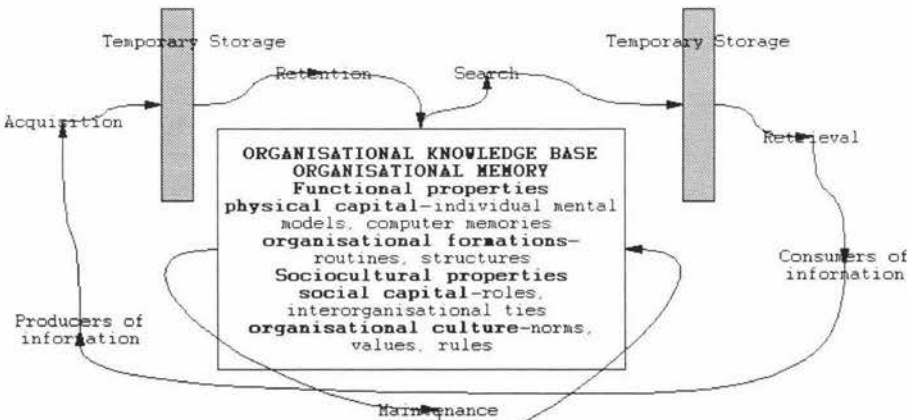
Walsh and Ungson (1991) associate knowledge acquisition with information from decision-making and the solving of problems, while Stein (1995) associates acquisition with learning. Acquisition occurs through a problem that stimulates an event to acquire information, which then encodes into human memory (Walsh & Ungson, 1991). The organisation also acquires the organisational response to the problem (Walsh & Ungson, 1991). It is the organisational decision through interpretation and the “subsequent consequences that constitute organisational memory” (Ibid. p. 62).

Kloot (1997) suggests prior knowledge enhances learning and acquisition. Effective acquisition requires “searching (intentional) and noticing (unintentional)” (Huber, 1991, cited in Kloot, 1997, p. 56). The organisation scans for the problem, its resolution, and to monitor performance (Kloot, 1997). When referring to an OMIS, Stein and Zwass (1995) argue acquisition requires a means of transferral to link “internal and external data sources, information filtering, limited language processing, and intelligent summarising capabilities” (p. 104).

Stein (1995) associates acquisition with higher (double loop) and lower (single loop) levels of organisational learning, and according to Stein (1995), first coined by Bateson (1972), and Argyris and Schön (1978). Stein (1995) argues knowledge acquisition occurs through human capital and records. In an ethnographic study of design engineers, the acquisition of “technological solutions into organisational memory for possible use in current and future designs” was a strong finding in semi-structured interviews by Hargadon and Sutton (1997, p. 733). The designers acquired information by “talking to and watching new clients, by reading about the industry” and in the design process (Ibid. p. 733). Weick (1979, cited in Walsh & Ungson, 1991) suggests a key barrier to acquisition is the variant interpretation ‘schema,’ and “organisational frames of reference” that “may block, obscure, simplify, or misrepresent some attributes of the decision stimuli and organisational responses” (Ibid. pp. 62-63).

### Storage and retention

Organisational memory serves as a medium to perpetuate stored information over time from which to make decisions, facilitate dialogue and debate, solve problems, and answer questions (Choo, 1998; Stein, 1995; Stein & Zwass, 1995; Walsh & Ungson, 1991). A popular metaphor for organisational memory structures is storage bins.



Source: Adapted from Lukas et al., 1996; Stein & Zwass, 1995

**Figure 5 Organisational memory process and content**

Walsh and Ungson (1991) borrow the idea of a “storage metaphor from individual-level memory processes” first coined by Cowan (1988) (p. 63). They posit memory is stored in five storage bins: individuals, culture, transformations, structures, and ecology internal to the organisation, and external archives. Lukas et al. (1996) later coined the storage bin metaphor to describe how marketing channels learn and remember. Based on case study research, Lukas et al. (1996) posits there are four storage bins that make up the functional and

sociocultural properties of organisational memory. The functional properties are the physical capital and the organisational formations, while the sociocultural properties are the social capital and organisational culture of organisational memory (Figure 5).

Walsh and Ungson (1991) suggest individuals base what they store in human “belief structures” or personal “direct experiences and observations” (p. 63). At the organisational level, individuals store information in information technologies, an idea suggested as early by March and Olsen (1975), Weick and Simon (1979), Yates (1990), and Huber (1991) (Walsh & Ungson, 1991). Lukas et al. (1996) suggests information is manifest in individual employees, computer memories, and documents that make up the organisation’s physical capital. Hargadon and Sutton (1997) found strong evidence of these assumptions. They observed knowledge about “potential solutions residing in the minds of individual designers” from previous design experience and observations of fellow designer’s experience in conversations or readings (Ibid. p. 735). The designers routinely “stored specific knowledge” and routinely “maintained and refreshed knowledge until it could be used” (Ibid. p. 735).

Lukas et al. (1996) maintain the norms, values, rules, and speech, are manifest as organisational culture and constitute the sociocultural properties of organisational memory, while Walsh and Ungson (1991) differentiate culture as a separate storage bin (Figure 5). Walsh and Ungson (1991) posit organisational memory is stored in the collectivity of culture in language learned in the organisation, “shared frameworks, symbols, sagas and the grapevine” (p. 65).

The logic of the transformation process also stores organisational memory, for example, an input could be a problem, and the output could be the problem resolution and subsequent action (Walsh & Ungson, 1991). Another example is the standard operating procedures referred to as schema or transformations that guide action to deal with the environment (Walsh & Ungson, 1991). Lukas et al. (1996) suggest the transformations, routines, and structures are part of the organisational formations, while Walsh and Ungson (1991) refer to structures inclusive of roles as one storage bin. According to Lukas et al. (1996), roles constitute the social capital of organisational memory.

Walsh and Ungson (1991) argue roles link with organisational structures as employees interact with other organisational members. Consequently, employees behave according to organisational rules and encode certain behaviours (Walsh & Ungson, 1991). Organisational

memory is also encoded into the workplace ecology such as the workplace layout, which Walsh and Ungson (1991) says shapes and reinforces employee's behavioural patterns. The external organisational archives are another source of organisational memory. Past employees store information about the organisation, as do competitors and other memory such as government records. External archives are what Lukas et al. (1996) refer to as firm-to-firm ties that are part of the sociocultural properties of organisational memory.

Two main barriers exist for encoding knowledge into organisational memory. First, electronic organisational memory assumes knowledge is explicit, but what is implicit cannot be stored (Stein & Zwass, 1995). Implicit is the context of a problem that the documentation often excludes from a decision. The second barrier is a consequence of search mechanisms and retrieval processes.

### **Retrieval processes and search mechanisms**

The retrieval of organisational memory relies on efficient and effective search mechanisms (Stein & Zwass, 1995). Indexing is a key tool but inhibited by search engines that do not allow full-text retrieval (Ibid. p. 105). Retrieval of information can occur on a continuum from automatic, which is easy, to controlled, which is not easy depending on the storage bins (Walsh & Ungson, 1991). Shared repeated procedures and practices invoke ease in retrieval, while conscious retrieval of information from the organisational culture invokes non-ease of retrieval (Walsh & Ungson, 1991). The non-ease of retrieval could also be attributed to organisational memory distributed across "different memory facilities" (Stein & Zwass, 1995; Walsh & Ungson, 1991, p. 62). Some of this organisational memory is unavailable due to its "unknowable nature" (Weick, 1979, cited in Walsh & Ungson, 1991, p. 62).

Hargadon and Sutton (1997) observed the ease of retrieval when they noticed the designers retrieved information through "conversations, brainstorming, and other group problem-solving activities" (p. 735). There were two retrieval processes evident. Designers retrieved "technological solutions through analogic thinking and through established routines for sharing the problems of a current design" (Ibid. p. 738). Schön (1993, cited in Hargadon & Sutton, 1997) define analogic thinking as "generative metaphors in creative problem solving" (p. 738). According to Neustadt and May (1986, cited in Walsh & Ungson, 1991), it is the purposeful and conscious effort to make an "analogy to a past decision" to retrieve information (p. 69). Established routines included emails and informal conversations that followed weekly meetings. Search mechanisms also enabled ease of retrieval through



physical display of the designer's work, continuous conversations with other designers about "who has what design knowledge," and informal lunches and meetings (Ibid. p 738). Specialist design knowledge was an asset and treated with respect by colleagues. Specialists were considered experts and when a solution was required in a certain project, then the project leader would try and involve that expert.

The electronic retrieval of information can be constrained by irrelevant information when searching for information to solve a problem, or alternatively the individual searching for the information may reconstruct the information that does not match pre-indexed information (Stein, 1995). According to Stein (1995), the search process consists of three tasks. First, the users goals and the context must match what is sought, second, prior knowledge of the system's structure is required, and third, the development of the query requires interaction with the system to refine, and redefine the search. At the individual and organisational levels search mechanisms are categorised by Stein (1995) into "schemas, scripts, and systems" (p. 27).

Schemas are individual "cognitive structures to organise and process information efficiently," to "aid retention and retrieval" (Ibid. pp. 27-28). Schema categorise information into structural properties, for example into a conceptual group such as project leadership, further divided into director, sponsor, manager, or co-ordinator (Stein, 1995). Sharing of the conceptual group occurs at the collective level because individuals are like holograms: they "maintain the values, norms, and images of the organisation" (Ibid. pp. 28-29). Scripts on the other hand, are the transformations or procedural memory such as routines, while systems are the "social fabric of organisations" (Ibid. p. 28). A system is the inter-related elements, which directly or indirectly connect (Ackoff, 1971, cited in Stein, 1995).

### **Maintenance and organisational memory loss**

Another process inherent to organisational memory is maintenance (Stein, 1995). The organisational memory is maintained when the organisational members have access to the organisational memory knowledge and expertise. A condition of maintenance is complete, up-to-date, and relevant content to avoid the loss of history. There is a paradox; on one hand, the reinforcement of the organisational social structure is crucial, while on the other hand, some memory needs elimination to deal with change and promote new learning (Stein, 1995). Additionally, relying on the retrieval of experience from the past, may inhibit innovation and

lead to “tunnel vision” through failure to acknowledge new internal and external opportunities (Johnson & Paper, 1998, p. 517).

Despite the risk of tunnel vision, the absence of knowledge structures inhibits organisational learning (Huber, 1991; Juran, 1988; Simon, 1991; Stein, 1995). Employee turnover, restructuring, ineffective retention structures, and ad hoc maintenance of records over time constrain learning and fragments memory. For example, employee turnover inhibits cumulative learning by continuously eroding experience (Kim, 1993; Simon, 1991). These disablers of cumulative learning are counteracted by systemic organisational policies to interpret and distribute information, and the effective design of acquisition storage, search, and retrieval systems (Davenport et al., 1998).

### **2.4.3 Organisational memory properties**

The organisational memory properties are the “knowledge from the past” that concerns the knowledge base of the organisation (Stein, 1995, p. 22). An important conceptual property of organisational memory is its persistence as a record not dependent on a close affiliation between a sender and receiver (Stein, 1995). It is a type of information differing from management information systems. Information systems target message encoding, transmission, and decoding on a two-way basis between a sender and receiver. Memory systems are one-way where “temporal distance is significant” (Ibid. p. 22).

March and Olsen (1976, cited in Walsh & Ungson, 1991), argue organisations have memories consisting of “past events, promises, goals, assumptions and behaviours” of humans (pp. 62-63). Both Huber (1991) and Simon (1991) view memory from a sociocultural perspective. Huber (1991) argues memory resembles the human brain, while Simon (1991) argues all learning occurs in the human brain. Simon (1991) adds that in organisations, most learning is stored in human memory with minimal electronic or manual documentation. Argyris and Schön (1978, cited in Walsh & Ungson, 1991) dispute the idea that organisations have memories, maintaining, “organisations do not literally remember” (p. 58).

The discord in the literature is the assumption that information processing is either a social and organisational event or a technical function. Walsh and Ungson (1991) integrate the social and technical facets stating organisational memory is an instrument to store “information from an organisation’s history” that can be retrieved for decision-making (p. 61). In extensive research with Japanese managers, Nonaka and Takeuchi (1995) maintain



learning from the experience of the past “is focused on developing or modifying routines,” for which organisational memory serves as a support mechanism (p. 45).

The properties of organisational memory were the focus of a qualitative study of 92 new product development projects by Morman and Miner (1997). They found in development projects there was the need to understand the different features of organisational memory and how it influences new product development if organisational learning benefits such as competitive advantage were to be realised.

In a retrospective case study of Buckman Laboratories, Pan and Scarbrough (1999) explored “knowledge sharing processes” through the technology, structures, and culture of the organisation (p. 359). Among the key findings was evidence that top management played a critical role in the sharing and use of knowledge, made possible through virtual informal communities of practice.

#### **2.4.4 Organisational learning and organisational memory**

Organisational memory is the consequence of learning because memory is required to store learning (Argyris & Schön, 1978, Hedberg, 1981, both cited in Stein, 1995, p. 20; Sinkula, 1994, cited in Lukas et al., 1996). According to Stein (1995), sustained organisational memory will:

- “Support management to maintain strategic direction over time.
- Avoid reinventing the wheel.
- Provide new meaning to the work of individuals if such efforts are retained.
- Facilitate organisational learning through better understanding of memory processes to provide new paths for organisations to profit from organisational knowledge.
- Strengthen the identity of organisations.
- Provide newcomers with access to the expertise to those who preceded them” (pp. 31-32).

Organisations must ‘rely’ on organisational memory because business is shifting “from one dominated by economic capital to one dominated by social capital” (Brenneman, Keys & Fulmer, 1998, p. 64; Zack, 1999). Social capital is reflected in human “relationships, trust and goodwill” within organisational and societal communities (Cook, 2000, p. 1).

In organisations, employees who learn collectively in a climate of trust build the experiential knowledge gained by everyday organisational work successes and failures (Hargadon & Sutton, 1997). An ethnographic inductive study of forty-five engineers and thirty-five managers by Hargadon and Sutton (1997), illustrated these benefits in a technology-brokering organisation innovative in new product development. Hargadon and Sutton (1997) found organisational memory was a critical link in the product design process. To illustrate, organisational memory enabled “analogies between past technological solutions and current design problems” to generate alternative solutions (Ibid. p. 739). They allowed the designers to see past technological solutions through new lens to accept what was relevant and ignore what was not.

Effective organisations exploit knowledge at the strategic and operational levels (Quinn, Anderson & Finkelstein, 1996). Stored knowledge enables learning from past success, mistakes and failures (lessons learned), and builds collective experience. Its greatest potential is in sharing experiential knowledge to improve task performance. When knowledge is shared and captured, it grows exponentially leading to an enriched knowledge base, builds and sustains competitive advantage, and is more likely to sustain market leadership (Quinn et al., 1996; Stein & Zwass, 1995). Consequently, talented people strive to work for the organisation further enhancing strategic success.

In an ex-post analysis of three organisations with an OMIS, Wijnhoven (1999) found the research, design and analysis to develop rules for the effective management of organisational memory was at its early stages of development. Wijnhoven (1999) recommends the alignment of organisational memories with strategic organisational goals, and facilities to “improve dispersed and fragmented memories” (p. 146). In this way, Wijnhoven (1999) suggests that organisational effectiveness is enhanced, which in turn enhances business success.

## 2.5 Summary

The literature review has described and explained a range of studies, academic perspectives, and practical viewpoints about lessons learned in project management, organisational learning, and organisational memory.

## **Lessons learned**

Lessons learned are a project management output to learn from the experience of the project to better manage the gaps between planned and actual activities. Lessons learned provide the opportune tool to explore the transformation of learning from experience into skilled action to achieve a successful project. Commonly they are referred to as the past successes and failures that arise from decisions about a problem or issue.

A project is a temporary and unique entity with a definite start and finish where cause and effect is separated significantly over time and space. It is characterised by complexity, linear phases, non-linear relationships, and its use of procedural and conceptual knowledge drawn from multi-disciplines.

In a survey of project practitioners, 79 percent used lessons learned (Kotnour, 1999). They produced a lesson learned to deliver a successful project, deliver a series of successful projects, and to build capability. Kotnour (1999) used the findings to develop a project-learning framework based on the PDCA quality cycle. The learning cycle is a useful tool to frame the production of lessons learned and what happens to them after they are produced.

The OADI\_SMM cycle considers the sharing of mental models critical to organisational learning that the PDCA quality cycle does not (Kim, 1993). The sharing of the tacit experience by individuals invokes a collective action at the interpersonal level, in groups, and sometimes at the organisational level. The intentional sharing of mental models is the active component of organisational memory, and is only relevant to organisational learning when the organisation chooses to remember from its experience (Kim, 1993). The contention is that storing lessons learned in mental models may open up interpretation and recall bias, and non-systematic quality analysis (Juran, 1988). The main risks for not choosing to remember lessons learned are the failure to know what is happening, and the cost of repeating past mistakes which erodes competitive advantage (Cooper, 1998; Juran, 1988).

## **Organisational learning**

A concern from the literature review is the grey area concerning the integration of project management with organisational learning. The issue is the linearity and task focused orientation of project management in contrast to the non-linear and continuous cycle of thinking, doing, evaluating, and reflecting characteristics of organisational learning (Senge,

1992; Wheelwright & Clarke, 1992). It is suggested this barrier can be overcome by the formal acquisition, capture and dissemination of lessons learned (Abramovici, 1999). At the core of this capability is the competence of the project practitioner, the success of the project, and the strategic fit of the project with the organisational objectives. The cited barriers are ineffective knowledge transfer and non-sharing of lessons learned in and between projects (Dogan, 1999).

Collective learning enables the achievement of the desired results (Schein, 1997; Senge, 1992). Shared learning exponentially generates new learning, which brings about individual and organisational capability to change (Senge, 1992). Learning requires five competencies: personal mastery, mental models, building shared vision, team learning, and systems thinking (Senge, 1992). Unlearning is a requirement of learning to make way for new knowledge. Competent organisational learning is the capability to know how to close the gap between the desired result and the current problem, and know why in a manner that generates new learning, revised ways of doing things, and change (e.g., Argyris, 1999).

The prescriptive approaches to organisational learning are abundant, multi-disciplinary, and fragmented in nature, and generally argue enablers such as policies, when created, produce intended consequences. The academic perspective is minimal in contrast and argues real world action in organisational behaviour impedes organisational learning (Argyris, 1999). However, both approaches focus on the organisational capability to transform learning from experience into effective action.

Essentially the prescriptive literature suggests an organisation builds and sustains competitive advantage by its members learning to question, experiment, adapt, and innovate (Argyris, 1999). Organisational members learn effectively when they use espoused theories and not the theories-in-use. The difference is the capability to manage defensive routines that inhibit double loop learning, and the resolution of a problem that changes the underlying structure of an activity for future organisational benefit.

Organisational behaviour research suggests routine problem resolution, learning from project management mistakes, and the sharing and dissemination of this learning, brings about self-generating productive organisational change enhanced by the contribution of multiple perspectives to make sense of complex situations (Dixon & Ross, 1999). In this way, the creation of knowledge spirals dynamically from tacit to explicit and back to tacit (Nonaka &

Takeuchi, 1995). It is the tacit knowledge that is value added; it is a tool to build and sustain a competitive advantage because of its unique and difficult acquisition characteristics (Nonaka & Takeuchi, 1995).

The significance of tacit knowledge to learn from experiences of the past is one of five effective learning skills Garvin (1993) advocates to build a learning organisation. The other four skills are the capability to systematically solve problems through quality management, experimentation with new ideas for continuous improvement, learning from experience and best practice of others, and transferring knowledge quickly and efficiently throughout the organisation. Other influences that advance or inhibit learning are the culture or cultures of the organisation, the organisational structure, and the variant communication modes.

Whereas the prescriptive literature focuses on the enablers and disablers of organisational learning, the academic literature focuses on the paradox, benefit, meaning, and the productive nature of organisational learning (Argyris, 1999). A key construct is the aggregation of learning at the individual, group, and organisational levels. Aggregation allows an understanding for the redesign of practices entrenched into organisational behaviour (Argyris, 1999).

### **Organisational memory**

Learning is fundamental to organisational memory (Stein, 1995). It constitutes organisational memory content and organisational memory processes (Huber, 1991; Stein & Zwass, 1995; Walsh & Ungson, 1991). The processes are the means by which knowledge from the past is brought to bear on present activities, while the properties are the 'knowledge from the past' that concerns the knowledge base of the organisation (Stein, 1995). The processes define organisational memory and comprise acquisition and capture, retention, retrieval, search mechanisms, and maintenance, while the content are the manifestations of organisational life such as lessons learned (Stein, 1995).

Organisational memory is essential to the organisation to store learning in the physical capital, organisational formations, social capital, and organisational culture of the organisation (Lukas et al., 1996). If organisational memory is sustained it avoids reinventing the wheel and facilitates organisational learning to provide economic profit (Stein, 1995). If not sustained the risk of knowledge loss through turnover and restructuring will be an organisational reality



(Simon, 1991). Case studies evidenced this in large international organisations (e.g., Hargadon & Sutton, 1997).

### **Research gaps**

The review of the literature has minimal known studies exploring the extent and the behavioural characteristics of lessons learned in project management. Although the international organisational learning and organisational memory literature extensively explores the transformation of tacit to explicit knowledge, it minimally explores how this process is realised using lessons learned. Apart from one known New Zealand study exploring the barriers to organisational learning in project management, there is a gap in understanding about the organisational learning capabilities to achieve project success in a project management environment and more so, in learning as an essential component of organisational memory. The gap in understanding about how lessons learned can contribute to project success by effective organisational learning strategies, including organisational memory, invites exploration.

The literature and anecdotal evidence indicates project success is a vexed issue. This opens a space for the exploration of how lessons learned relate to project success. It also opens up an opportunity to explore the extent of use of lessons learned, how project practitioners view the role of lessons learned for project success, and where lessons learned are manifest in the organisational memory. As learning is essential for organisational memory, it is important to explore the effective organisational learning strategies that project practitioners use to realise project success, and ultimately if they perceive any link with organisational success from lessons learned.

The true problem is the minimal understanding about the role of organisational memory for learning in project management using lessons learned, as the title of this thesis states. The exploration of the problem is timely given the shift from an industrial economy to one where global communication disseminates knowledge at “warp speed,” and where “a knowledge advantage is a sustainable advantage” (Allee, 1997; Davenport & Prusak, 1998, p. 17). The significance of this study is a more in-depth understanding about the use of lessons learned, effective organisational learning strategies (including organisational memory), and project success. Furthermore, it will contribute further knowledge about project management and organisational learning in a New Zealand context.

The next chapter details the methodology about how the research was actualised in practice. It collates the study procedures and operationalises the questions first conceptualised in the introduction.



## CHAPTER THREE: METHODOLOGY

*"When considering important things like purpose, mission, or objectives, I always want to ask, 'What are the roots of this?' and how has this been expressed historically?' That's a way of knowing the real nature of something" (unknown citation in Seagal & Horne, 1997, p. 156).*

### 3.1. Introduction

This chapter follows on from the literature review and outlines how the study was carried out. The research problem was the minimal understanding about the role of organisational memory for learning in project management using lessons learned to achieve project success. The exploration of this problem used methodological triangulation, inclusive of a literature review, survey, self-assessment questionnaire, and in-depth semi-structured interviews.

First discussed are the research objectives and hypotheses, followed by the research instruments, the pilot test, and ethical principles. Central to the discussion are the rationalisation of the chosen methodology and its application to the research design, the data collection procedures, data processing and analysis.

### 3.2 Research objectives and hypotheses

The research objectives provided a purpose for the study and a basis for what the research should accomplish. They defined the scope of the study, and along with the hypotheses, provided an operational framework to empirically test the primary data. The hypotheses directed the study by definition of the research design, framed the conclusion, and developed the theory (Emory & Cooper, 1991). A theory is "a set of systematically interrelated concepts, definitions, and propositions that are advanced to explain and predict phenomena" (Ibid. p. 62).

Theoretical development involved building the theory from the literature followed by cross-comparison with the findings from the fieldwork. Cross-comparison determined the similarities and differences with the use of descriptive and inferential statistics involving multiple variables and abstraction. The analysis and discussion involved the constant referral to the hypotheses and research objectives. The overall design began with the hypothetical statements of causal relationships between the dependent variables (DV), and the independent variables (IV). The research questions in Chapter One were operationalised into investigative questions to answer the research problem. These were to determine the:

1. Demographic and professional background of project management practitioners.
2. Learning aims or goals of project management practitioners when they managed, led or co-ordinated a project.
3. Extent of use of lessons learned by project management practitioners.
4. Behavioural characteristics of lessons learned:
  - How project management practitioners used lessons learned.
  - Why project management practitioners' used, and did not use lessons learned.
  - When project management practitioners used lessons learned during a project.
  - What project management practitioners did with lessons learned.
  - Whether project management practitioners shared lessons learned, intraproject, interproject, and intra-organisationally.
5. Use of effective, non-effective organisational learning strategies that influenced project management learning practices.
6. Properties and processes of organisational memory.
7. Organisational manifestations of lessons learned.

The overall research objective was to investigate and explain the role of organisational memory for learning in project management using lessons learned. Specifically, the intention was to explain the relationship between the effectiveness of organisational memory to manage lessons learned and project success. The assumption is the greater the use of effective organisational learning strategies the more likely project practitioners would report a belief that personal and or organisational ability to achieve project success had significantly improved in the past 12 months. This key assumption was operationalised into the following null hypotheses.

**A\_** $H_0$  Project practitioners would not report a belief that in the past 12 months the use of effective organisational learning strategies (IV) had significantly improved their personal ability to achieve a successful project (DV).

**B\_** $H_0$  Project practitioners would not report a belief that in the past 12 months the use of effective organisational learning strategies (IV) had significantly improved their organisation's ability to achieve successful projects (DV).

$H_0$  reports the testable null hypothesis. It assumes no significant differences in the beliefs about personal or organisational ability to achieve project success in the past 12 months

(McCormack & Hill, 1997). The opposite assumes the alternative hypotheses, i.e. no difference exists in project practitioner's beliefs.

### **3.3 Research instruments**

#### **3.3.1 Survey**

The survey method is a widely used research tool in business studies and the social sciences to gather primary data (Bordens & Abbott, 1996; Ghauri, Gronhaug & Kristianslund 1995). It is also a popular quantitative tool in methodological triangulation (Jick, 1979). The research design can be explanatory or descriptive, as it considers the 'who,' 'what,' 'where,' 'how many,' and 'how much,' and sometimes the 'why' (Barker & Barker, 1989; Ghauri et al., 1995; Yin, 1994).

Explanatory research deals with causal processes to explain the relationships and patterns in the data (de Vaus, 1991). For example, 'why' PMPs (IV) produced a lesson learned (DV) significantly more than non-PMPs (IV). Descriptive research provided a context for the data; for example, quantitative measures described the demographic background of the survey respondents (de Vaus, 1991).

#### **Questionnaire format**

The objective was to design a questionnaire to boost the response rate with accurate completion. The considerations were question sequence, wording, and format (Zikmund, 1991). It was important for the layout to be easy to follow with a non-crowded appearance. The wording attempted to avoid the perception of manipulation, while the five-point Likert scales used scripted choice responses to enhance respondent recall (Gaskell, Wright & O'Muircheartaigh, 1993).

#### **Questionnaire design**

The questionnaire was composed of four sections: Demographic; Project Management; Lessons Learned and Memory Systems; and Lessons Learned and Learning Opportunities (Appendix II). All the questions were designed to measure the objectives of the study.

Section One measured the demographic characteristics of the target population: professional role, industry type, the number of years working in project management by five year groups,

PMP status, career goal, sex, age in five year groups, and ethnicity. The respondent wrote their job title and ticked industry type. Occupation was designed and classified using level one of a three-digit code based on the New Zealand Standard Classification of Occupations (NZSCO95). Industry type was classified according to level one of the Australian New Zealand Standard Industrial Classification 1996 (ANZSIC96). PMP status represented the standardised competency against the PMI global certification process.

Alreck and Settle (1985) suggest demographic questions are placed at the end of the questionnaire for reasons of item completion and to avoid respondent sensitivity. Alternatively, Ghauri et al. (1995) suggest questions be placed in the “right order” so “easy-to-answer questions and positive questions” are placed first (p. 64). The demographic section was placed first as the final section measured learning and organisational memory. These were believed to be a possible threat for some respondents and considered difficult to answer with any subsequent questionnaire items not completed.

Section Two measured the behavioural aspects of the use of lessons learned. All items used project management terminology. It was assumed project practitioners were familiar with this terminology used in the PMBOK published by the PMI. Questions nine, eleven, and twelve used an open-ended format, while question ten used a closed format. These questions asked about the learning goals and the routine use or non-use of a lesson learned (Kotnour, 1999). Questions thirteen and fourteen measured the use of a lesson learned during the project phases and in the nine knowledge areas specified by PMI, i.e., integration, scope, time, cost, quality, human resource, communication, risk, and procurement management. Respondents could choose to tick, and, or make comments for as many items as were applicable. Question fifteen measured the production of a lesson learned against expectations on a five point frequency Likert scale where 1 = ‘all of the time,’ 2 = ‘often,’ 3 = ‘not sure,’ 4 = ‘sometimes,’ and 5 = ‘hardly ever’ (Kotnour, 1999). Respondents had the option to tick that they did not use a lesson learned.

Section Three measured organisational memory processes, sharing attributes of a lesson learned, and the belief about lessons learned as a factor for project success at the personal and organisational levels (Kim, 1993; Kotnour, 1999; Stein & Zwass, 1995). Questions 16 to 25 measured the items on a five point Likert scale where 1 = ‘all of the time,’ 2 = ‘very often,’ 3 = ‘often,’ 4 = ‘sometimes,’ and 5 = ‘hardly ever.’ Questions 26 and 27 measured the level of agreement on a similar Likert scale where 1 = ‘strongly agree,’ 2 = ‘agree,’ 3 = ‘uncertain,’ 4

= 'disagree,' and 5 = 'strongly disagree.' Specifically, questions 16 to 18 asked about the routine acquisition, formal capture, and retention of a lesson learned (Huber, 1991; Stein, 1995; Stein & Zwass, 1995). Question 19 asked if the retrieval of lessons learned was a simple process, and question 20 asked if search mechanisms eased the access of lessons learned (Huber, 1991; Stein, 1995; Walsh & Ungson, 1991). The formal capture of lessons learned refers to an electronic OMIS as opposed to human memory (Stein, 1995; Wijnhoven, 1999).

Questions 21 to 25 measured the generic sharing of a lesson learned, sharing a lesson learned within and between projects, and with the external customers of a project (Kotnour, 1999). The concept sharing is grounded in the sharing of tacit knowledge stored in mental models (Kim, 1993). Questions 26 and 27 measured the level of belief about whether personal and, or organisational ability had significantly improved by using lessons learned to achieve project success in the past 12 months.

The final section, Section Four, measured lessons learned and the perception of learning opportunities about the organisations that respondents worked in on a nine-paired self-assessment questionnaire (Honey, 1993). The original questionnaire was truncated to match effective organisational learning skills such as systematic and collaborative processes, self-responsibility to make decisions and meet objectives, getting to the root cause of problems rather than a quick fix, and experimentation to try different ways of doing things (Garvin, 1993). The possible score ranged from zero to nine. A score of five or more points provided an indicator for the respondents to volunteer for an interview.

### **Reliability and validity**

The Cronbach's alpha measured the reliability of the 13 scale items of the questionnaire (questions 15 to 27) (Coakes & Steed, 1997). Reliability is how "accurate, on average, an estimate of the true score was in the population of objects measured" (SPSS Release 6.1.3). Standardised items have a correlation between '0' to '1.' The closer the alpha is to '1' the greater the reliability (Bordens & Abbott, 1996). The 13 scale items had a relatively high reliability coefficient of 0.786, and a standardised item alpha of 0.800. Item 15 (activities measured against expectations), and item 21 (lesson learned stored in the head), would have increased reliability to alpha 0.793 and 0.797 respectively if removed (Appendix I).



Validity of the questionnaire implies it measured what it intended to measure. The descriptive and explanatory questions designed to answer the research objectives addressed content validity. The literature grounded the questionnaire content to enhance construct validity. The expectation of questionnaire concurrent validity was not realised through the lack of an established measure to correlate the results, however comparison of the findings with the literature provided some predictive validity (Bordens & Abbott, 1996).

### Sample design

The design was a purposive non-probability sample using judgement sampling based on the assumption that the respondents' practiced project management (Emory & Cooper, 1991). Emory and Cooper (1991) suggest this is a good choice rather than using a random selection from a population of general businesspersons whom may have been unfamiliar with the concepts employed. Purposive sampling limited the study to the sample population. It was a snapshot providing insight of reported practice and a platform for future research.

Random sampling error and non-sampling error (bias) are the two main sources of error in a survey. Random sampling error was not applicable to this research. Systematic or non-sampling error was the result of the research design and the administration or execution of the research (Zikmund, 1991). Fifty-nine of the 109 respondents did not return the questionnaire. Ideally, response bias did not occur due to written assurance of respondent confidentiality and the pilot survey that tested for completion accuracy and a clear format (Appendix III). Systematic data editing and ethical practice ideally reduced administrative error. The research was conducted under academic supervision, ethics peer review by the Department of Human Resource Management, Massey University, and the PMI Professional Code of Conduct.

### Response rate

The response rate can be affected by the "nature of the sample," the questionnaire length, and the care taken to implement the survey (de Vaus, 1991, p. 107). A robust way to calculate the response rate was the formula (Ibid. p. 107):

$$\text{Response rate} = \frac{\text{Number returned}}{\text{N in sample} - (\text{Ineligible} + \text{Unreachable})} * 100$$

N = number of questionnaires handed out

Ineligible = do not meet study criteria e.g., are not members of the Project Management Institute (PMI)

Unreachable = not relevant in this study as questionnaires were handed out at two branch meetings

The sample size was limited to a PMI branch that represented the 'qualified' respondents who attended a branch meeting and chose to participate.



## **Data collection**

Following formal sanction from the PMI Committee, the questionnaires were handed out at two sequential branch meetings (May and June 2000). This followed an introduction of the study in the PM Forum (2000, May) (Appendix III), and a brief introduction by the researcher at the two branch meetings. The researcher administered the data collection. The exception was the inclusion of an email reminder sent to the branch members by the membership coordinator to remind respondents to return the questionnaire at three weeks following the first questionnaire handout.

## **Survey administration**

Surveys are administered either face-to-face, by telephone, post or electronic email. The survey by Kotnour (1999) guided the idea to hand out the questionnaires with attached Information Sheets at a PMI branch meeting (Appendix II). The remaining administrative choices were guided by previous experience and included the postal return by a stamped addressed envelope.

Face-to face and telephone administrative methods were rejected on the grounds of high cost, the extended time to administrate, and a target population who were busy literate professionals who generally prefer to respond in their own time frame (Barker & Barker, 1989). The benefits of handing out the questionnaires were personal contact with the potential respondents and the opportunity to talk about the study. The non-use of electronic email was based on confidentiality issues, even though this method had proved effective for "surveying a specific population using mixed mode surveys" (Vehovar & Batagelj, 1996, pp. 1, 5).

## **Data processing and analysis**

The questionnaires were systematically numbered and dated on receipt, checked for completion, and captured into Excel 97. The quantitative data was transferred to SPSS Release 6.1.3, while the qualitative responses from the questionnaire were analysed using content analysis in Microsoft Excel and Word 97/2000. All the data was backed up on floppy disk and in paper form. Storage of the raw data was in a secure location and only available to the academic supervisor.

Data analysis aligned with the research objectives (Barker & Barker, 1989). At the design stage, the variables were categorised as nominal, ordinal, interval/scale, and textual variable types. Scale/interval variables provided robust and accurate measurement as they ranked naturally into quantitative differences between categories, e.g., the organisational learning opportunity score (de Vaus, 1991). Ordinal variables, considered less robust, ranked categories into a “justifiable order” e.g., the five point Likert scales (Ibid. p. 130). The less statistically robust variables were nominal e.g., sex, as the categories male and female ranked in no specific order.

Univariate statistics (frequency and descriptive) summarised the values of categorical variables, while inferential statistics tested significance and probability for categorical and ordinal variables. Frequency statistics identified and summarised the differences in values, while ‘explore’ summarised the cases or groups of cases (SPSS Release 6.1.3). Where the data assumed normality, parametric statistics (Crosstabs, One-Way ANOVA, and Simple Factorial ANOVA) tested for probability, association, and significance. Crosstabs calculated and tested for correlation and significance where there were two or more variables, while ‘means’ computed and compared groups of variables based on values (SPSS Release 6.1.3). Where the data did not assume the normal curve, nonparametric statistics tested for significance and probability (Chi-Square, Binomial, Fishers Exact Test, Kruskal Wallis).

One-Way ANOVA (and the nonparametric Kruskal Wallis) tested if several independent groups come from populations with the same mean (SPSS Release 6.1.3). The nonparametric Chi-Square ( $\chi^2$ ) tested the hypotheses about the relative proportion of cases that fell into several mutually exclusive groups, while the Binomial Test was used to test the hypothesis that a dichotomous variable (or transformed multi-category variable collapsed into a dichotomous variable), came from a binomial population with a specified probability of an event occurring. All tests of significance used the nondirectional test to consider the probability that “rejection” would fall into the “two tails of the normal distribution” ( $p < 0.05$ ) (Emory & Cooper, 1991, p. 521). Where appropriate Fishers Exact tested the significance of a test statistic based on its exact distribution (SPSS Release 6.1.3). Linear ‘enter’ regression analysis estimated the coefficients of the linear equation to test the conceptual hypotheses, and predicted the best model to reject or accept the null hypotheses.

## **Open-ended questions**

The open-ended questions invited written response and were analysed using content analysis. Content analysis was an applicable analytical choice designed to “code open-ended questions in surveys” and to provide “objective, systematic, and quantitative description” of the written comments (Berelson, 1952, cited in Stempel III & Westley, 1989, p. 125, Weber, 1985, p. 9).

Content analysis involved several iterative steps beginning with capturing the responses into Excel 97, followed by reading each response closely to classify each response derived from Kotnour (1999), i.e. to deliver a successful project, to deliver a series of successful projects, and to build capability. Within each classification scheme, each response was further analysed to assess similarity in meaning and coded accordingly e.g., organisational learning characteristics. The responses were tabled into a grid in Excel 97 and Word 2000, reread and further refined and classified (Kerlinger, 1986; Weber, 1985). The key limitation was small quantities of data to derive objective meaning in terms of quantitative frequency. Any ‘codes’ that led in different directions were noted separately to add meaning to the overall interpretation of the data (Patton, 1999). The final classification scheme was tabled, and the scores and proportions analysed to determine the strength of the findings.

### **3.3.2 In-depth interviews**

The methodology consisted of the self-assessment questionnaire, interviews, interview design, data collection, and qualitative analysis.

#### **Self-assessment questionnaire**

The self-assessment questionnaire about effective learning from experience completed by the seven participants was based on 24-paired questionnaire items adapted from a manual of questionnaires (Honey, 1993). Following dialogue about the self-assessment questionnaire, each participant received a copy of the notes explaining the Kolb learning cycle (Honey, 1993). Training Media Auckland gave verbal permission to use the notes and questionnaire. The 24-paired items measured effective learning from experience assessed on a person’s knowledge and skills and the attitudes and emotions about learning (Appendix II).

#### **Interviews**

The participants were assumed to practice project management within an organisation that characterised organisational learning skills. The interviews were intended to last one but no

longer than two hours, a factor made explicit in the survey and the Information Sheet. The questions in the Interview Guide complemented the survey, while the operational requirements considered the time to conduct the interviews, capture the transcripts, analyse the qualitative data and report the findings (Appendix II).

## Design

The Interview Guide framed the questions on the hypotheses and the research objectives. These were the effective and non-effective organisational learning strategies that influenced project management learning practices, and the organisational memory properties and manifestations of lessons learned. Several probing techniques were used to ease the interview process. These were used when:

- The participant was uncertain of the nature of the question.
- The interviewer needed to: check understanding, repeat the question, pause and wait for a response, ask neutral questions such as 'anything else you may like to add,' and motivate the participant to enlarge on, or clarify a certain response (Easterby-Smith et al., 1991; Emory & Cooper, 1991; Zikmund, 1991).

The aim was to reduce researcher bias, promote consistency in questions across interviewees, avoid ambiguous words, and avoid leading the participants by stating the expected response (Easterby-Smith et al., 1991). An audiotape recorded the interview, while a Contact Summary sheet captured the field notes as soon as possible following the interview (Appendix II). The Contact Summary captured the date, themes, situation, events, context, the variables the participant focused on, new hunches or propositions, and memos.

The face-to-face semi-structured interviews enabled the collection of in-depth stories (Barker & Barker, 1989; Emory & Cooper, 1991; Ghauri et al., 1995). The participants freely related their stories in response to the open-ended questions. As Stewart (1982, cited in Easterby-Smith, 1991) says, the qualitative interview is an instrument:

To understand how individuals construct the meaning and significance of their situations ... from the complex personal framework of beliefs and values, which they have developed over their lives in order to explain and predict events in their world (p. 73).

To gain this insight about project management work required trust and sensitivity (Easterby-Smith et al., 1991; Emory & Cooper, 1991; Ghauri et al., 1995).

### **Data collection**

Sixteen participants volunteered their intention for an interview in a tick box in the survey. The seven participants interviewed all scored five or more points out of a possible nine points on the organisational learning indicator (Section Four, survey). A telephone call within one week following receipt of the survey was made to arrange an interview time and date, and verbal consent to send by post the self-assessment questionnaire, the Information Sheet, and the letter of confirmation written on Massey letterhead (Appendix II). Those volunteers not interviewed were sent a letter to thank them for their intention as soon as was feasible (Appendix II).

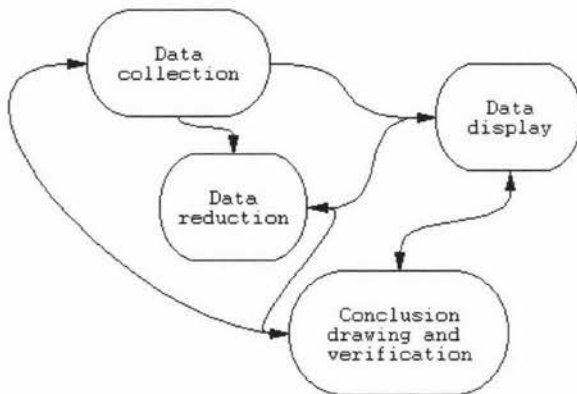
At the interview, the first step was an informal introduction followed by a discussion about the self-assessment questionnaire and handing out of the notes. The next step was consensual understanding about the interview formally acknowledged by the participant signing the Consent Form. Following the interview, each participant received a thank you letter expressing appreciation (Appendix II).

The interviews ranged between 65 minutes and 95 minutes, the average being 79 minutes. All the interviews took place in a private organisational workspace, except for one participant who chose a private residence. All the interviews were audiotaped. In one case, the audiotape was not switched on until 50 minutes into the interview. This limited the captured findings to the final 20 minutes of the interview followed by a written summary immediately following the interview. The participant received the transcript along with the summary notes to increase validity of the qualitative findings. In one other case, an interview went ahead with a participant who did not complete a lesson learned. A discussion with the academic supervisor clarified the uncertainty about whether to conduct the interview.

The transcripts were captured electronically into Word 2000. Where indicated on the Consent Form, each participant individually received the raw transcript by email to gain feedback. Five of the seven participants made changes to the transcripts.

## Qualitative analysis

The researcher used the classic framework by Miles and Huberman (1994) as a guide to analyse the qualitative data (Figure 6). This macro process entailed three simultaneous “flows of activities: data reduction, data display, and conclusion drawing and verification” (Ibid. pp. 10-11).



Source: Miles & Huberman 1994

**Figure 6 Qualitative data analysis: a flow model**

In practice, the process followed a systematic sequence from data collection, reduction, display, conclusion, and verification (Figure 6). All attempts to make sense of the data ensued in light of the available literature, feedback from the academic supervisor, and from the participants themselves. Table 1 outlines the activities involved at each stage of the qualitative process.

Processes	Activities
<b>Data collection</b>	<ul style="list-style-type: none"> <li>▪ Electronic Contact Summary Sheet per participant.</li> <li>▪ Electronic verbatim capture into Word 2000 and backup by floppy disk and paper copy.</li> <li>▪ Editing the transcripts for sense making (but not changes to the ‘stories’).</li> </ul>
<b>Data reduction</b>	<ul style="list-style-type: none"> <li>▪ Preliminary coding and noting of participant’s comments and changes.</li> <li>▪ Memos written onto the paper transcripts and use of Word ‘comments’ feature. This was a continuous process of crosschecking to determine meaning (descriptive and explanatory variables) and context within content categories. In some cases, whole paragraphs were coded, and in other cases, two or three words were coded as having similar theoretical meaning (Qualitative Codes, Appendix I).</li> <li>▪ Continual attempt to use inductive derivation of themes despite the three main deductively derived themes: organisational learning, organisational memory, and lessons learned. This meant continuous self-reminders to allow the themes to flow from the participant’s stories. It also meant ongoing memo writing, adding, modifying and removing codes, and noting outliers and surprises.</li> <li>▪ Systematic identification of sub-themes: these were prioritised in importance by frequency of mention across the seven participants, noting different views, both negative and positive.</li> </ul>



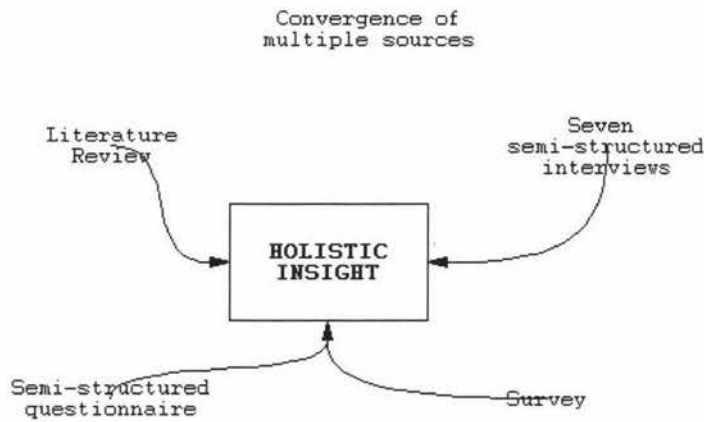
	<ul style="list-style-type: none"><li>▪ Data that did not answer the research objectives was considered irrelevant and discarded.</li><li>▪ Supervisor verification of one transcript.</li></ul>
Data display	<ul style="list-style-type: none"><li>▪ Tables created in Word 2000 to display the data and allow easier cross-comparison of the qualitative data between the participants.</li><li>▪ Reporting the findings by the three main themes and sub-themes, relating to the context, how and why an event occurred. Verbatim examples of these events in the flow of the findings added richness and verification.</li></ul>
Conclusions	<ul style="list-style-type: none"><li>▪ The conclusion was the outcome of in-depth analysis of the data in displays, grouped by themes and frequency of mention to make sense of the findings. In this way patterns, explanations, descriptions, and causal flows emerged from the data. The findings were prioritised according to strong, 6/7 participants, medium, 4/7 participants, and weak 2/7 participants (Hargadon &amp; Sutton, 1997).</li></ul>
Verification	<ul style="list-style-type: none"><li>▪ Individually emailing the transcripts to participants where agreed on the Consent Form to promote transparency, data validity, and reliability (on average this took seven to ten days for the return of the transcripts).</li><li>▪ Individually emailing the draft qualitative findings to the participants for comment (one participant made changes) for data validity.</li><li>▪ Noting the comments and making changes to the findings.</li><li>▪ Continuous editing of the findings for sense making, format, and the strength of the findings.</li><li>▪ Cross-comparison of the quantitative and qualitative findings and the literature presented as a discussion.</li></ul>

Table 1 Qualitative analysis process

3.4 Triangulation

A substantial issue in methodological choice is the positivist versus phenomenological argument about how to make sense of the world (Easterby-Smith et al., 1991; Miles & Huberman, 1994). A logical positivist preference is entrenched in the collection and measurement of numerical facts to determine patterns. Conversely, qualitative phenomenological researchers focus on “naturally occurring ordinary events in natural settings” in the attempt to achieve a holistic “richness” to interpret the “social world” (Miles & Huberman, 1994, p. 10).

The use of conceptually and theoretically focused relevant research questions eased the complexity of the methodological triangulation (Jick, 1979). As some results contradicted or conflicted with each other, decisions were made in light of the literature what to believe (Miles & Huberman, 1994; Morse, 1999; Patton, 1990). This approach was “comparative analysis” where different operational measures of the same concept strengthened reliability and enhanced the quality and credibility of the findings (Patton, 1990, p. 266).



Source: Yin, 1994, p.93.

### Figure 7 Triangulation of multiple data sources

Methodological triangulation facilitated a numerical and textual understanding (Figure 7). It required continuous checking between the quantitative and qualitative finding and the literature. Each supported the other at the design stage, during data collection, analysis, in the findings, and in the discussion (Miles & Huberman, 1994; Patton, 1990). Together the triangulation of the methods provided conceptual insight and richness to the contextual quantitative data to develop a holistic understanding of how things worked in the complexity of project management (Jick, 1979; Miles & Huberman, 1994). To make sense of the complexity, causal loop diagrams illustrated the key qualitative and quantitative research findings about lessons learned (Senge, Kleiner, Roberts, Roth & Smith, 1994).

### Methodological considerations

In terms of organisational learning research, the choice was between mechanistic or organic research methodologies. Organic research is grounded in action research where the researcher collaborates with the participants during the research project in a mutual learning situation, while in mechanistic research the researcher drives all aspects of the study (Argyris, 1999). This study employed elements of organic research practice in the pilot test, data collection, analysis, and reporting stages. Participants collaborated with the researcher in the timing of the survey, at the data transcript analysis and display stages, and in suggestions for dissemination of the results.

### 3.5 Pilot test

The pilot test was a trial run of the administration of the research instruments for the main study but used a smaller number of participants (Appendix III). It evaluated the validity and reliability of the questionnaire to ensure the concepts measured the objectives, and the questions were completed with the same repeated responses (de Vaus, 1991). The pilot test aimed:

- To determine the average time to complete the questionnaire, the time to conduct the self-assessment questionnaire and the interview.
- Gain feedback on the clarity of instructions, clarity of wording and ease to complete the questionnaires.
- Gain feedback on other respondent issues.

The end deliverables of the pilot test were robust instruments and procedures that ideally boosted the response rate and reduced respondent load in terms of time. The revised questionnaire is reported in Appendix II. The pilot test followed academic peer review of the research.

### 3.6 Ethical principles

An important role was to consult and collaborate, where practical, with the research respondents and the academic supervisor. Each stakeholder had certain rights and obligations that involved a set of major ethical principles (Zikmund, 1991). The major ethical principles were:

- Informed consent of the respondents.
- Confidentiality of the data and the individuals providing it.
- The minimising of harm to the respondents and researcher.
- Truthfulness to avoid deception.
- Social sensitivity to the stakeholders in terms of their age, gender, culture, religion, and social class (MUHEC, 1999, p. 1).

These principles are considered in the ethics application (Appendix III). To ensure anonymity, the quantitative findings are presented in aggregate format, while the participants in the qualitative findings are represented as A, B, C, D, E, F, and G. No names of

organisations were used, nor were other possible identification markers such as detailed job titles or software vending organisations.

### **3.7 Summary**

This chapter has clarified the research objectives, and discussed the research instruments, the pilot test, detailed the methodological triangulation research design, study administration, the quantitative and qualitative data analysis, the major ethical principles, and considered organic and mechanistic research processes. The next four chapters present the quantitative and qualitative research findings.

## CHAPTER FOUR: PROJECT MANAGEMENT PRACTITIONERS

### 4.1 Introduction

This chapter describes the research population and follows on from the methodology. First presented are the response rates for the survey and the interview participants. Next is the demographic background of the survey respondents and the interview participants. The findings are in an aggregate format to ensure confidentiality and anonymity. Denominator data was unavailable from the local PMI branch to compare with the study population.

The survey went into the field on May 19<sup>th</sup> 2000 and closed July 31<sup>st</sup> 2000. The distribution of the questionnaires spanned ten weeks to enable the handing out of two batches of questionnaires at two local PMI branch meetings and postal return. The seven interviews began at the end of May 2000 and ended in mid August 2000.

### 4.2 Survey

#### 4.2.1 Response Rate

The response rate was 47.17%, even with reminders at two PMI branch meetings and one email reminder. The total number of questionnaires distributed was 109, with 50 returned by pre-paid mail to the researcher by the closure date. This included several questionnaires completed by project management practitioners in one organisation. The formula to measure the response rate was:

Response rate =	$\frac{\text{Number returned}}{\text{N in sample} - (\text{Ineligible} + \text{Unreachable})}$	* 100
Response rate =	$\frac{50}{109 - (3 + 0)}$	* 100
	$= 50/106 = 0.47169$	

Of the 50 returned questionnaires, 47 were valid. The rejection process was a systematic clarification of those that were ‘obviously acceptable’ observed by complete questionnaire completion (46), those that were ‘obvious rejects’ (2), and those that were partially completed (2) (Alreck & Settle, 1985). The ‘obvious rejects’ included one respondent who wrote on the returned questionnaire they had no time to complete it, while the other respondent suggested that asking ethnicity ‘invalidated’ the questionnaire. Partial completion included one

questionnaire that was rejected on failure to complete the Project Management section questions 13, 14 and 15, as well as section three about lessons learned and memory systems (Q. 16 to Q. 27). The other partially completed questionnaire consisted of failure to complete questions 9 to 13 about learning goals and specific events in a project when a lesson learned would occur. The acceptance of this latter questionnaire was based on complete data about the production of a lesson learned (Q. 9 to Q. 12).

4.2.2 Demographic data

The demographic data provides background information about the survey population’s professional job, industry type, the number of years practicing project management, PMP status, ethnicity, sex, age group, and career goal in terms of project management.

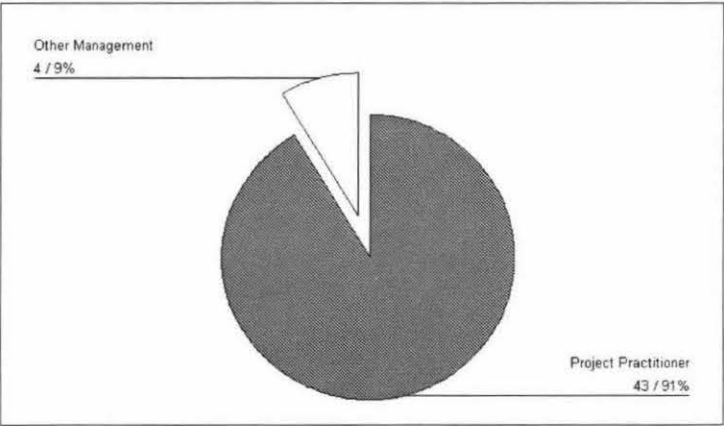


Figure 8 Proportion of respondents by profession

The professional background of respondents consisted of Project Practitioners (n = 43, 91.5%) and Other Management (n = 4, 8.5%) (Figure 8, Table 2).

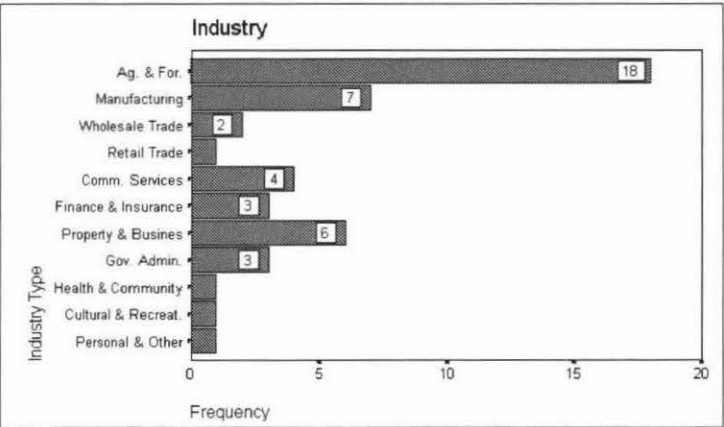


Figure 9 Frequency of industry type



The respondents represented a broad cross-section of industries including Agriculture and Forestry (n = 18, 38%), Manufacturing (n = 7, 15%), and Property and Business Services (n = 6, 13%) (Table 2, Figure 9).

Characteristic	n (%)	Mode
<b>Job Category (NZSCO95)</b>	<b>47 (100)</b>	<b>Project Practitioners</b>
Project Practitioners	43 (92)	
Professionals	4 (8)	
<b>Industry (ANZSIC96)</b>	<b>47 (100)</b>	<b>Agriculture &amp; Forestry</b>
Agriculture, Forestry	18 (38)	
Manufacturing	7 (15)	
Property and Business Services	6 (13)	
Communication Services	4 (8)	
Finance and Insurance	3 (6)	
Government Administration and Defence	3 (6)	
Wholesale Trade	2 (4)	
Retail Trade	1 (2)	
Health and Community Services	1 (2)	
Cultural and Recreational Services	1 (2)	
Personal and Other Services	1 (2)	

Table 2 Job category and industry type

They ranged in age group from 26 years to more than 55 years. There were 29 (63%) male respondents and 17 (37%) female respondents, with a bimodal cluster of age groups at 36 – 40 years and 41 – 45 years (Figure, 10, Table 3). The European ethnic group was the predominant mode (n = 42, 91%), while ‘Other’ ethnic group consisted of four (9%) respondents. There were no Maori or Pacific Island ethnic groups (Table 3).

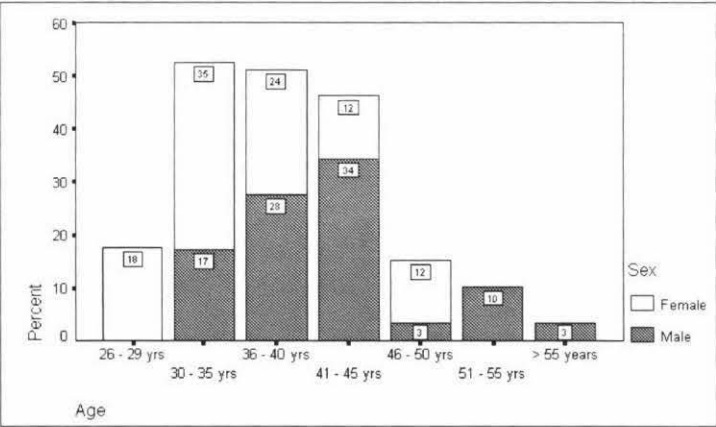
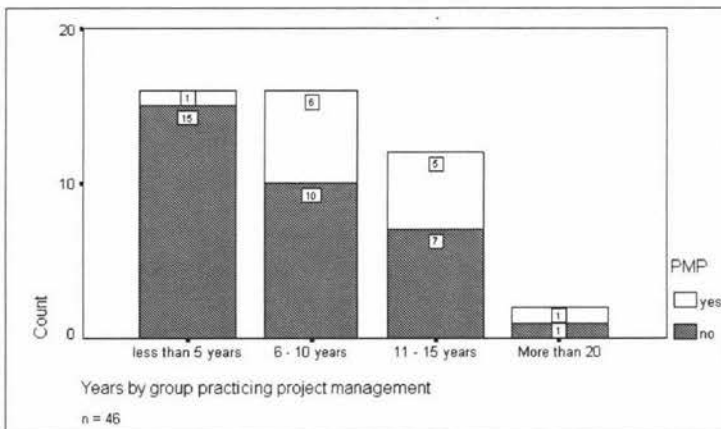


Figure 10 Proportion of age group by sex

The respondents had practiced project management from less than five years to more than twenty years (Table 4). Two modes dominated, less than five years (n = 16, 35%), and six to ten years (n = 16, 35%).

Characteristic	n (%)	Mode
<b>Age</b>	<b>46 (100)</b>	<b>36-40 &amp; 41-45 yrs</b>
Aged 25 years of age or less	0 (0)	
26 - 29 years	3 (6)	
30 - 35 years	11 (24)	
36 - 40 years	12 (26)	
41 - 45 years	12 (26)	
46 - 50 years	3 (6)	
51 - 55 years	3 (6)	
Aged 56 or more years	2 (4)	
<b>Sex</b>	<b>46 (100)</b>	<b>Male</b>
Male	29 (63)	
Female	17 (37)	
<b>Ethnicity</b>	<b>46 (100)</b>	<b>European</b>
New Zealand Maori	0 (0)	
European	42 (91)	
Pacific Island	0 (0)	
Other	4 (9)	

**Table 3 demographic profiles**



**Figure 11 Years practicing project management by PMP status**

Just under one third of the respondents were PMPs ( $n = 13$ , 28%), while 34 (72%) were not (Table 4). The proportion of non-PMPs to PMPs was significant when practitioners fell into two mutually exclusive groups with equal expected values (Binomial Test,  $p$  0.003).

Characteristic	n (%)	Mode
<b>Years by group practicing project management</b>	<b>46 (100)</b>	<b>Less than 10 yrs</b>
Less than 5 years	16 (35)	
6 - 10 years	16 (35)	
11 - 15 years	12 (26)	
16 - 20 years	0 (0)	
More than 20 years	2 (4)	
<b>Project Management Professional (PMP)</b>	<b>47 (100)</b>	<b>No</b>
Yes	13 (28)	
No	34 (72)	
<b>Career goal to continue working in Project Management</b>	<b>47 (100)</b>	<b>Yes</b>
Yes	30 (64)	
No	7 (15)	
Unsure	10 (21)	

**Table 4 Years practicing project management, PMP status, and career goal**

Just under two thirds of the respondents stated a desire to continue their career in project management ( $n = 30$ , 64%), while 17 were either unsure or had no desire (Table 4). The One Sample Chi-Square with expected equal proportions was significant for career desire ( $\chi^2$  19.957,  $df$  2,  $p$  0.000).

### 4.3 Semi-structured interviews

The response from the survey for interview volunteers totalled 16 persons (3.2 times the targeted number). Although the initial goal was to conduct five interviews, seven were completed. This crept project scope, however the researcher believed this would not compromise the quality of the analysis or the thesis completion. The participant's learning organisation scores ranged between five and eight. Selection was on a score of five or more points, a first come basis, and a match to the overall objectives of the research. The mean organisational learning score was 6.57 with an even distribution of scores ( $SD$  1.2, Median = 6). The minimum score was '5' and the maximum was '8.'

#### 4.3.1 Demographic profile

The seven participants were either a Project Manager, Project Director, Project Manager / Consultant, or Director. They represented a range of industry types made up of Agriculture and Forestry, Communication Services, Finance and Insurance, Property and Business Services, and Culture and Recreational Services (Table 5).

The years of experience in project management ranged from less than five years ( $n = 2$ ) to between 11 and 15 years ( $n = 5$ ). All stated a desire to continue their career working in project management except one who was unsure. Four were PMPs, while three were not. All but one was male, and all self-determined European ethnicity. Their age group ranged from 36 to 50 years, with participants predominantly aged between 41 and 45 years (Table 5).

The participants worked in global ( $n = 5$ ) and national organisations ( $n = 2$ ), of which five were private sector and two were public sector. The size of the organisations the participants worked in ranged from less than 50 persons to several thousand members. Although not asked in detail, the organisational structures varied between relatively flat, collegial forms, a blend of functional and projectised forms, and the hierarchical functional form.

Characteristic	n (%)	Mode
<b>Job Type</b>	<b>7 (100)</b>	<b>Project Manager</b>
Project Management Manager, Consultant, Director	7 (100)	
<b>Industry Type</b>	<b>7 (100)</b>	<b>Agriculture &amp; Forestry</b>
Agriculture, Forestry and Fishing	1 (14)	
Communication Services	1 (14)	
Finance and Insurance	2 (29)	
Property and Business Services	2 (29)	
Cultural and Recreational Services	1 (14)	
<b>Years practicing project management by group</b>	<b>7 (100)</b>	<b>11-15 years</b>
Less than 5 years	2 (29)	
11 – 15 years	5 (71)	
<b>Project Management Professional (PMP)</b>	<b>7 (100)</b>	<b>Yes</b>
Yes	4 (57)	
No	3 (43)	
<b>Career goal to continue working in Project Management</b>	<b>7 (100)</b>	<b>Yes</b>
Yes	6 (86)	
No	1 (14)	
<b>Age</b>	<b>6 (100)</b>	<b>41-45 years</b>
36 - 40 years	1 (14)	
41 - 45 years	4 (57)	
46 - 50 years	1 (14)	
<b>Sex</b>	<b>7 (100)</b>	<b>Male</b>
Male	6 (86)	
Female	1 (14)	
<b>Ethnicity</b>	<b>7 (100)</b>	<b>European</b>
European	7 (100)	

Table 5 Demographic profiles - interview participants

### 4.4 Summary

This chapter has presented the demographic findings about the research population. The next chapter presents the findings about the behavioural characteristics of lessons learned in project management practice.

## CHAPTER FIVE: LESSONS LEARNED

### 5.1 Introduction

This chapter follows on from the demographic profile of the respondents in the previous chapter, and presents the findings about the behavioural patterns of lessons learned in project management practice. The research objectives were to determine:

- The extent of lessons learned use.
- The behavioural aspects of lessons learned:
  - The how, why, and why not used, and when.
  - What happens with lessons learned once created.

The survey provided the quantitative data, while the semi-structured interviews provided qualitative information to explore the how, why, and what of the behavioural aspects of a lesson learned.

### 5.2 Survey

First presented is the routine and non-routine production of a lesson learned. Next presented are the findings about the production of a lesson learned in the project phases, in the project management knowledge areas, and the production of a lesson learned when measured against project expectations. Content analysis analysed the open-ended questions. The findings that the respondents mentioned more than once are presented in this chapter. The full tables are found in Appendix I.

#### 5.2.1 The routine production of a lesson learned

Question 10 asked the respondents if they produced a lesson learned as a routine part of project management output. All but one respondent completed the question with 29 (63%) producing a lesson learned and 17 (37%) not producing a lesson learned (Table 6). The 50% probability that a lesson learned would be produced on a routine basis was not significant (Binomial Test, 2-Tailed  $p = 0.104$ ).

Lessons learned	n (%)	Mode	p
	<b>46 (100)</b>	Yes	0.104
Yes	29 (63)		
No	17 (37)		

**Table 6 Routine production of a lesson learned**

In question 11 the respondents who did produce a lesson learned were asked why they did this. The responses were in an open-ended format. The 29 respondents who did produce a lesson learned made 59 comments (Table 7). Using content analysis, these were first analysed and grouped by meaning, then counted to determine frequency and categorised according to the delivery of a successful project, delivering a series of successful projects, and building capability (Kotnour, 1999).

Why produce a lesson learned n = 29		n	% of responses	% of cases
<b>To deliver a successful project</b>	▪ Part of the methodology	4	6.78	13.79
	▪ Provides closure to team members	2	3.39	6.90
<b>Response total</b>		<b>6</b>	<b>10.17</b>	<b>20.69</b>
<b>To deliver a series of successful projects</b>	▪ Try not repeat the error, same mistakes	5	8.47	17.24
	▪ Repeat successes and capitalise on successful solutions	4	6.78	13.79
	▪ Reference or assistance for future projects	2	3.39	6.90
	▪ Leverage lessons from past projects	2	3.39	6.90
<b>Response total</b>		<b>18</b>	<b>30.51</b>	<b>62.07</b>
<b>Building capability</b>	▪ <b>Organisational learning strategies:</b> one source to refer to for successful and non successful lessons and experience; continuous improvement for processes, methods and performance; share project and organisational knowledge; organisational learning; team learning from successes and failures; develop best practice for project management, problem identification and resolution; collection knowledge to improve processes; improve quality; learn from team members, project leaders; and formal capture of successes and failures	30	50.84	103.45
	▪ Redefine organisational practice	2	3.39	6.90
<b>Response total</b>		<b>35</b>	<b>59.32</b>	<b>120.69</b>
<b>Total responses</b>		<b>59</b>	<b>100.00</b>	<b>203.44</b>

\* Excludes comments made less than twice but includes total responses (refer Appendix I).

**Table 7 Why produce a lesson learned**

The most frequently ranked theme was to build capability (n = 35, 59%). The main sub-theme was organisational learning strategies (n = 30). These were to use lessons learned as a “source to refer to for successful and non-successful lessons and experience; continuous improvement for processes, methods and performance; sharing project or organisational knowledge; redefining organisational practice; team learning from successes and failures, and organisational learning.”



The next most ranked theme was to deliver a series of successful projects (n = 18, 30%). The main reasons were to “try and not repeat the same error or mistake” (n = 5), “to repeat successes and capitalise on successful solutions” (n = 4), “as a reference for future projects” (n = 2), and “to leverage lessons from past projects” (n = 2). The last ranked theme was to deliver a successful project where the main reasons were because it was “part of the methodology” (n = 4), and “it provided closure to team members” (n = 2).

### 5.2.2 The non-routine production of a lesson learned

In question 12, more respondents (n = 22) documented why they did not produce a lesson learned than actually stated they did not produce a lesson learned in question 10 (n = 17). The same themes were used to categorise the comments (Table 8).

Why a lesson learned is not produced n = 22		n	% of responses	% of cases
To deliver a successful project	▪ Not part of methodology, culture and practice	4	10.81	18.18
	▪ No time	3	8.11	13.63
	▪ Size of project is to small	3	8.11	13.63
	▪ If no perceived value nothing to produce	3	5.41	13.63
	▪ Produce for a large project only	2	5.41	9.09
	▪ Not a conscious process	2	5.41	9.09
	▪ Ad hoc practice	2	5.41	9.09
Response total		20	54.05	90.90
To deliver a series of successful projects	▪ Keenness to move to next project	2	5.41	9.09
Response total		3	8.11	13.63
To build capability	▪ Not aware of the process	3	8.11	13.63
	▪ Personal professional expertise (not organisation)	3	8.11	13.63
	▪ Uncertainty over definition of a lesson learned (individual versus team)	2	5.41	9.09
Response total		14	37.84	63.64
Total responses		37	100.00	168.18

\* Excludes comments made less than twice but includes total responses (refer Appendix I).

**Table 8 Why not produce a lesson learned**

The main theme not to produce a lesson learned negatively impacted mostly on the desire to deliver a successful project (n = 20, 54%). The main reasons were that it was “not part of the methodology, culture, and practice” (n = 4), and there was equally (n = 3), “no time, the size of the project was to small,” and “where there was no perceived value then there was nothing to produce.”

Building capability was the next most ranked theme not to produce a lesson learned (n = 14, 38%). Respondents were either “not aware of the process” (n = 3), produced a lesson learned for “personal development” (n =3), or were “uncertain over the definition of a lesson learned”

(n = 2). The third ranked theme was to deliver a series of successful projects (n = 3, 8%), where the main reason was the “keenness to move to the next project” (n = 2).

### 5.2.3 Production of a lesson learned in project phases

Question 13 asked the respondents to tick each project phase where they produced a lesson learned, or did not produce a lesson learned. The planning phase was omitted from the questionnaire, hence any comments that related to planning were categorised accordingly.

Project phases	n (%)	Mode	p
Project initiation	46 (100)	No	0.000*
Project planning	46 (100)	-	-
Project execution	46 (100)	No	0.000*
Project control	46 (100)	No	0.000*
Project closure	46 (100)	Yes	0.104
Throughout life of project	46 (100)	No	0.055
Produce a lesson learned	46 (100)	Yes	0.005*

\* Statistically significant at  $p < 0.05$  (Binomial, 2-tailed significance)

**Table 9 Production of a lesson learned during project phases**

The traditional project life cycle has five phases: project initiation, planning, execution, control, and project closure. Overall, 33 respondents produced a lesson learned in either one of these phases, and 13 respondents did not (n = 46). This was significant at the 50% probability of occurring (Binomial Test, 2-Tailed  $p$  0.005). The respondents mostly but not significantly produced a lesson learned during project closure ( $p$  0.104) (Table 9, Appendix I). Of significance for not producing a lesson learned, were project initiation ( $p$  0.000), execution ( $p$  0.000), and control ( $p$  0.000).

Table 10 categorises the responses made in question 13. The 33 respondents who produced a lesson learned made 70 responses. Project closure was the most cited responses to produce a lesson learned (n = 29, 41%). Throughout the life of a project, ranked next (n = 17, 24%), followed by project control (n = 10, 14%).

During closure, the “post implementation review, post project reviews, assignment reviews, or meetings (n = 14) were the most frequently mentioned event to produce a lesson learned, followed by the “presentation of lessons learned” (n = 3) and “specific team meetings to build lessons learned consensus” (n = 2).

<b>Production of a lesson learned in project phases n = 33</b>				
<b>Project initiation</b>	<b>Specific events</b>	<b>n</b>	<b>% of responses</b>	<b>% of cases**</b>
	▪ Kick off meeting, project briefing, team awareness	3	4.28	9.09
	▪ Launch product (presentation)	2	2.86	6.06
<b>Response total</b>		<b>7</b>	<b>10.00</b>	<b>21.21</b>
<b>Project planning</b>	▪ Baseline documentation	1	1.43	3.03
<b>Response total</b>		<b>1</b>	<b>1.43</b>	<b>3.03</b>
<b>Project execution</b>	▪ Meetings (progress, team, reviews)	3	4.27	9.09
<b>Response total</b>		<b>6</b>	<b>8.57</b>	<b>18.18</b>
<b>Project control</b>	▪ Monthly Steering Committee	2	2.85	6.06
	▪ Reviews (phase, routine, periodic)	2	2.85	6.06
	▪ Post milestones	2	2.85	6.06
<b>Response total</b>		<b>10</b>	<b>14.28</b>	<b>30.30</b>
<b>Project closure</b>	▪ Post implementation review, post project, assignment review, meeting	14	20.00	42.42
	▪ Presentation lessons learned	3	4.28	9.09
	▪ Specific team meeting to build lesson learned consensus	2	2.86	6.06
<b>Response total</b>		<b>29</b>	<b>41.43</b>	<b>87.87</b>
<b>Throughout life of project</b>	▪ Ad hoc, unexpected outcomes, as issues arise that are not resourced for – logged and resolution sought	10	14.28	30.30
	▪ Completion milestones	3	4.28	9.09
	▪ Informally - lessons not captured	2	2.85	6.06
	▪ Phase / systems lifecycle end	2	2.85	6.06
<b>Response total</b>		<b>17</b>	<b>24.28</b>	<b>51.51</b>
<b>Total responses</b>		<b>70</b>	<b>100.00</b>	<b>209.07</b>

\* Excludes comments made less than twice but includes total responses (refer Appendix I).

\*\* The % of cases that equals yes.

### **Table 10 Why produce a lesson learned during the project phases**

During the project, lessons learned were mainly produced for “ad hoc, unexpected outcomes, as issues arose that were not resourced for,” and then “logged and resolution sought” (n = 10). When controlling a project, lessons learned were produced at the “monthly steering committee management meeting,” “reviews” and “post milestones” (n = 6). At project initiation, “kick-off meetings, project briefings and team awareness” were the main activities when lessons learned were produced (n = 3). “Baseline documentation” was derived as the key activity during planning to produce a lesson learned (n = 1), while “progress, review, or team meetings” (n = 3), were the most frequently mentioned at the project execution phase.

### **5.2.4 Project management knowledge areas**

Question 14 asked what respondents broadly produced a lesson about. The respondents were asked to tick the project management knowledge area where they produced a lesson learned (Table 11). A tick box was available for those who did not produce a lesson learned.

All 47 respondents completed valid responses. Overall, the proportion of cases that produced a lesson learned in one or more knowledge areas was significant (Binomial Test, 2-Tailed  $p = 0.003$ ). Respondents produced a lesson learned to manage risk ( $n = 28$ , 60%), scope ( $n = 26$ , 55%), and communication ( $n = 25$ , 53%). None were statistically significant at a 50% probability of occurring (Table 11, Appendix I). Procurement management was significant in the proportion of cases that did not produce a lesson learned (Binomial Test, 2-Tailed  $p = 0.000$ ).

Knowledge areas	n (%)	Mode	p*
Integration management	47 (100)	No	0.381
Scope management	47 (100)	Yes	0.559
Time management	47 (100)	No	1.000
Cost management	47 (100)	No	0.770
Quality management	47 (100)	No	0.080
Human resource management	47 (100)	No	0.080
Communication management	47 (100)	Yes	0.770
Risk management	47 (100)	Yes	0.243
Procurement management	47 (100)	No	0.000*
Produce a lesson learned	46 (100)	Yes	0.003*

\* Statistically significant at  $p < 0.05$  (Binomial, 2-tailed significance)

**Table 11 Production of a lesson learned in the knowledge areas**

### 5.2.5 Production of a lesson learned measured against expectations

A tool to measure progress during a project is whether or not project activities meet expectations, e.g., planned cost against actual. Question 15 measured the frequency of whether project management practitioners produced a lesson learned against project expectations on a five point Likert scale where 1 = 'all of the time,' 2 = 'very often,' 3 = 'not sure,' 4 = 'sometimes,' 5 = 'hardly ever.' The negative scale items were not recoded into positive items. A tick box was available for those who did not produce a lesson learned. Valid responses were received from 43 respondents. There were four non-responses, and ten (21%) who did not produce a lesson learned. For statistical analysis, these 14 cases were treated as missing, leaving 33 valid responses.

The data was first screened for normality. The box plot of the 33 valid cases indicated an even distribution of cases with no outliers (Figure 12). The distribution was weakly skewed towards 'sometimes' or 'hardly ever' producing a lesson learned for activities that met expectations. The distribution was relatively even with tails fatter than normal (Kurtosis, -1.434).

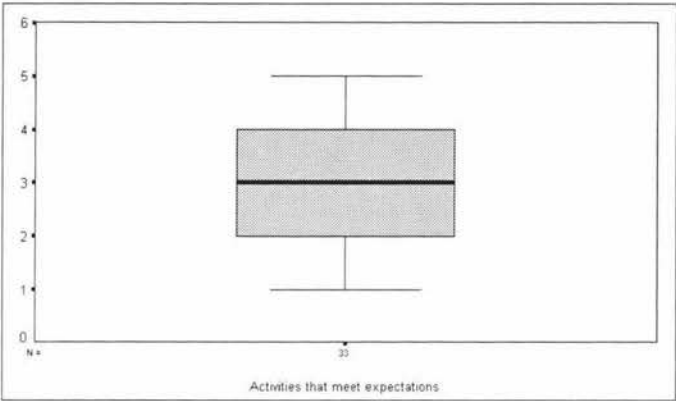


Figure 12 Box plot - activities that meet expectations

	Mean	Medium	Mode	SD	Range
Activities that meet expectations	3.091	3	2	1.400	4

Table 12 Activities that met expectations

Of the 33 valid responses, four (12%) produced lessons learned when activities met expectations ‘all the time,’ 11 (33%) did ‘often’ (mode), eight (24%) did ‘sometimes,’ and seven (21%) of the respondents ‘hardly ever did.’ On average, respondents were ‘not sure’ ( $\mu = 3.09$ ), (Table 12, Appendix I). The cases were widely distributed and positively skewed to ‘often’ (SD 1.400, Skewness  $-0.105$ , Kurtosis  $-1.421$ ). The production of a lesson learned for activities that met expectations was not significant ( $\chi^2 6.242$ , df 4, p 0.181).

5.2.6 Years of experience, PMP status and career goal

The independent variables, ‘years of experience by group,’ ‘PMP status,’ and ‘career goal to continue working in project management’ were cross-tabulated with the dependent variable ‘production of a lesson learned.’ The nonparametric statistic Fishers Exact Test identified any association between the dependent and the independent variables, as the Pearson Chi-Square was inappropriate (cells had expected frequencies of less than five).

PMPs were significantly more likely to produce a lesson learned than non-PMPs. (p 0.033). Of the 12 PMPs, 11 (92%) produced a lesson learned compared to 18 (53%) of the 34 non-PMPs (Table 13). The years of experience or career goal did not influence the production of a lesson learned.

Production of a lesson learned	Fishers Exact *
Years of experience ( $\leq 10$ years: $> 10$ years)	0.089
PMP status	0.033*
Career goal to continue working in project management (Unsure = No)	0.534

\* Fishers Exact Test (2-Tail significance) Significant p < 0.05

Table 13 Years of experience, PMP status, and career goal by lessons learned

### 5.3 Semi-structured interviews

The findings from the interviews included the profile of the participants about producing a lesson learned, followed by the main theme of what learning from experience means for the participants. The main sub-themes were the events where lessons learned were produced, project and organisational success, project support, the drivers, and the issues. Integral to these themes were the negative and positive consequences surrounding the production of a lesson learned.

#### The survey

In the survey, five produced a lesson learned and two said they did not. Both of these participants were new to project management in the past five years. One participant maintained a database to record the length of time taken to complete tasks by project team members for use in future projects. The other participant said this was “not part of the ‘culture’ and practice (yet),” however stored learning from the past in written and electronic documents, and but did not acknowledge these as a lesson learned in a project management sense. The remaining five participants had between 11 and 15 years of project management experience. When producing a lesson learned about one of the nine knowledge areas, all mostly did except for human resource management. None were significant findings.

#### 5.3.1 Learning from experience

A strong finding was not to repeat the same mistake. For one participant ‘E,’ with between 11 and 15 years of project management experience, learning from experience was “not to make the same mistake twice.” This was “at an individual level” when producing a lesson learned. Another participant, ‘D,’ new to project management in the past five years, described the task of getting documents signed off when talking about personal experience and learning as a project manager.

There are lots of things you learn, like getting project documents signed off can be extremely onerous and time consuming if you do not figure out faster ways of doing it. I have been through that process and found faster ways of doing it.

This account of getting documents signed off was a key learning experience for ‘D’ because “most people are so busy and the only way to do it effectively is to walk around with the thing and give them a pen and say sign here.” ‘D’ added that at the project level, using lessons learned from the past was the “fundamental way” projects were managed.



Fundamental to the way we manage projects. We follow the process the way it has been laid down through experience and the way it is documented on the Intranet.

This example suggests learning from the past contributed to future practice shared via an Intranet. Another way of learning from experience was by a mentor. 'C,' with between 11 and 15 years of project management experience, explained that mentors were "experienced and certified project management people."

They sit alongside the Project Managers to provide guidance and support. It is sort of a shared experience, mentors are learning from the practitioners and practitioners are learning from the mentors.

Mentoring was described as a "shared experience" to provide "guidance and support." Colleague support in the work place was also the experience of 'B' who worked in a large global organisation. In a current project with "cultural" impact across the organisation, 'B' mentioned the support of the management advisory team, business analysts, and a change manager. The management advisory team also provided "an education or a mentoring type capability for people on the project team." 'C' described some negative aspects of not learning from experience and the realisation of this as a concern for the organisation where business solutions for external clients were the business focus.

Typically we are finding that sales initiatives or areas of business that we shouldn't be going into, as we have been burnt before. We had one of those (deals) that turned really sour, and we are still paying the price for that so why are you going in it. You will have to put us through a real good reason why you are putting us through this again and what are the lessons we learnt last time. We had three instance of the same type of business been sold and the same problems occurred through the three of them. The three initiatives turned into real losses for the company. This is where our Delivery Review process really kicked off. Why are we still doing the same things? Why are we still getting ourselves into these sorts of cycles?

For 'C' the consequences of "been burnt" at the organisational level were "real losses for the company." This experience had instigated "significant changes in the past 12 to 18 months to break down communities of practice; these silo type areas particularly between hardware and software," where the "areas of specialisation were very much focused on their own areas" and people did not "talk to each other." A solution for this organisation was a "Delivery Review Board for projects worth \$100k or greater to ensure everyone could buy into what it (the project) was going to mean and commit their effort in the project." 'C' observed that trying to

avoid repeating past mistakes, was a “challenge” for the organisation because mistakes were “very much experiential based.” An approach was to train people.

We use project simulation; a 14-week project that we go through in two days. It brought some things home but people go back to their work places and commit the same mistakes they have learnt not to do on the course.

Regardless of training through project simulation, ‘C’ commented “people tend to go back to old tried and true, for example, we haven’t produced a status report this week because we haven’t got time.” ‘C’ rationalised this by saying that people went back to traditional ways of doing things “when push comes to shove and the acid comes on particularly in times of huge change.”

### 5.2.2 Project reviews

At the practice level, post project reviews were a strong finding to manage not repeating past mistakes. The most mentioned review was at the closeout project phase with an external or internal client, usually between the project manager and the client and, or, the project team. ‘E’ who worked in a consulting organisation with between 11 and 15 years of project management experience, managed not repeating past mistakes by a process typical of most of the participants.

At the end of that (the project), we (consultant) sit them (client) down. We get them to do a lesson-learned review at the end of it (assignment). So they look at things that went well and things that did not go so well in that assignment, note them all down, and have an overt focus on what can be learnt from that.

The process began with client consultation, review of the successes and failures, and was completed by the capture of project experiences with a focus on learning from that experience. Another participant described a successful lesson-learned review in terms of problem or issue resolution practiced routinely at a “weekly project meeting.” ‘B’ who managed information technology projects, explained that local and global problems were logged into an electronic system as they happened during the project. The real-time logging of a problem meant it could be collaboratively discussed on a routine basis.

It might be as simple as having a discussion on it and we can then close the issue. If we need additional action we follow the PL processes for identifying that the problem exists, what we have to do to resolve it, who needs to be involved, and move on from there.

In addition to the weekly meeting review, 'B' along with organisational colleagues, produced lessons learned at close out.

At close out time, we complete a review of what we have learnt from this instance, and what we could do to avoid this kind of situation happening again. Then we can close it off with the additional information.

The strong theme across the participants was a review process incorporating what went well and did not go well, what was going to be done about resolving the problem, and what could be learnt from the problem.

This process did not always achieve success in terms of a stakeholder's response to imparting things that did not go well. 'G,' with between 11 and 15 years of project management experience who worked for a global technical solution organisation, related how it was a situation of "them and us and the customer." The internal review "at the end" of the project documented "what went well, what went badly, what we would do differently next time." 'G' further explained the same process with an offshore company supplier and the client was "a lot harder, I tried very hard with the customers and with the 'X' guys but it didn't come off." 'G' explained the off shore supplier "did things the way they did things in the time they did things and the "methods were very specific" within a climate fraught with "internal competition." The supplier was integral to this organisation to provide unique client technological requirements.

In a different situation but similar in terms of non-effective reviews was the experience of 'F' with less than five years project management experience who worked in a national organisation. Reviews were part of the project management methodology at the end of projects but were unsuccessful. 'F' observed, "I have being involved in one or two reviews but even when I have being involved in the reviews, I don't think I've actually seen the outcome." 'F' explained that in this organisation, project management methodology was a "reasonably new discipline" with "very little going on up until five years ago and the majority of it really started up in the last three years." Lessons learned were an espoused practice "so that our estimates are better, our Work Breakdown Structure might be better, and the whole way we do it may be better."

### 5.2.3 Drivers and issues

The lessons learned from project reviews were driven by the successes and failures that arose throughout a project. The stories included the issues that surrounded on the job learning. A driver for 'F' to manage past experience was to prevent resource waste. This participant described in detail the experience in "software development."

Software developer A looks at something and says it doesn't make sense and it doesn't work. I will change it to position B. Software developer B comes along and says well it doesn't make sense and doesn't understand why it does it and changes it to position C. Software developer C comes along and then changes it back to position A again. You have gone around in a circle and if nobody documented or thought about writing it down or discussing it, you have spent a whole lot of money and wasted it just going round in a circle. I see that happening from time to time and I think that happens not just in software development but also in other areas of the organisation. You throw things away and the organisational knowledge gets lost as it has pretty much done in the last ten years, and you become much skimpier on staff and the rest, and you end up reinventing the wheel and it costs you.

This story describes a scenario where not learning from experience caused people to go around in circles, and the resultant loss of organisational knowledge due to staff attrition. In another scenario, an issue was to manage the lessons at the organisational level. 'C' who managed business solutions in cross-functional projects, found when projects end, the team disbands, and the lessons go with them. Again, this was richly described.

Ideally, we would like to sit down and say well what have other projects learnt that have gone through this sort of thing before. One of the big challenges I think is that project by project, individual by individual, you are learning the lessons carried forward, but it is very much tied to the people or the project team. So if you split up the project team, going from one project into a new one, they will individually carry that experience with them, but there is no way that you can tap into it at an organisational level, and well say what sort of things have we learnt at a useful time that you can actually plug into your practices.

For 'C' lessons learned had relevance at the individual and the project team level in the current project, but was an issue at the organisational level for future projects. 'C' explained this "challenge" when talking about sharing project information.

The challenge I suppose is the interchange of information within and between other project managers, and in other parts of the organisation. Like if someone has not done a particularly good job, you don't say well come and tell us how wonderful you have done it and let everyone learn from that and get everyone in a group. You have obviously taken an absolute battering and bruising over this last project, now you are out of intensive care would you like to come and tell everyone to avoid the same situations themselves.

The sharing of experience for a job not well done was the current scenario for 'C' at the "organisational level," but it was something the organisation was "tending towards but had not quite got there yet." The issue of applying lessons learned that "plugged" into future practice was endorsed by 'E' when using lessons learned acquired at the project closeout phase.

The other one at the end of the assignment, I am not so sure on that one because it is actually a bit of a harder problem in terms of how you really make the most of those. Where there is, a lesson learned that we could put straight back in and change something around here, and then we will do that. That is fine. But often the lessons learned are not quite like that. I think it is easier to apply lessons learned during the course of the project to improve the course of that project. The challenges is more for both that client organisation, and let's say for us, and take that lesson learned and apply it in other circumstances at other times.

For 'E' it was easier for both the client and the organisation to apply lessons learned in the "course of the current project to improve the course of that project," but the difficulty was to apply the lesson learned "in other circumstances at other times."

#### **5.2.4 Project and organisational success**

A strong finding related to project success was learning from experience for both the current project and for future projects. Yet, project success did not always imply organisational success by using lessons learned. For 'G,' project success was important as "everyone in the project wins if the project goes well and if the project goes badly your reputation goes down." Important to project success were lessons learned as to why things happened they way they did, and for other experience. When talking about what lessons learned meant, 'G' observed.

Important in terms of the project as it tends to make things easier such as knowing why and support. Also, in the sense of other people you know that it is not just you who has this problem and other people will have a feel for what is happening, and they will have different experiences from your experiences to apply.

The application of learning from experience for future projects had benefits at the project level for 'D.' As the result of a successful project at the organisational level in a large global service organisation, were recently implemented project processes and support tools.

As a result of the merger program the project office does a lot of things e.g., a training person provides all sorts of training, the office provides templates, information on the Intranet for our process, and about how you should apply that process for projects. The project office manages all projects, they have processes that keep track of projects, and they have a very structured process in terms of how projects are managed.

This account was part of a discussion about how project success and lessons learned relate. The project office provided multiple benefits for future projects such as standardised templates and project training.

## **5.4 Summary**

This chapter has presented the quantitative data and qualitative information from the survey and the interviews about the behavioural characteristics of lessons learned. The next chapter presents the findings about organisational learning in project management practice.



## CHAPTER SIX: ORGANISATIONAL LEARNING

### 6.1 Introduction

This chapter presents the findings about organisational learning strategies derived from the survey, the self-assessment questionnaire, and the interviews. It follows on from the findings about lessons learned in the previous chapter. The research objectives were to:

- Identify the learning aims or goals for persons who practice project management.
- Determine the sharing of a lesson learned at the intraproject, interproject, and intra-organisational levels.
- Determine the effective and non-effective organisational learning strategies that influence project management learning practices.

The findings from the survey are first presented. Next are the qualitative findings from the interviews, including the self-assessment questionnaire and the organisational learning scores.

### 6.2 Survey

The findings from the survey present the learning aims or goals for project practitioners (Q. 9), the sharing of a lesson learned (Q. 22 to Q. 25), and personal and organisational ability to achieve project success in the past 12 months by the use of lessons learned (Q. 26 and Q. 27). Next are the scores from the organisational learning filter questions from Section Four in the survey. For clarity, the organisational memory processes are presented alongside the attributes of sharing lessons learned to measure effective organisational learning strategies against personal and organisational ability to achieve project success.

#### 6.2.1 Learning goals

Question nine asked what the learning goals were when managing, leading or co-ordinating a project. There were 46 valid responses to the open-ended question, and of these 42 (91%) mentioned one or more learning goals (Table 14). The 50% probability that a respondent would have a learning goal was significant (Binomial statistic, 2-tailed sig.,  $p < 0.000$ ).

Learning goals	n (%)	Mode	p
	46 (100)	Yes	0.000
Yes	42 (91)		
No	4 (9)		

**Table 14 Learning goals when managing a project**

Overall, there were 95 responses about learning goals. These were categorised using the same three derived themes used to produce a lesson learned i.e., to deliver a successful project, to deliver a series of successful projects, and to build capability (Kotnour, 1999). The first two themes were categorised into two sub-themes: the demands of scope, time and cost; and the demand to meet or exceed stakeholder needs and identified requirements. The third theme, to build capability, was sub-categorised into the project management processes (initiation, planning, execution, control, and closure), the product or service, project management output, and the levels of learning. The content of the responses were then analysed by counting the frequency of mention. Table 15 illustrates similar responses in meaning made more than twice. The full table is found in Appendix I.

The most cited theme was to build capability ( $n = 48$ , 51%). Overall, respondents focused on learning goals at the personal, team, and organisational levels ( $n = 27$ ). Foremost this was at the personal level to improve “project management skills, methodology, processes, and best practices” ( $n = 8$ ). The next most cited response to build capability was throughout the execution process “to develop and to improve team performance” ( $n = 3$ ).

Delivering a successful project was the next most cited theme ( $n = 31$ , 33%). The most cited learning goal was to meet or exceed stakeholder needs and identified requirements, i.e., to “meet and improve stakeholder and team member communication (conflict, politics, personality) needs” ( $n = 6$ ). The next most cited learning goals were to “identify and manage scope, risk, and time for the benefit of the organisation” ( $n = 3$ ), “better manage the project team” ( $n = 3$ ), and “to better conduct the project and be successful in terms of efficiency and effectiveness” ( $n = 3$ ).

The third main theme was to deliver a series of successful projects to meet stakeholder needs and requirements ( $n = 14$ , 15%). Predominantly this was to “incorporate learning and experience from past projects into future projects to improve” ( $n = 3$ ), and to “avoid the same mistakes and pitfalls next time” ( $n = 3$ ) (Table 15).

To deliver a successful project n = 42		n	% responses	% cases
The demands of scope, time, cost & quality	▪ Identify and manage scope, risk, time to the benefit of the organisation	3	3.16	7.14
Response total		4	4.21	9.52
To meet or exceed stakeholder needs and identified requirements	▪ Stakeholder and team member communication (conflict, politics, personality) needs and improvement	6	6.31	14.29
	▪ Better manage project team	3	3.16	7.14
	▪ How to better to conduct the project to be successful (effective and efficient)	3	3.16	7.14
Response total		28	29.47	66.66
To deliver a series of successful projects				
The competing demands of scope, time, cost & quality	▪ Size similar tasks to more accurately predict timelines	2	2.10	4.76
Response total		2	2.10	4.76
To meet or exceed stakeholder needs and identified requirements	▪ Incorporate learning's, experience from past projects into future projects to improve	3	3.16	7.14
	▪ Avoid the same mistakes, pitfalls next time	3	3.16	7.14
	▪ Learn from the project (management, processes)	2	2.10	4.76
Response total		12	12.63	28.57
To build capability				
The project management processes (phases)	EXECUTION			
	▪ Improve team development, performance	3	3.16	7.14
Response total		20	21.05	47.62
The product or service**				
Response total		2	2.10	4.76
Learning levels	PERSONAL			
	▪ Build and improve project management skills, methodology, processes, refine management technique to achieve best practice, improve performance, expand soft skills, redefine best practice, learn aspects that ensure lessons of improvement, to be a better project manager	8	8.42	19.04
	TEAM			
	▪ Refine management technique to achieve and redefine best practice	2	2.10	4.76
	ORGANISATIONAL			
	▪ Build organisational knowledge to improve	2	2.10	4.76
Response total		27	28.42	61.90
Total responses		95	100.00	226.17

\* Excludes comments made less than twice but includes total responses

\*\* Please refer to Appendix I

**Table 15 Learning goals when managing a project**

### 6.2.2 Sharing a lesson learned

The questions 22 to 25 in Section Three of the survey measured the sharing of a lesson learned, sharing a lesson learned within a project, between projects, and between the external customers of the projects on a five point Likert scale. The response choice ranged from 1 = ‘all of the time,’ 2 = ‘very often,’ 3 = ‘often,’ 4 = ‘sometimes,’ 5 = ‘hardly ever.’ Valid responses were made by 47 respondents for all variables except sharing a lesson learned with the external customers of the project. The Likert scales were treated as ordinal variables and the negative choices were not transformed into positive values. The full results are in Appendix I.

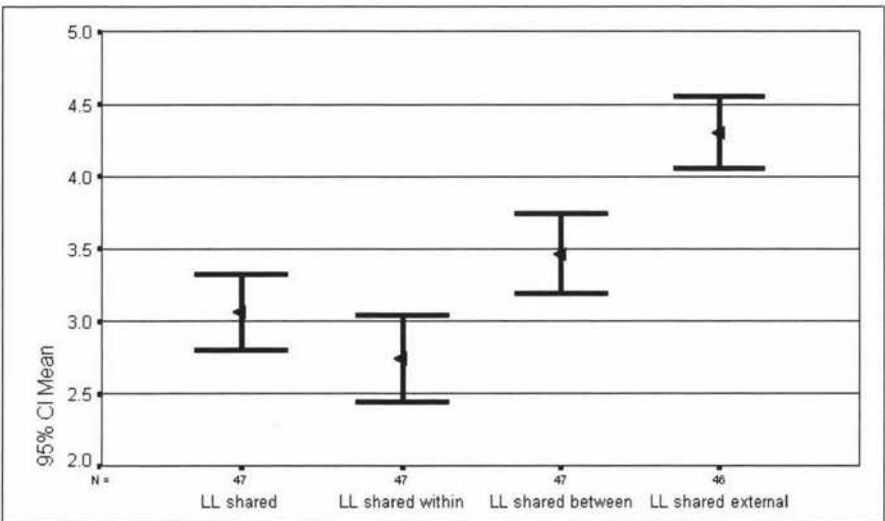
Sharing lessons learned*	n	$\mu$	95 % CI, $\mu$	Med.	Mode	SD	Range
Shared	47	3.06	2.80:3.33	3	4	0.89	3
Shared within projects	47	2.74	2.45:3.04	3	2	1.01	4
Shared between projects	47	3.47	3.20:3.74	4	4	0.93	3
Shared between external projects**	46	4.30	4.06:4.55	4.5	5	0.84	3

\* Scales represent five-point Likert scales

\*\* Missing mean ( $\mu$ ) not replaced

**Table 16 Sharing a lesson learned**

The mean for sharing a lesson learned ranged from  $\mu = 2.74$  (‘very often’) for sharing lessons learned within projects, to  $\mu = 4.30$  (‘sometimes’) for sharing a lesson learned between the external customers of the project (Figure 13, Appendix I). The average mean ( $\mu$ ) for all attributes of sharing a lesson learned was ‘often’ or 3.39.

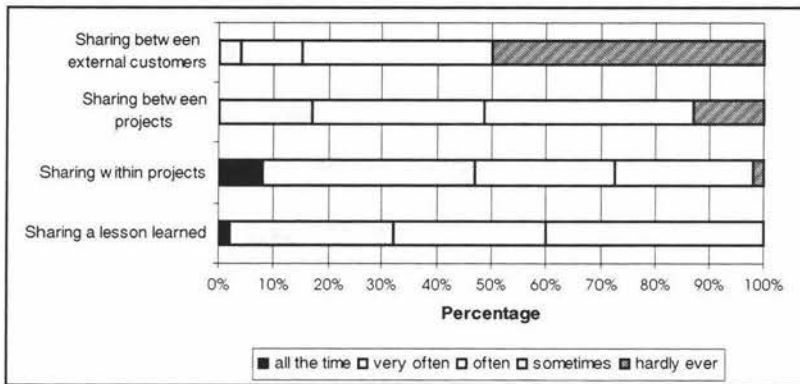


**Figure 13 Mean and confidence interval - sharing lessons learned**

All sharing attributes were statistically significant (Table 17). The generic sharing of a lesson learned was significant for ‘sometimes’ sharing ( $n = 19$ , 40%,  $p = 0.001$ ) (Figure 14). Respondents next ‘very often’ ( $n = 14$ , 30%) and ‘often’ ( $n = 13$ , 28%) shared lessons

learned. The distribution skewed negatively towards 'sometimes' sharing a lesson learned (Skewness, -1.246).

The respondents shared a lesson learned within projects 'very often' ( $n = 18$ , 38%,  $p$  0.000). Equally and next most cited was 'often' ( $n = 12$ , 25%) or 'sometimes' ( $n = 12$ , 25%). The distribution was weakly and positively skewed to 'very often' (Skewness, 0.148) with a relatively even distribution of cases (Kurtosis, -0.867).



**Figure 14 The frequency of sharing lessons learned**

The respondents mostly 'sometimes' shared lessons learned between projects ( $n = 18$ , 38%,  $p$  0.041), (Table 16). Next ranked was 'often' sharing a lesson learned between projects ( $n = 15$ , 32%), while eight respondents 'very often' did so (17%). The responses reflect the weak negative skew to 'sometimes' sharing (Skewness, -0.073), and the relatively even distribution of cases (Kurtosis, -0.800).

Sharing lessons learned	$\chi^2$	df	p
Shared	14.872	3	0.001*
Shared within projects	19.914	4	0.000*
Shared between projects	8.234	3	0.041*
Shared between external project customers **	24.782	3	0.000*

\* The Chi-Square is significant at the power of 95%, 2-sided. ( $p < 0.05$ ) (Likert scale collapsed into 3 levels).

\*\* The serial mean replaced the one missing case, automatically recoded by SPSS as 'sometimes.'

**Table 17 Significance of sharing lessons learned**

The respondents significantly and 'hardly ever' shared lessons learned between the external customers of a project ( $n = 23$ , 50%,  $p$  0.000). The distribution skewed strongly towards 'sometimes' or 'hardly ever' (Skewness, -1.109), with an abnormal number of cases in the negative tail (Kurtosis, 0.688).

### 6.2.3 Years of experience, PMP status and career goal

The variables sharing (share, share within, between and between the external customers) were transformed into a composite variable 'share.' Analysis of variance (Simple Factorial

ANOVA) tested “the null hypothesis that the mean of the dependent variable (share) was equal in all of the groups defined by the first-layer independent variable” (SPSS Release 6.1.3). Career goal was dichotomised as 0 = yes, 1 = no and unsure, and years of experience was dichotomised as 0 = 10 years or less, 1 = more than 10 years. In all cases, the homogeneity of variance was appropriate ( $p > 0.05$ ).

PMP status, years of experience and career goal	n	df	Mean square	F	F prob.
Sharing and PMP status	47	1	2.566	0.336	0.565
Sharing and career goal	47	1	1.362	0.179	0.675
Sharing and years of experience	47	1	9.196	1.205	0.278

\* F Significant ( $p < 0.05$ ) (2-tailed significance)

**Table 18 Years of experience PMP status, career goal, and sharing a lesson learned**

PMP status, career goal, or years of experience did not influence the sharing of a lesson learned, or the sharing of a lesson learned at the intraproject, interproject, or intra-organisational levels when all effects were entered simultaneously ( $f > 0.05$ ) (Table 18).

### 6.2.4 Effective organisational learning strategies

Questions 26 and 27 measured the belief about the personal and organisational ability to achieve project success in the past 12 months on a five point Likert scale where 1 = ‘strongly agree,’ 2 = ‘agree,’ 3 = ‘uncertain,’ 4 = ‘disagree,’ and 5 = ‘strongly disagree.’ The respondents on average agreed ( $\mu = 2.13$ ) that lessons learned had significantly improved their personal ability to achieve project success in the past 12 months (Table 19). The distribution skewed positively towards agreeing and strongly agreeing (SD 0.90, Skewness, 0.844), with cases predominantly in one tail (Kurtosis, 0.1.093).

Personal and organisational ability to achieve project success*	n	$\mu$	Med.	Mode	SD	Range
Personal ability	47	2.13	2	2	0.90	4
Organisational ability	47	2.70	3	3	0.59	4

\* Scales represent five-point Likert scales

**Table 19 Personal and organisational ability to achieve project success**

At the organisational level, the respondents were mostly uncertain ( $n = 19$ , 40%) whether lessons learned had improved the organisation’s ability to achieve project success in the past 12 months (Appendix I). However, on average they agreed ( $\mu = 2.70$ ) that lessons learned had significantly improved the organisation’s ability to achieve project success (Table 19). The distribution skewed positively towards uncertainty in this belief (SD 0.95, Skewness, 0.645), with cases predominantly in the centre of the distribution (Kurtosis, 0.529).



Personal and organisational ability to achieve project success*	$\chi^2$	df	p
Personal ability	7.680	1	0.005*
Organisational ability	0.532	1	0.465

\* The Chi-Square is significant at the power of 95%, ( $p < 0.05$ )

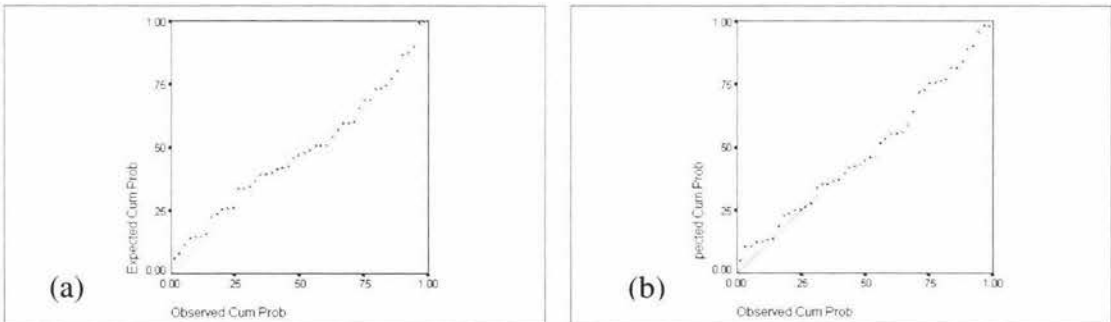
\*\* Likert scale collapsed into 2 levels, 1 = strongly agree and agree, 2 = all else.

**Table 20 Significance of belief about personal and organisational ability**

In summary, the respondents believed their personal ability had significantly improved in the past 12 months by the use of lessons learned ( $p$  0.005), while they did not believe the organisation’s ability had significantly improved ( $p$  0.465).

### 6.2.5 Sharing a lesson learned and organisational learning strategies

The effective organisational learning strategies were measured against the personal and organisational ability to achieve project success in the past 12 months by using ‘enter’ Linear Regression (Emory & Cooper, 1991). These were defined as the storage of lessons learned in human memory, the generic sharing of lessons learned, sharing of lessons learned within projects and between projects, and sharing of lessons learned with the external customers of a project. Additionally included were the routine acquisition, formal capture and routine retention of a lesson learned, the simplicity of retrieval of lessons learned, and the ease of access to lessons learned by search mechanisms.



**Figure 15 Normal P-P plots – personal (a) and organisational (b) ability**

SPSS did not produce any casewise plots as no outliers were found. The serial mean replaced the missing values (SPSS Release 6.1.3). Significance was at  $\alpha T < 0.05$ . The P-P plots of regression both indicated a relatively normal distribution as the cases sat close to the regression line (Figure 15).

The independent variables entered together influenced the belief that lessons learned significantly influenced personal ability to achieve project success in the past 12 months ( $p$  0.009) (Table 21). This was not the belief at the organisational level ( $p$  0.179). The independent variables explained 45% (R square) of the variance in the personal ability to

achieve project success by the use of the quantitatively measurable effective organisational learning strategies, while the independent variables explained 29% (R square) of the variance in the organisation's ability (Table 21).

Effective organisational learning strategies and achievement of project success	n	df	Sum of squares	R Square	F	Sig. F
Personal ability	47	10	16.681	0.448	2.924	0.009*
Organisational ability	47	10	12.318	0.294	1.503	0.179

\* Significant at  $p < 0.05$

**Table 21 Organisational learning strategies and project success**

Effective organisational learning strategies	n	$\mu$	SD	T	T 1 tailed sig.
<b>Personal ability</b>					
Shared generically	47	3.064	0.89	-1.708	0.096
Shared within projects	47	2.745	1.01	0.851	0.400
Shared between projects	47	3.468	0.92	2.694	0.010*
Shared between external customers**	47	4.304	0.83	0.656	0.515
Routine acquisition	47	3.362	1.16	-0.464	0.645
Routine capture	47	3.574	1.11	0.656	0.516
Routine retention	47	3.745	1.09	1.695	0.099
Simple retrieval**	47	3.778	0.95	-1.919	0.063
Search mechanisms enhance access**	47	3.698	1.17	-0.644	0.511
Store lessons learned in human memory	47	1.936	0.96	2.342	0.024*
<b>Organisational ability</b>					
Shared generically	47	3.064	0.89	2.269	0.029*
Shared within projects	47	2.745	1.01	0.619	0.540
Shared between projects	47	3.468	0.93	0.367	0.716
Shared between external customers**	47	4.304	0.83	-0.155	0.878
Routine acquisition	47	3.362	1.17	-0.241	0.811
Routine capture	47	3.574	1.12	-0.125	0.901
Routine retention	47	3.745	1.09	-0.449	0.656
Simple retrieval**	47	3.778	0.95	-0.599	0.553
Search mechanisms enhance access**	47	3.698	1.17	1.325	0.194
Store lessons learned in human memory	47	1.936	0.96	-1.013	0.318

\* Significant at  $p < 0.05$

\*\* The serial mean replaced the missing variables

**Table 22 Sharing lessons learned and effective organisational learning strategies**

There were two significant predictors of personal ability and one significant predictor of organisational ability to achieve project success. At the personal level, the sharing of a lesson learned between projects ( $p = 0.010$ ,  $\mu = 3.46$ ), and the storage of lessons learned in human memory ( $p = 0.024$ ,  $\mu = 1.93$ ), were significant predictors of personal ability to achieve project success, while the generic sharing of a lesson learned was a significant predictor at the organisational level ( $p = 0.029$ ,  $\mu = 3.06$ ).

A closer examination using the nonparametric Kruskal-Wallis 1-way ANOVA (Homogeneity of Variance  $p < 0.05$ ) found the project practitioners who shared lessons learned between projects were 'often' more likely to store a lesson learned in human memory than those who 'sometimes' did ( $p = 0.019$ ) (Table 23). Additionally, project practitioners who generically

shared a lesson learned were 'very often' or 'often' more likely to store a lesson learned in human memory than those who 'sometimes' did ( $p = 0.027$ ).

Storing a lesson learned in human memory by sharing**	$\chi^2$	df	p
Shared generically	14.572	4	0.005*
Shared within projects	7.970	4	0.092
Shared between projects	10.959	4	0.027*
Shared between external customers	0.636	4	0.228

\* The Chi-Square is significant at the power of 95%, 2-sided. ( $p < 0.05$ )

\*\* Nonparametric Kruskal-Wallis

**Table 23 Storing a lesson learned in human memory by sharing**

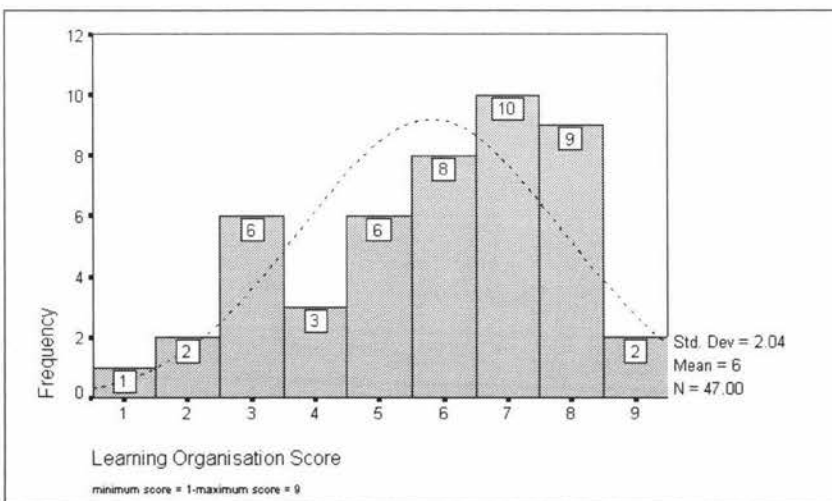
## 6.2.6 Organisational learning characteristics

The respondents were asked to tick each of the nine matched questions in Section Four of the survey. The possible score ranged from a minimum of zero to a maximum of nine points. The mean organisational learning score was 5.8 with a relatively normal distribution (K-S Lilliefors,  $p < 0.05$ ) (Table 24, Figure 16). The scores were reasonably evenly spread and moderately skewed towards the higher values (Skewness, -0.532; Kurtosis -0.629).

Organisational learning opportunities	n	$\mu$	Medium	Mode	SD	Range
Score	47	5.80	6	7	2.039	8

**Table 24 Organisational learning score**

The collapsing of the learning organisation score into a dichotomous variable ( $1 = < 5$ ;  $2 = \geq 5$ ), found at a 50% probability there was a significant proportion of learning organisational characteristics in the survey population (Binomial Test,  $p = 0.001$ ).



**Figure 16 Histogram organisational learning scores**

Four learning characteristics were significant ( $p < 0.05$ ) (Appendix I). The respondents had a relatively free hand rather than system constraints in the decision how to best meet personal objectives ( $p = 0.000$ ). They also perceived objectives were agreed through a collaborative

process rather than a top down process (p 0.000). The idea to say it was OK you did not know, had a significant probability of occurring (p 0.000), as did the perception the work environment was a place of constant change rather than a place where things were relatively constant (p 0.000). Contrary to these organisational learning opportunity indicators, the respondents also perceived they were encouraged to conform and ‘stick to the rules,’ and required clearance or approval when making decisions on their own initiative. These findings lacked statistical significance (Appendix I).

### 6.3 Semi-structured interviews

The findings from the interviews included the self-assessment questionnaire administered prior to the interview, the organisational learning characteristics of the participants, and the qualitative information inductively derived from the interviews. The main themes were systematic problem solving and continuous improvement. Interwoven with these themes were the flexibility of the use of standardised templates, benchmarking, quality management, strategic project support, organisational and project culture, espoused views and the negative and positive consequences surrounding organisational learning.

#### 6.3.1 Self assessment questionnaire

Before the interview, the participants self-completed an assessment questionnaire on the skills and knowledge, attitudes and emotions related to effective learning from experience. The participants kept this questionnaire along with notes provided about effective learning from experience (Honey, 1993).

Characteristic	n	%	Mean	SD	Min-max	Sum
Knowledge and skills	7	100	8.14	2.34	5 – 12	57
Attitudes and emotions	7	100	9.86	2.41	5 – 12	69

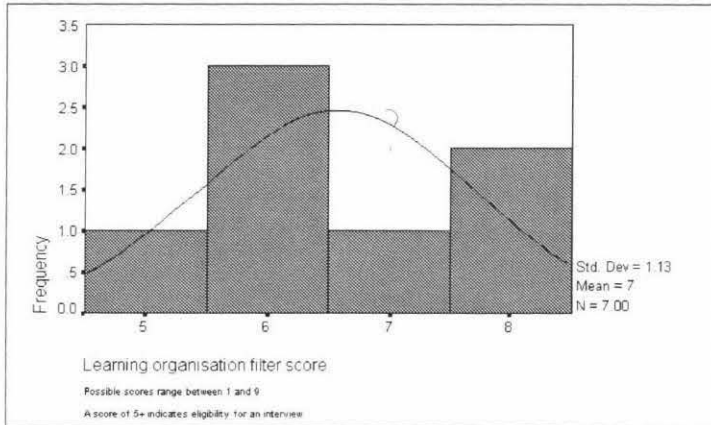
**Table 25 Characteristics of effective learning from experience**

Based on the analysis by Honey (1993), the participants had moderate scores for knowledge and skills ( $\mu = 8.14$ ), and attitudes and emotions ( $\mu = 9.86$ ) towards effective learning from experience (Table 25). No other denominator data was available for comparison of these scores.

#### 6.3.2 Organisational learning characteristics

The mean organisational learning score for the participants was ‘seven.’ The distribution was bimodal with one peak where three participants scored six, and another peak where two

participants scored eight (Figure 17). The Binomial Test with a 0.50 probability that a certain organisational learning characteristic would occur in the interview population, found three significant organisational learning characteristics (Appendix I). The seven participants had a significant probability that objectives were agreed through a collaborative process ( $p$  0.015), that it was OK to say you did not know and be open about problems ( $p$  0.015), and that quality came first, i.e., consistent emphasis was placed on improving the quality of products and services ( $p$  0.015) (Appendix I).



**Figure 17 Histogram of participant's organisational learning score**

### 6.3.3 Problem solving

The problem solving process was a consistent question across all interviews to derive effective organisational learning strategies that would influence project management practice. For all participants, problems were either technical or human resource based. 'F' who worked in information technology described this typical finding.

Soft problems are to do with people and hard problems are to do with the technical problems when on a project.

Whatever the problem type, problems arose either unexpectedly or proactively as part of the project phase planning. Two participants made similar comments when describing how problems arose and the subsequent process. Characteristic was 'C,' a project manager who worked in business solutions:

If it is something that comes out of left field then woops, where did that come from? Lets get everyone together and figure out what to do. Otherwise we tend to, as we are going through phase by phase for a project, looking forward to, what we recognise that might trip us up in the next phase to prevent it from happening.



Whether problems arose unexpectedly or proactively, the process to reach a resolution was collaborative, occurred in stages, and was routine, either with one other colleague or in a group situation. Often collaboration was at either the second or third stage of resolving a problem. 'D,' who worked as a project manager in information technology, explained the continuum from the individual level to the group level.

I guess I would break it down into its individual parts thinking from experience. How I have solved things before that would be the first stage. The next stage would be to discuss it with colleagues probably as a one on one situation informally, and the next stage after that would be some meetings to explore it in a more structured manner, with it quickly solved after that stage.

In this example, problem solving was systematically broken into stages where an informal process was followed by a formal process to reach resolution. This was a strong finding for all participants. However, only four participants described processes that involved a long-term solution in terms of project success. 'B' described a current scenario where three information technology projects were running parallel experienced a capacity issue "for setting up a common hosted end environment." 'B' explained and described the problem solving process like this:

No one had initially anticipated this (capacity issue) in terms of these other projects. So one is the problem definition. We have to go back to square one with two of the other projects. In terms of solving it, we brought in an external expert. The problem was actually identified during dimensioning on my project when I said; look, we need to take consideration of the one that is coming behind us. The problem beyond that is one of funding. I think the problem is under control in terms of what will have to happen. But it will have a spin off problem, which is overall co-ordination and definition. So the lesson learned is that each of the people here wants the project to work for the organisation. The lesson learned is that the organisation needs someone who can take the holistic view of what has to happen, and understand that if you have three different projects in the same environment that is been developed, they have to be integrated, because the whole business process integrates with all three of those projects. So you better look at what the end-result is and do not do dimensioning based upon three individual blocks along the way, which has being the traditional approach (abbreviated).

This rich story describes and explains the 'why' of the problem, the process, the consequences, and the organisational perspective in terms of lessons learned and the organisational strategic direction. 'B' later explained this project was "a major cultural shift and major impact on many individuals" because "it was a move from a 90 percent manual based requisition pay cycle towards an Internet Centric system." In another example, 'E' who worked in a business-service consulting organisation illustrates the continuum from the



problem recognition by the individual, collaborative problem solving to get at the “root cause” of a problem, and resolution.

I tend to have a reasonably analytical approach to problem solving. Part of that is aiming to get at the root cause of something rather than just trying to deal with the symptoms. I like to break the problem down to see what it is that might be affecting or causing the problem in the first place. I then look at potential strategies for solving after you have really come down to what the problem is. Around here, we often get more than one person together. They get on the white board and take both of those steps in terms of working out what problem you are dealing with in the first place, and then what the options there are for solving it, and finally what is the best option, and what you have to actually do to carry that through.

We've got a fairly good background in quality management. So some of the tools that come out of that, things like work flow, effect-cause diagrams, Ishikawa type fishbone things. More often (versus people), you have three failures caused by the axle, and two by the hub sort of thing. So, it is more the Ishikawa type thing that will get to the root cause of the issue. Even then, more often the discussion that burrows down, asks questions repeatedly, and gets down to the root cause rather than formalised tools (abbreviated).

In this example, the problem resolution process had four stages aimed to get at the underlying ‘root’ cause. Integral to problem resolution was quality management, the subsequent use of tools, and collaboration with colleagues. Another participant ‘C’ related a different perspective on problem resolution in terms of project and organisational success. The outcome of problem resolution was an “end solution, or whatever the customer was looking for, or what the project requirement was.” Again, the process was to “typically use a team-based problem solving total approach for business type problems.”

The problem solving process sometimes included reviewing lessons with external clients. In a small consulting organisation, ‘E’ said sharing lessons learned with clients was not routine but “on some occasions we do take the lessons learned and present them back to the client so that they get some benefit, to feedback what thinking you have done.” At the organisational level, lessons learned were “presented to the whole team” as a routine practice by the project manager as part of the project closeout phase.

The learning from lessons did not always extend to the organisational level. ‘D,’ who worked in an information technology environment with an open climate, mentioned there was “no putting under the carpet.” This was part of the “unit’s culture, not the organisational culture.” This was similar in another situation where ‘G’ shared “lessons learned with whoever wants them,” but this “all tended to be with people in our own group.” The challenge for this

participant was that Project Manager's rarely talked with each other; something 'G' "suggested" could change if a regional "Project Manager's forum was set up." Project management practice in this situation was "you just do what comes best to you in a particular situation" and said the value of sharing was "you might find out all this other stuff."

### 6.3.4 Continuous improvement

Continuous improvement interwove with all the participants' stories about project management and the practice of using lessons learned. The examples expressed commonly included tacit and explicit learning, quality management, support mechanisms, standards, flexibility, benchmarking, and competitive advantage. In talking about learning from experience, 'E' linked continuous improvement through quality management with the dynamics of learning from experience.

We try and look at things we can feed back into the quality system here so that it is part of the way we do things around here, and it is then on the treadmill to be done right, done better every time. I guess we have an approach here where we have a quality system. That is a basis for improvement really. We are looking for improving small and large that we can apply to get better over time. The lessons learned are a part of that process.

Project learning from lessons learned was commonly described with reference to learning using project management support tools. 'A,' who worked in a global consulting organisation, described a learning process through an external learning resource when managing a project.

We discussed client work where I was involved in the setting up of a more formal TQM process. The approach was improved upon by working alongside a quality consultant (QM) on the job. The process involved: discussing the approach where I lead the project, discussing as and when necessary with the QM (both 'A' and QM could make this call as to when it was necessary). There was periodic review by the QM and myself, and we would analyse and discuss the differences (viewed as a valuable learning mechanism as the "QM was tough-but good").

Here the quality consultant and the project manager "set up a more formal Total Quality Management process." In another management consulting organisation, learning on the job suggested a link with quality management and learning. This was a routine practice for 'E.' A recent initiative in the past year was to "institutionalise the "lessons that could be learnt from a project in terms of the processes we apply to our quality system." The implementation process had not yet reached a stage where 'E' felt satisfied that it was working as fully as

expected. "They had made good steps on that" but had not gone "as far" as they wanted to go in terms of the lessons been "institutionalised" and "embedded" into the quality system.

Quality management was a strongly espoused organisational learning practice cited in the filter question in the survey, however only five participants mentioned it in the interviews. Typical where quality management was discussed, were quality management standards embedded into project management practice. Strongly expressed was the recent change in quality processes for future project success. In a global organisation 'G' described how in the past three months, project quality requirements had being set up.

They (the organisation) have just bought out this new application, which requires you to have certain features to make sure you have the right quality requirements. They have tried to tighten that up a bit too. It has only been set up in the past three months, as there are quite a few systems e.g., they have just set up a Terapack one, and now have a project management one.

The link between project management standardised tools, continuous improvement, and learning was a common theme mentioned by all participants. In another global consulting organisation, 'C' observed that:

Every project within the organisation needs to demonstrate they are following the same methods and processes, procedures and standards, so we need to document, define and demonstrate that the project is consistent with the standards across projects.

Consistency in standards for 'C' was embedded in continuous improvement. The standards were the result of the organisation's "experience, PMBOK and the Software Engineering Institute." Expanding on the development of the standards, 'G' explained that:

We have our own internal methodologies, user systems life-cycle methodologies, requirements determination, systems engineering estimating process, implementing organisational change process, and project management methodology, which is now PM2. It started of as Project Management, it now has a number of iterations pretty much in association with what you read in PMBOK, and what the Software Engineering Institute is doing with its capability maturing process.

In this example, the benchmarking of learning against external agencies resulted in continuous iterations to the project management methodology at the organisational level. Except for the two smaller consulting organisations, a common management support tool to assure standards were met was a project steering committee. In one organisation where project management was a relatively recent practice in the past five years, the steering committee was set up to provide an "oversight role for all the projects." The driver behind the initiative was an annual

external audit. In conjunction with the steering committee was the setting up of a project office in the “last few months” with the support of an external project-consulting organisation. ‘F’ described the purpose of the project office.

The project office is supposed to provide a set of common resources across all projects as standards. Ours has started with common reporting through the steering committee. We are working towards standardising a whole lot of other processes and procedures. I have been told today, literally, we have adopted a project management-scheduling tool. We also set some monthly objectives for the team. These ones are reported back to the steering committee that has an oversight role of all the projects.

The standardisation of project tools, processes, and procedures were not a practice that constrained inflexible practices. For four participants where standard methodologies were embedded into project management practice, flexibility to suggest change and, or implement adapted methodology was commonplace in terms of a specific project. ‘C’ explained flexibility in terms of standard methodology in a global organisation.

We can put suggestions for change back at any point to the group that looks after change. The way which we use the methodology itself is the generic way in which you would manage all your projects. There are processes that support the method. Some of the tools that support the process is a tailoring process that will pick up the standards, and we will say right this is what we are going to use and what we are not going to use. We tailor the methodology down to what is applicable at the time and if there are things that are irrelevant, we can tailor those out and document that we are not going to use those.

Standardisation here was a flexible and generic process to achieve consistency in project management practice across the organisation. An additional tool mentioned by all participants was benchmarking. As part of an annual assessment for project management practice, ‘C’ described the benchmarking process as a reference tool to compare practice against an external model. In the organisation that ‘C’ worked in, the “Software Engineering Institute Capability Model” was a benchmark tool used as “a common goal across the organisation.” The process involved:

Feedback on what is happening here. We are also discussing the same activities on a regular basis with other groups that are doing the same projects in other organisations too, to see what the variant, different approaches are, what sort of successes or what the lessons they have learnt are.

As well as to identify gaps in project management practice, the model also identified “lessons and successes” on an annual basis. The reality for all participants was new initiatives in the past three years for continuous project management improvement.

## **6.4 Summary**

This chapter has presented the quantitative data and qualitative findings from the survey and the interviews about organisational learning practices. The next chapter presents the findings about organisational memory.

## CHAPTER SEVEN: ORGANISATIONAL MEMORY

### 7.1 Introduction

Chapter Seven follows on from the findings about organisational learning in project management practice. The findings presented in this chapter are the organisational memory properties, processes, and manifestations of lessons learned derived from the survey and the interviews. These findings constitute the research objective.

### 7.2 Survey

Questions 16 to 21 in Section Three of the survey measured the routine acquisition, formal capture, routine retention, ease of retrieval, and the ease of search mechanisms to enhance access to lessons learned on a five-point Likert scale. The scale ranged from 1 = 'all of the time,' 2 = 'very often,' 3 = 'often,' 4 = 'sometimes,' and 5 = 'hardly ever.'

The data was first screened for normality and missing cases. Two missing cases in the variables 'retrieval' and the four missing cases in the variable 'search mechanisms' were automatically recoded and replaced with the serial mean 'sometimes.' The Likert scales were treated as ordinal variables and the negative choices were not transformed into positive values.

#### 7.2.1 Organisational memory processes and storage

The mean for the routine acquisition ( $\mu = 3.36$ ), the formal capture ( $\mu = 3.57$ ), and the routine retention ( $\mu = 3.74$ ) of lessons learned was 'often' (Table 26, Figure 18). Retrieval was 'often' simple ( $\mu = 3.77$ ), and search mechanisms 'often' enhanced the access of lessons learned ( $\mu = 3.69$ ). Lessons learned were stored in human memory 'all of the time' ( $\mu = 1.93$ ). The full table of frequencies of scores for organisational memory processes are in Appendix I.



Organisational memory processes and storage	n	Mean	Medium	Mode	SD	Range
Acquisition a routine process	47	3.362	3	4	1.169	4
Formal capture a routine process	47	3.574	4	4	1.118	4
Retention a routine process	47	3.745	4	3	1.093	4
Retrieval a simple process*	47	3.778	4	4	0.953	3
Search mechanisms enhance access*	47	3.698	4	5	1.171	4
Storage in human memory	47	1.936	2	2	0.965	4

\* Missing variables replaced with the serial mean

Table 26 Lessons learned and organisational memory

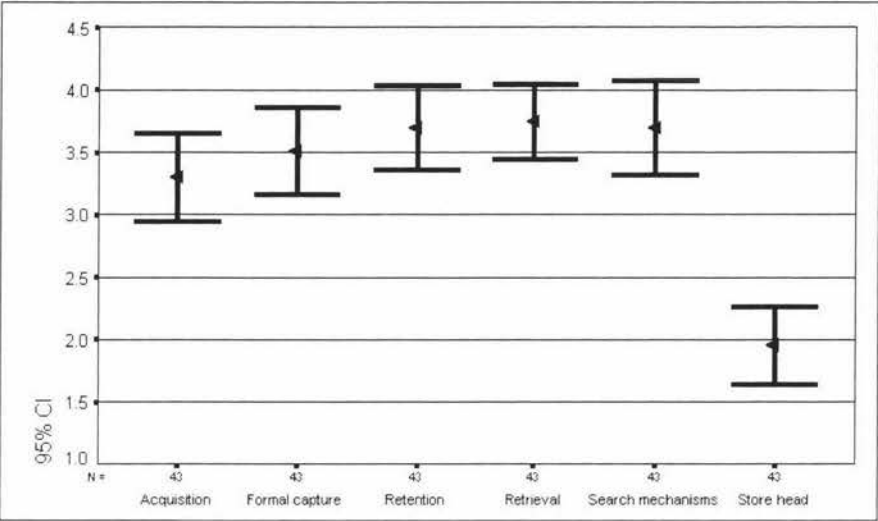


Figure 18 Organisational memory processes - mean and confidence interval

The respondents’ mostly acquired lessons learned on a routine basis ‘sometimes’ (n = 14, 30%), while the average extent lessons learned were acquired routinely was ‘often’ ( $\mu = 3.36$ ) (Table 26). The scores were weakly and negatively skewed to ‘sometimes’ (Skewness, -0.162, Kurtosis, -0.985).

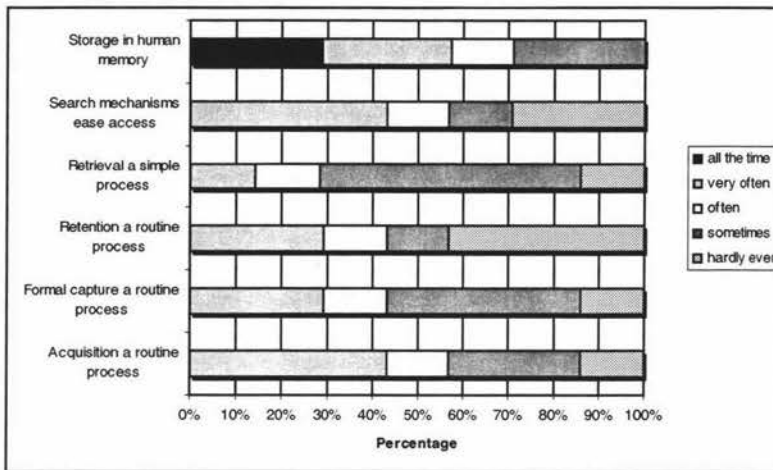
Organisational memory processes and storage	$\chi^2$	df	p
Acquisition a routine process	8.638	4	0.070
Formal capture a routine process	18.000	4	0.001*
Retention a routine process	21.404	4	0.000*
Retrieval a simple process	8.244	3	0.041*
Search mechanisms ease access	11.302	4	0.023*
Storage in human memory	34.383	4	0.000*

\* The Chi-Square is significant at the power of 95% (p < 0.05)

Table 27 Organisational memory processes

The formal capture of lessons learned was significantly ‘sometimes’ a routine process (n = 19, 40%, p 0.000) (Table 27). There was a bimodal frequency of scores where respondents ‘very often’ or ‘hardly ever’ formally captured lessons learned routinely (n = 20, 42%). This reflected in the moderate negative skew to ‘sometimes’ with a strong cluster of scores at the negative tail (Skewness, -0.439, Kurtosis, -0.858).

Significantly, respondents 'often' routinely retained lessons learned ( $n = 17$ , 36%,  $p = 0.000$ ) (Table 27). The scores were relatively evenly distributed with a weak negative skew towards 'often' (Skewness, -0.298, Kurtosis, -0.795).



**Figure 19 Organisational memory processes and content**

The retrieval of lessons learned was 'sometimes' and significantly a simple process ( $n = 21$ , 42%,  $p = 0.041$ ). The scores clustered in the negative tail of the distribution (Skewness, -0.463, Kurtosis, -0.569). Search mechanisms significantly 'sometimes' or 'hardly ever' enhanced the access of lessons learned ( $p = 0.023$ ), with the scores moderately clustered at the negative tail of the distribution (Skewness, -0.631, Kurtosis, -0.490).

Most respondents' stored lessons learned in their head 'all the time' or 'very often' ( $n = 38$ , 81%). This reflected in the strong positive skew and cluster of cases in the left tail (Skewness, 1.194, Kurtosis, 1.427). The Chi-Square with equal expected values was significant for the storage of a lesson learned in human memory ( $\chi^2 = 34.383$ ,  $df = 4$ ,  $p = 0.000$ ), (Table 27). These findings are illustrated in Figure 19.

### 7.2.2 Years of experience, PMP status and career goal

The organisational memory process variables were transformed into a composite variable 'memsys' (acquisition, formal capture, retention, retrieval, and search mechanisms). Simple Factorial ANOVA tested "the null hypothesis that the mean of the dependent variable (memsys) was equal in all of the groups defined by the independent variables" PMP status, career goal (dichotomised as 0 = yes, 1 = no/unsure), and the years of experience (0 = 10 years or less, 1 = more than 10 years) (SPSS Release 6.1.3).

Memory processes	n	$\chi^2$	df	p
Memory processes and PMP status	47	0.806	1	0.369
Memory processes and career goal	47	0.106	1	0.744
Memory processes and years of experience	47	4.605	3	0.203

\* Significance  $p < 0.05$   
\*\* Kruskal Wallis 1-way ANOVA (non-parametric)

**Table 28 Organisational memory processes by PMP status, years of experience and career goal**

There was no significant difference between any organisational memory process and the years of experience ( $p$  0.203), PMP status ( $p$  0.369) and career goal ( $p$  0.744) (Table 28).

7.3 Semi-structured interviews

The strong themes that emerged in the qualitative information were the wide manifestation of lessons learned in organisational memory, the consistent use of human memory to store lessons learned, an OMIS, the social nature of the organisational memory processes, and the added efficiency from formal management of lessons learned. Integral are the positive and negative events and consequences.

Individual		Collective	
Individual level	Project level	Organisational level	
Human memory	Procedures, processes	Intranet	
Individual know how	Paper workbooks	Global Web	
Paper documents/files	Paper methodology workbook	Global knowledge management repository	
Electronic documents (Word, Excel, E-mail)	Paper documents/files	Web E-room (global chat-room)	
	Project ring binder workbooks	E-mail queries	
	LAN project workbook (under development)	Global PL (lesson learned database)	
	Web E-room (chat room)	Databases	
	Electronic documents (Word, Excel)	Knowledge management system	
	Electronic project repository	Organisational culture	
	Project culture		

**Table 29 Manifestations of lessons learned**

7.3.1 Organisational memory storage bins and content

Lessons learned are manifested widely in organisational memory (Table 29). There was strong suggestion all participants used human memory to store lessons learned. One participant who worked in a consulting organisation where the climate was “collegial and sharing,” perceived human memory was the “obvious” place to store lessons learned. ‘A’ explained, “there would always be other people you can go and ask about things, because you know they are an expert in those areas.” Other participants perceived human memory as less than ideal. ‘C’ observed this media “was easier.”

It's not the ideal way. I certainly know the ones that cause the most pain and suffering. It works well. You would be working on a problem and suddenly the alarm bells would go off and you would say, I remember the solution from two to three years ago, seems awfully familiar, so what happened then. OK, these are the things we need to know? We need to sit down and work through it.

In this example, the retrieval of lessons learned relied on human recall that although less than "ideal," "worked well," and was acted on in another time frame through collaborative social processes. 'E' validated the perception that human memory recall was less than ideal:

You can't rely on people's minds, however good they are. One day they are going to walk outside of this organisation and go somewhere else and then you have lost it all. So you have got to encapsulate that into some sort of system, which is either a paper based system which is difficult to make really effective, or an IT system of some sort where you can put some tools into the IT to make it more effective.

Another main reason for not relying on human memory for 'E' was attrition. 'E' commented that "some sort of system" to store lessons was necessary. In another example, 'D' mentioned attrition through retirement was a threat to the organisation in terms of losing skills and knowledge. This was part of a narrative about competitive advantage and an organisational initiative to catalogue human resource skills to capitalise on the skill base. 'D' explained the initiative was to "work out what skills we have, and if some of those skills disappear what risks there would be to the X." When asked what risks 'D' replied:

Well knowledge. If you have a whole lot of people who are about to retire and they are going to take all your knowledge in a certain area you better do something about it quick.

Here knowledge loss was a key risk when organisational members retired. A moderate finding to manage knowledge loss was the implementation of an OMIS. Where an OMIS was not implemented, a moderate to weak finding was management of lessons learned either at the individual or project level. One participant, who managed lessons learned at the individual level, described the intention as a personal learning goal. The organisation 'D' worked in had a medium term plan to implement an organisational-wide system to manage knowledge because "data was stored in excess of 30 different types of systems throughout the organisation." In project management terms there were:

A large number of projects with a large amount of information that hasn't been kept, or recorded anywhere throughout the organisation. Actually getting to it has been virtually impossible so the idea is to centralise it so the whole organisation can use it.

The difficulty to access information, along with external project management training, motivated 'D' to acquire lessons learned on a real time basis for future project scheduling of tasks.

The idea is that I will build up a library of similar type tasks and record the time that I take to do them to help me estimate how long it will take to do future projects; a realistic idea of how long it takes to get things done. I record everything I do on a real-time basis during the day in Access database.

Although 'D' had not had the opportunity to assess the effectiveness of this system, owing to its' implementation in the past six months 'D' perceived the project team viewed the database as a negative project management tool.

I think they see it as a job that will stop them doing other things. That it is not really worth it. It is like a timesheet, I have called it a timesheet, which is probably a mistake. It does allow people to be measured by the amount of time they are on the job, so has an inherently negative aspect.

The "job" to record the use of time is one element of project experience perceived in this example as "not really worth it" by the team members. Conversely, another participant observed the global electronic storage system implemented in the past year was, as far as 'B' knew:

Used quite widely. You can see problem logs from all over the world in different categories. I know within our own project we sit down and we review it at our weekly project meeting.

In the first example, the process was relatively new and not standardised across projects, while in the second example the process was organisational-wide at a global level. The design and purpose of the global database was a "reporting mechanism" to record all "internal changes, issues, and problems." The identified problems were:

Categorised in terms of severity, impact, and escalation requirements. Then as we go through each step of the resolution the log is updated to reflect the status of the problem. What that gives us is a reference for other projects, so that if someone runs into a similar issue in their project, they can actually do a search across any problems, and it would hopefully identify the one we had come up with. So they can see how the problem has being resolved in our project and get direction from there.

The database used a classification method to categorise problems by “severity, impact, and escalation requirements” for use as a “reference for other projects” for similar problems. Another strong finding was paper-based organisational memory at the individual, project, and organisational levels to store lessons learned (Table 29). Apart from lessons learned documents printed from computer systems, paper organisational memory included project workbooks and a ring binder to store lessons learned. In one example, where an OMIS was not implemented, there was a gap between the traditional paper filing system and the advent of technological office tools. ‘F’ told it like this.

What has happened in the last 5-10 years, with the advent of photocopiers, PCs and trials, is that nobody files anything any more. The turnover of staff and the loss of organisational knowledge because of the restructuring have meant that people come in, do not know the systems there, and do not know the files. What has happened is effectively, that in this organisation, we have this big sort of gap in our organisational history because things are not going in files any more.

This narrative explains the gap between the old paper systems and the new technology, worsened by turnover, restructuring, and the new staff who did not know the paper systems. The transition also meant a loss of power for some organisational players, resulting in a gap in the organisation’s history. In another example, ‘C’ described the manifestation of lessons learned in project tools.

There is a wide variation and it really depends on the size and nature of the project, like if you have got a small project, say half a dozen people or something you can run it though a ring binder and everyone is quite happy, everyone knows where the binder is, they can access it. The other extreme is an e-room, like a virtual project team web-based site. That workbook and everything is set up on the Intranet so you set up a virtual project room, and that includes a chat room, discussion strings.

In this organisation, the size of the project influenced the manifestation of lessons learned in organisational memory where a ring binder stored lessons learned for small project teams, and larger project teams used an e-room.

### **7.3.2 Organisational memory processes**

#### **Acquisition, capture, and retention**

The routine acquisition of lessons learned was to resolve problems and issues, do follow ups, and make decisions about a further course of action within the current project or to use



possibly for later projects. 'B' described the capture of lessons as an outcome of the review process.

It is just a process where we discuss it within the project team, and with any external groups impacted by the problem. We have to judge each situation on its own merit, noting the action we take, so whatever the collective involvement, we reach a consensus in terms of a lesson learned we then document that in our database.

In this organisation, the formal capture of lessons learned was by way of a consensus decision involving the project team. A moderate finding was the routine capture, and retention of lessons learned as part of a review process in a paper document or an OMIS. As 'C' explained:

All this gets captured and documented in some way. It gets documented into the project workbook and feedback to the process owners. The challenge there is that once that goes back and there is no change that results from those suggestions, then there is no information that is not readily available to other teams going through the same cycle.

The issue for 'C' was the non-capture of lessons learned in formal organisational memory where there was no changes from the identified problem. The implication was no "readily available information for future projects in the same cycle."

The idea that a lesson learned could occur during the life of a project was told in an example where everything they did in the course of three interdependent projects to implement a new software system was a lesson learned. 'B' first "identified" the problem during "dimensioning on my project," and said "look we need to take consideration of the project that is coming behind us, and then all the red flags went up because we just didn't have a big enough hardware environment." 'B' observed:

Instances can occur at any time during the life of the project. We are implementing application software that is in a brand new environment, so everything we touch is in essence a lesson learned. We are developing this brand new piece of software sent out by 'X.' As we start to implement it, we are identifying problems within the actual software release. These have to be sent back to 'X,' as they have to be fed into other projects that are going to use the 'X' environment as well.

Here, an internal project acquired lessons learned because of issues that arose from the product of an external supplier. To help resolve the capacity issue, 'B' had requested a person from the supplier software organisation to "re-dimension the scope across all three projects." In another example, 'C' described the acquisition process as collaborative or interactive by

working through with the project team and project stakeholders a series of questions that were customer focused.

What we are doing now is collaborative or interactive with our project team, our sponsor group, and our customers as well. We identify who our customer group is, and as we deploy at a certain phase on the project, we go back and do follow-ups with representatives within that group to ask how it has gone. What is your perception, can you see value in this, what are the things that went well for you, what are the things we need to address to bring this change about and so on.

In this example, 'C' did external customer follow-ups at certain phases in the project. This was to address the successes and failures as well as what needed changing. While this was a routine process for 'C,' an issue was the need to impose some kind of structure on the acquisition process.

You do tend to have some discipline, some structure in some of the things that you do because if you don't you are just going to cause some pain and suffering if you take the easy road. That is the thing too about lessons learned. To what degree do you document those things? What is a meaningful lesson for one person may not be meaningful to another person. How can we effectively sit down and record our experience in a useable way that we can then easily reuse?

The issue for 'C' was a lesson learned for one person might differ in meaning for another person. 'C' is also questioning "how" the acquisition process of experience could be captured so it was easily reused. The difference in the meaning of a lesson learned for 'C' led to uncertainty over what lessons learned to acquire and capture.

## **Retrieval**

A strong finding was the informal nature of retrieval. In a consulting organisation, 'A' perceived no issues with retrieving data. It was not a formalised process because organisational members "just know" where to look for the data, who to ask, and how to use the search engines. In another organisation, 'F' explained:

Well after you have been here awhile you just start to know whom the people are who would know the answers to questions, and you would approach people directly. If they get stuck then they will come along to my team leader or myself and say well, whom do I need to see. That would be the question, or where can I go to find out.

This approach was within a culture where 'F' aimed:

To model a culture where you can say 'I don't know,' where do I find out and the only dumb question is the one not asked? It helps you understand because perhaps you haven't been communicating as effectively as you could have. You will get two different points of view and you will tap into two different knowledge bases.

The culture of saying 'I don't know' was a strong theme across all participants, indicated by the filter question about learning opportunities in the survey. Another strong finding was the use of email to find out unknown information. 'C,' who had an inquiry about a specific tool not used locally described the retrieval of unknown information like this:

I went out to the web and did a search as there are networks of people I could tap into so I just put a query out saying so who can tell me about this then. I just sent out an email and I will get some responses back. Last week someone was looking for full software inspection processes. We had responses from South Africa, Italy, and the States who use that software inspection.

For 'C' the retrieval process was "simple and effective" at a global level as it was for other participants who used electronic technology:

Obviously I look at any paper records that I have got but I find that electronic is a far better way of finding stuff i.e., using search tools, assuming I have catalogued them (lessons learned) well in the past.

In this example, retrieval depended on effective cataloguing of lessons learned as 'A' observed when looking for past organisational experience. Another retrieval strategy was talking with the person who logged the lesson learned originally. 'B' described the effective use of electronic memory to find further detail about a similar problem.

I guess when you are going through and checking the repository, and there is something there that is similar to the situation you are trying to address, you can pick up the phone and talk to the individual who logged the similar problem, and get further details on it if you want. The PL gives you documented information on the problem, but the thing that you gain out of talking to the originator, is you can then address some of the contributing factors to your situation that do not always get documented.

Here, an OMIS enabled 'B' to talk with the originator of the problem in another project to gain insight about the "contributing factors" to the current situation. A weak finding was the difficulty of retrieval when no change resulted from any suggestions in the same project cycle. When asked why this was the case, 'C' said the information was ignored because of the storage of lessons learned in project paper workbooks.

It is just ignored because it is stored in the workbooks. The workbooks are stored away and archived, but as you come to start a new project you are not going to be wading through everyone's workbooks to see what lessons have been learnt from previous projects.

The "wading" through of paper project workbooks was time consuming and not a favoured strategy to learn from past projects. Strongly suggestive was an OMIS implemented in the past year. One issue was the effective indexing of lessons learned. 'E' described an organisational policy to index lessons learned against significant events by "subject, word type, title, and industry or document type." According to 'E,' the indexing was "probably not very effective at all if applied to lessons learned" because 'E' "doubted if they were doing a good job," even with regular mention at meetings. What enhanced the retrieval of lessons learned in this example was a search engine recently implemented as part of the operational support system.

### **Search mechanisms**

A moderate to weak finding were search mechanisms that enhanced access to lessons learned. In the previous example, 'E' found the search process easy, but others found issues. For example, 'G' often found the search results irrelevant. This was in spite of the "knowledge learnt" being "characteristically open." When using the recently implemented knowledge management system, 'G' found that it would:

Pull up a whole lot, (project plans), and half of them won't be and the other half would be rubbish and not relevant to your project. It would be a big waste of effort because you have to go down into each thing and open each document to see if it is relevant.

In this example, the issues of irrelevance, time, and cost constraints were feedback to the offshore management by 'G,' but without resolution. 'C,' who also worked in an organisation with the head office offshore, pointed out the irrelevance of some captured lessons learned.

We have the Central Metrics Group, which does organisational metrics and comes up with lessons learned, but that is done on a regional or global basis, which might not have a lot of relevance to a local team working for a specific bank customer.

Here the irrelevance of lessons learned was a global issue. The same two participants also observed access to lessons learned was the responsibility of the project manager while the project was in progress. 'G' explained access was "if you let them" (people external to the project) "or you submit it through to the main repository" (knowledge management system). This approach was similar for 'C.'

The workbook and everything is set up on the Intranet in a virtual project room, and that includes a chat room, discussion strings. You can set that strictly for access by the project team or open access for others to come and use it as well.

A moderate finding was open and unrestricted access to lessons learned during the current project and between other projects across the organisation. 'B' observed that:

All of the project team have access to that; members of other project teams also have access. It is open and various managers in the organisation have access.

'B' was referring to a database where search was by "key words and phrases." 'B' described the system as driven by a search engine where project members:

Catalogue the nature of the problem, and what are its' impacts. There are key words and phrases you can put in. You can dynamically add to that list as well if an appropriate key word is not covered. So again, if someone were reviewing a problem they would go to that category and they could access the list and they could look through it, do a search on that category, see if it relates to any similar problems, and classify it that way.

This system 'B' described as "simple to use." Again, the system was relatively new having being implemented globally in the past year.

### **Drivers for organisational memory**

A strong to moderate finding was talk about the drivers behind the implementation of an OMIS to manage lessons learned. In a large global organisation, 'G' explained the driver was to "make use of different experience and to consolidate experience," while in a small consulting organisation two specific drivers were mentioned:

Added efficiency and the other is in fact knowledge management quite overtly. It is knowledge retention. The company retains access to and ownership of the information they have paid for.

'E' was talking about the routine capture of business opportunities and the retention of knowledge from business networks in an electronic system. Other benefits cited by 'E' included:

To keep ahead of some of the pack in a way that we would not have otherwise. You have to keep moving because in my mind there is no such thing as sustainable competitive advantage. There is always another thing, and that is where the continuous improvement comes in; you've got to keep at it.

For 'E,' keeping ahead and continuous improvement were key benefits of an OMIS. For 'E,' the overall driver was the quality management system: an "ISO9000 TQM approach" that was the "basis for continuous improvement." 'E' added, "lessons learned were part of that process of improving large and small." Central to the effective routine capture of lessons learned for 'E' were the requirements for organisational members to be individually motivated and an easy to use system.

It has got to be relatively easy to do because people are busy and flat out and it has got to make them individually more effective. And there are other motivating factors that sit around in the back there.

In the case of a large global organisation, the driver behind a global OMIS was to communicate "duplicable" implementation software processes:

Knowing the nature of a lot of the projects they have going on here that are also duplicable in terms of implementation in other global subsidiaries, for example, where they have multiple teams involved in doing that, it would have been driven on the basis of the need to communicate.

It was also "just a part of the overall philosophy that the information was there so let's use it to everybody's advantage." When asked if there was a competitive advantage in that 'B' replied:

Yes definitely. I would relate that to developing programmes to go to market and to try and understand our position in the global market, by virtue of being able to share information and lessons learned because the XX is a global organisation. It has to be a competitive advantage at the end of the day.

In contrast, one organisation that did not have a formal system to routinely capture lessons learned was because top management had not perceived any importance in "electronic document management." 'F' explained this perception:

We haven't solved, even in our area, let alone at an organisational level, this issue of electronic document management and nobody at the top level has really put enough emphasis on it, although in our area there is a push to do something more about document management. We are aware of the problem but I guess it is not seen as benefiting the bottom line perhaps, I don't know.



The implication for 'F' was lessons learned not routinely captured, and wasted time because you have to repeat things; "it means you have to reinvent things again, and go and do things again." A moderate finding was talk about the culture of the organisation. 'D' described the culture as an important factor for continuous improvement to be "responsive to change."

I think that it is extremely important that you have the right culture i.e. a culture of developing projects that allows for continuous improvement. I think that if you have this culture, the organisation would be responsive to change - more like a speed boat rather than an oil tanker if you like. That is the difference. If an organisation does not adapt and change its culture to change faster, my personal feelings are that it will not survive.

Here, the culture of "developing projects allowed for continuous improvement" so it could "adapt and change fast."

## **7.4 Summary**

This chapter has presented the quantitative data and qualitative findings from the survey and the interviews about organisational memory. The next two chapters discuss the findings and present the conclusion and summary from the previous four chapters about the research population, the behavioural characteristics of lessons learned, organisational learning, and organisational memory.

## CHAPTER EIGHT: THE RESEARCH FINDINGS AND THE LITERATURE

### 8.1 Introduction

Quantitative data and qualitative information was gathered from 47 project management practitioners at two branch meetings of the PMI Institute. This was to test the null hypotheses that project practitioners would not report a belief that personal or organisational ability to achieve a successful project had significantly improved at the personal or organisational levels in the past 12 months by the use of effective organisational learning strategies. Surrounding the hypotheses the study sought to explore the:

- Extent of production of lessons learned.
- Behavioural characteristics of lessons learned.
- Use of learning goals to manage, lead, or coordinate a project.
- Generic sharing of a lesson learned, and the sharing of a lesson learned at the intraproject, interproject and intra-organisational levels.
- Effective and non-effective organisational learning strategies that influence project management learning practices.
- Use of the organisational memory processes and the manifestations of a lesson learned.

### 8.2 The project practitioners

The respondents were predominantly European males (63%), worked in a broad range of industries, and who had mostly practised project management for ten or less years (70%). They were mostly aged between 30 and 45 years with nobody aged 25 years or younger. There was a significant proportion of non-PMPs (72%) to PMPs (28%), and a significant desire to continue a career in project management ( $p < 0.000$ ). Anecdotally, the PMINZ report a similar proportion of male members, and about a 30% proportion of PMPs. The strong career desire suggests a commitment to “continuous learning, willingness to develop new ways to use skills,” and commitment to organisational success (Waterman et al., 1983, cited in Noe et al., 1997, p. 421). The research population was characterised by a significant proportion that believed they worked in organisations with organisational learning opportunities ( $p < 0.05$ ).

### 8.3 Lessons learned in project management

This study found 63% of project practitioners produced a lesson learned. This is not significant within the research population, and is proportionately less than in a recent survey by Kotnour (1999) of a branch of the PMI in the United States where 79 percent completed a lesson learned.

#### 8.3.1 Building capability and project delivery

Project practitioners routinely produced a lesson learned foremost to build capability, next to deliver a successful project, and finally to deliver a series of successful projects. The focus was to build capability by using lessons learned as a:

- Reference source for successful and non-successful lessons and experience.
- Process and method to continuously improve performance.
- Tool to enable the sharing of project or organisational knowledge from the successes and failures.
- Team learning practice.
- Tool to develop project management best practice, identify, and resolve problems.

The practitioners produced a lesson learned to “try and not repeat the same error or mistake,” and “because it was part of the methodology.” Kotnour (1999) had similar results where project managers focused on continuous improvement to benefit future projects and not to repeat the “mistakes of the past” (p. 39).

Garvin (1993), Juran (1988), and Kotnour (1999) all described lessons learned as a tool to learn from the successes and failures. In this study, lessons learned created new knowledge, and are suggestive of sound organisational learning strategies (Kim, 1993, Nonaka & Takeuchi, 1995; Stata, cited in Senge, 1992). For example, they “enabled the sharing of project or organisational knowledge to build best practice.” The findings strongly suggest a collaborative process where practitioners planned a set of actions, assessed a problem and built on successes (a project office), or revised an existing routine (re-dimensioned a set of three projects). Conceptually, these examples illustrate double loop learning (Kim, 1993). According to findings in case study research by Argyris (1999), double loop learning is rare, occurring more on a continuum between single and double loop action. The findings in this study suggest problem discovery solved by a solution to satisfice the current situation but with

possibly no change to the existing paradigm (Argyris, 1999). However, the “sharing of project and organisational knowledge” suggests the sharing of tacit know-how transformed into best practice know-why at the collective level (Argyris, 1999; Galagan, 1993; Kim, 1993; Nonaka & Takeuchi, 1995; Senge & Fulmer, 1995).

### 8.3.2 Learning from experience not to repeat the same mistake

The theme of learning from experience to build capability was strongly suggestive in the qualitative information to learn from success at the individual and project levels, and moderately at the organisational level. Project practitioners said lessons learned provided:

- **Individual level:** “An understanding of why things happened the way they did.”
- **Project level:** “A review of what we have learnt from this instance, and what we could do to avoid this kind of situation happening again, then we can close it off with the additional information.”
- **Organisational level:** “A project office to make available standardised templates, training, and process support for other projects, as the result of a successful merger project.”

Similar to the responses in the survey, the qualitative information suggests the production of a lesson learned was a social process where tacit knowledge was encoded into memory and later decoded for future use (Stein, 1995). At the individual and project levels, the examples cited support the claim by Cleland (1998) that lessons learned provide an understanding or insight at the post project phase. The issue is the gap between the time and space when the success or problem occurred and the review process (Wheelwright & Clark, 1992). A possibility is biased recall and memory lapses if lessons learned are not formally captured (Juran, 1988).

When lessons learned are formally captured, a benefit is the maintenance of organisational strategic direction, a strengthening of organisational identity, and a source of knowledge and support for newcomers to project management (Allee, 2000; Quinn et al., 1996; Stein, 1995). For example, the implementation of a project office as the result of a “successful merger project,” further enhanced success and generated future learning through project support, standardisation of methods, and training. Over time, the routine use of standardised tools leads to routine practice and generative learning diffusion at the collective level (Dixon & Ross, 1999; Kim, 1993; Senge, 1992).

### 8.3.3 Issues and drivers

Lessons learned also “avoided resource waste and reinventing things again, loss of organisational knowledge, and improved business success.” A case in point is one organisation where three successive projects failed to implement successful business solutions. The project manager put the failure down to “silos of practice existing in a strongly matrixed organisation with functional lines of business, where hardware and software did not talk to each other.” A lesson learned at “the organisational level was to implement the “Delivery Review Board for projects over \$100k” to improve working relationships between “cross-functional units” and advance successful business solutions.

The example suggests a communication gap between hardware and software. Schein (1996) describes ‘silos’ as communities of practice that “share assumptions around functional units of the organisation where members have similar background and experience” (p. 5). Schein (1996) says, “getting cross-functional project teams to work well together is difficult” (p. 5). Members of ‘silos’ “bring their functional cultures into the project and, as a consequence, have difficulty communicating with each other, reaching consensus, and implementing decisions effectively” (Ibid. p. 5). The issue is the jargon associated with professional practices that may block communication understanding (Schein, 1996).

‘Silos’ of project practitioners not talking to each other was not an issue in another large global organisation structured along functional lines. In this organisation, the project manager described learning from experience “as building capability for the project team through mentoring and education” by experts within the organisation such as a change manager, business analyst, and a management advisory team. Mentoring, education, and experts typify support mechanisms and processes to maintain and improve performance (Nevis et al., 1997). Multiple individual perspectives help make sense of simple and complex situations where individuals become both doers and thinkers (Dixon & Ross, 1999; Senge, 1992). In a study exploring communication in learning organisations, Barker and Camarata (1998) found support mechanisms enhanced the sharing, transmission, and interpretation of learning through communication, in turn building and sustaining business relationships.

A concern for the project managers in this study was “lessons learned went with the individuals even when documented, and lessons learned were easier to apply in the current project than in future projects” with different circumstances and time frames. Cooper (1998)

suggests this is the result of practitioners thinking all projects are different, and there is little to learn from other projects. The literature provides four recommendations. First, Olonoff (2000), and Wheelwright and Clarke (1992) recommend practitioners' change thinking from a task focused, linear and definitive time frame, to a non-linear and continuous organisational behaviour. Second, practitioners need to place effort into doing work now for future benefit to understand the lessons learned, and three, capture and act on them by use in continuous quality improvement (Abramovici, 1999; Juran, 1988; Kloppenborg & Petrick, 1999). Fourth, lessons learned need to be standardised across projects and grouped by subject to diffuse at the organisational level (Abramovici, 1999).

### 8.3.4 Why a lesson learned is not produced

Lessons learned were significantly not produced at project initiation, execution, and control ( $p < 0.05$ ). There was moderate to weak suggestion lessons learned were produced during the life of a project. A concern was 75% of the respondents not producing a lesson learned as part of overall project control, as the PMI recommend lessons learned are an output of overall change control (integration management), scope change control, schedule control (time management), cost control, and administrative closure (communication management) (Duncan, 1996). In this study, the implication for not producing a lesson learned was the negative influence when delivering a successful project and building capability. The main reasons why lessons learned were not produced were because it was:

- Not part of the methodology, practice, or procedural culture.
- Something the practitioners were not aware off.
- Keenness to get on with the next project.
- Part of personal development.
- Lack of time.

In one case, "people resorted to traditional ways in a climate of continuous change where they repeated the same mistakes back in the workplace even after project simulation training." Repeating the same mistakes, "even after project simulation training," in "a climate of continuous change" is suggestive of defensive routines. Argyris (1999), in case studies of large organisations, found strong persistence to adhere to traditional practice in face of new information to change. Argyris (1999) puts this behaviour down to theories-in-use or tacit routines learnt and embedded early in life that translate into defensive routines. Defensive routines arise when professional survival is important, and when management have not learnt



the rare skill to effectively manage the know-why, so tacit routines transform into skilful routines. The consequence is mistakes reinforcing the status quo to the point of embarrassment and non-communication.

Project managers can manage defensive routines by providing ongoing support for project team members to transform implicit defensive routines into espoused actions through open dialogue, informed choice and self-commitment (Argyris, 1999; Argyris et al., 1985). Graham (1995), and Kotnour (1999) recommend opening the thoughts to talk in the learning cycle by noting when successes and problems occur. Proactive management of defensive routines avoids the erosion of competitive advantage, and the “failure to know what’s what” by individuals and subsequently by organisations (Cooper, 1998, p. 422).

The remaining barriers to produce a lesson learned compare favourably with the project management literature. Kotnour (1999) found project managers had no time, it was not part of the procedural methodology, and project managers mentioned some lessons learned were irrelevant. Wheelwright and Clarke (1992), in research about product and process development projects, found there was an ongoing ‘push’ to move quickly from one project to the next. Dougan (1999) also found a lack of awareness by some about lessons learned. To counteract the lack of awareness, Dougan (1999) recommended scheduling learning points, and implementing methods to facilitate knowledge management systems either through technology, or by face-to-face and technical-person contact.

### **8.3.5 Managing expectations**

In project management, expectations are part of the written project plan about the set of steps to take and the expected results. Expectations provide the understanding for project managers to use the project planning and control tools to measure planned activities against actual activities (Kotnour, 1999).

This study found project practitioners mostly produced a lesson learned ‘often’ when activities met expectations. This suggests project practitioners managed expectations to build success to increase support of an effective practice (Kotnour, 1999). There is also strong evidence project practitioners decreased support for less effective practices through the production of a lesson learned. Moderately suggestive is project practitioners aiming to “repeat successes and capitalise on successful solutions,” and “not to repeat error and the same mistakes.” They strongly desired to “share project and organisational knowledge,”

“develop best practice for project management,” “collect knowledge to improve processes and quality,” and “learn from team members and project leaders.”

### **8.3.6 Years of experience, PMP status and career goal**

PMPs, compared to non-PMPs, significantly produced a lesson learned more on a routine basis ( $p < 0.05$ ). This was anticipated given PMP certification is a global “competency-based qualification” encompassing project management experience and knowledge (PMI, 1999).

### **8.3.7 Output of lesson learned in the project phases**

Significantly, project practitioners produced lessons learned in one or more of the project phases ( $p < 0.05$ ). The most strongly mentioned phase was at project closure, either at a “post implementation review, a post assignment review, or at a meeting.” Kotnour (1999) found 69% produced a lesson learned “before, during, or after closeout,” which is similar in proportion to this survey (63%) (p. 37). Producing a lesson learned at project closure is an expected finding given it is a recommended output of administrative closure (Duncan, 1996; Frame, 1998). The post project review involves technical, general management, and customer related issues to tease out the “strengths and weaknesses associated with the project effort” (Frame, 1998, p. 243).

Producing a lesson learned during a project was a positive finding given the opportunity for continuous improvement in multi-phase projects through risk management, training where needed, and to manage quality (Abramovici, 1999; Kloppenborg & Petrick, 1999). Project management practitioners did this for “ad hoc and unexpected outcomes, and as issues arose that were not resourced for.”

Producing a lesson learned strongly focused on learning. The project managers reviewed the lessons learned “collaboratively with the project stakeholders to look at the successes and failures, to improve processes and do better in the next project, and to learn openly from the lessons learned.” Lessons learned were reviewed through a systematic and social process at the assess stage of the OADI\_SMM model (e.g., Allee, 2000; Kim, 1993; Stein, 1995). For example, problems, changes, or issues were logged in a global organisational-wide database specifically designed to manage lessons learned for future reference. Typically, the problem solving process involved informal talk and formal meetings resolved through a consensus process. A weak finding was where the individual who identified the problem took ownership

of the problem until resolution. The informal and formal nature of the problem solving process suggests team learning and the sharing of mental models, and although not observed in the field, would advance team synergy to achieve the desired project results (Argyris, 1999; Senge, 1992).

### **8.3.8 Project management knowledge**

A significant proportion of project practitioners produced a lesson learned about one or more knowledge areas. They did this in eight of the nine knowledge areas, the exception being procurement management. They mostly, but not significantly did so to manage risk, scope, and communication.

The production of a lesson learned about communication management is a positive finding, given effective communication with clients is one of ten critical project success factors. This was an empirical finding by Slevin and Pinto (1988, cited in Ford & Randolph, 1998) to develop a Project Implementation Profile. A focus on communication eases the management of complexity and uncertainty (Barker & Camarata, 1998). Additionally the production of a lesson learned about scope management is positive, even though this was not a significant finding. The PMI recommend lessons learned are an output of scope change control to ensure the “causes of variances,” and the rational behind “corrective actions” are noted (Duncan, 1996, p. 58).

Producing a lesson learned about risk management was unanticipated. The PMI do not recommended lessons learned as part of risk management output, however Abramovici (1999), Kloppenborg and Petrick (1999), recommend using lessons learned to “develop risk management contingency plans.”

## **8.4 Organisational learning**

As cited, building capability and “collaborative and systematic problem solving processes to continuously improve” were strongly mentioned in the qualitative information. Interwoven with these themes were quality management, flexibility within standards, support mechanisms, and the positive and negative consequences surrounding lessons learned. Supportive of these findings, is the significant quantitative findings of sharing lessons learned ‘sometimes’ or ‘often’ between projects ( $p < 0.05$ ).

Also significant was the belief by project practitioners to say it was OK you did not know and to collaboratively agree about objectives (Honey, 1993). Additionally, the respondents believed they had a relatively free hand to decide how to best meet personal objectives, and worked in a place of constant change, while the informants in the interviews believed the quality of product and service came first. The informants in the interviews had a higher organisational learning score ( $\mu = 7.00$ ), compared to the overall research population ( $\mu = 5.80$ ).

#### **8.4.1 Learning goals to manage a project**

The quantitative and qualitative findings suggest a strong personal focus to build capability, a moderate focus to build team capability, and a moderate to weak focus to deliver a successful project and a series of successful projects to meet or exceed stakeholder needs and expectations. At the individual level, project practitioners “built capability to improve performance and project management skills, processes and practices,” “expand soft skills,” “learn aspects that ensured lessons of improvement,” and “be a better project manager.” At the team level, project practitioners moderately focused on team development and performance improvement “to improve and meet the communication needs of stakeholders,” and “effectively and efficiently manage the project team” during project execution. There was a moderate to weak focus to “incorporate learning and experience from past projects into future projects to improve,” and to “avoid the same mistakes and pitfalls next time” when building capability to deliver a successful project and a series of successful projects. These findings vary from the survey by Kotnour (1999) where the project managers focused on delivering a successful project.

#### **8.4.2 Sharing lessons learned**

Between all sharing attributes (generically sharing, sharing within, between, and between the external customers of a project), project practitioners, on average, shared a lesson learned ‘often’ ( $\mu = 3.39$ ). They significantly ‘often’ shared lessons learned between projects ( $\mu = 3.74$ ), and ‘sometimes’ with the external customers of a project ( $\mu = 4.30$ ).

The qualitative information provides some insight into why lessons learned were on average ‘often,’ but mostly ‘sometimes’ shared between projects. Weakly indicative comments included one project manager who shared a lesson learned with “whomever wants them,” but this “all tended to be with people” in the project manager’s “own group.” The issue was the

project managers' "hardly ever talked with each other." The minimal "talk" between the project managers may serve as a barrier to sharing lessons learned, but equally a concern is this entrenched organisational behaviour, which may impede organisational learning, hence organisational capability (Argyris, 1999).

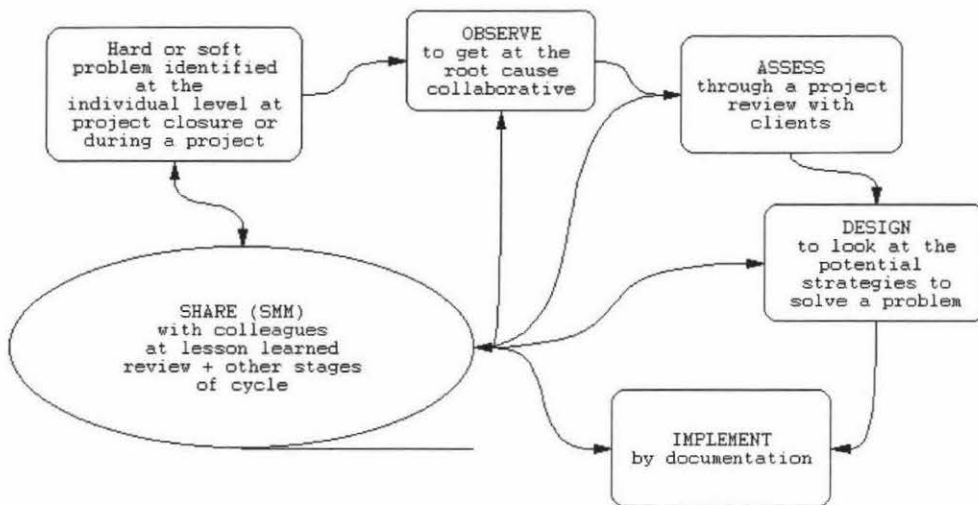
In this study the project practitioners found "no time," to share lessons learned, which as Abramovici (1999) suggests, may be due to little time or motivation to read lessons learned, or the information may have being customer sensitive (Abramovici, 1999; Cooper, 1998). Although this was not evident in the qualitative findings, a moderate to weak indicator was where lessons learned could not be fed straight back into the quality management system within the same project, they were possibly ignored in future projects. The project manager explained; "it is easier to apply lessons learned during the course of the project to improve the course of that project." The challenge for "both the client" and for the organisation was "to apply it to other circumstances at another time."

### **8.4.3 The problem solving processes**

According to Garvin (1993), real learning occurs when practitioners continually ask, "how do we know that's true" by pushing beyond symptoms to "assess underlying causes" (pp. 81-82). Garvin's (1993) finding is strongly suggestive in the project managers' stories of systematic problem solving. In this study, typically the problem was broken into stages where as much effort went into the diagnosis of a problem as into the solution (Honey, 1993).

The OADI\_SMM cycle provides a useful model to illustrate the process strongly typical of the project managers but exemplified by one project manager (Figure 20). The problem solving process illustrated in Figure 20 is an analogy to the learning cycle adapted from Kim (1993). It is a continuous behaviour interdependently cycling between the four learning stages activated by the sharing of tacit knowledge stored in mental models. In this study, the project manager described the "repeated questions and the discussion" more often effective to get to the "root cause" of a problem than the quality management tools e.g., "Ishikawa type fishbone things." These actions exemplify Model II theory of open dialogue, open informed choices, and a commitment to resolve the problem; a theory developed by Argyris (1999) from findings in extensive case study research of large organisations.





**Figure 20 OADI\_SMM cycle and problem solving**

The uncertainty whether the action is double loop is due to the implementation and internalisation of the lesson learned been a two-part process. The project manager related documenting and reviewing the lesson learned in an open manner, but the lesson learned was only ‘sometimes’ used in the current project or ‘sometimes’ used between projects. It was something the project manager said the organisation was working on but “had not quite got there,” and the capture and learning from lessons learned was a new process in the past nine months.

The problem solving process exemplified is similar to the knowledge creation process where the socialisation and sharing of procedural knowledge is externalised into conceptual knowledge or know-why (Nonaka & Takeuchi, 1995). The combination of the shared organisational members existing explicit knowledge with new explicit knowledge, internalised into a lesson learned captured into the organisational quality management system. The lessons learned were then shared at a lessons learned review with colleagues. The shared review process with open dialogue is what Nonaka and Takeuchi (1995) refer to as a process that amplifies individual experience into collective insight.

#### **8.4.4 Continuous improvement**

According to Garvin (1993), continuous improvement requires a commitment to learning. The qualitative information found strong evidence of “continuous improvement processes” embedded into “quality management, benchmarking, and flexibility of project management standards.” The strong commitment to “build capability” when producing a lesson learned, and to manage a project, support these findings.



Continuous improvement was exemplified in benchmarking quality management practice at the individual level with an external quality consultant (QM) while on the job to set up a “more formal Total Quality Management two-way periodic review” process. The project manager, while leading the project, discussed and analysed “as and when necessary with the QM, the differences in approach” to Total Quality Management. The experience was viewed as “tough but valuable.” Benchmarking is an organisational learning skill to continuously improve individual performance for project benefit, complemented by new suggestions and ideas through evaluation of current practice (Garvin, 1993). Shared learning builds team learning and personal mastery to learn what really matters (Senge, 1999).

Explicit external learning by benchmarking against PMBOK as a common reference tool for practice by all the participants was another strong finding. PMBOK is the core source of knowledge published by the PMI of proven traditional practice” and the “innovative and advanced practices” within the profession of project management” (Duncan, 1996, p. 3). A project manager at the collective level exemplified this. Project management was one of a range of internal methodologies this global organisation used to implement business solutions. The project management methodology “started as Project Management; it now is PM2 with a number of iterations pretty much in association with what you read in PMBOK.” “PM2” provided a set of standards to benchmark all projects within the organisation.

Every project within the organisation needs to demonstrate they are following the same methods and processes, procedures and standards, so we need to document, define and demonstrate that the project is consistent with the standards across projects.

PMBOK used as a benchmarking tool to develop project management standards, is a means to implement best practices by learning “the way things get done rather than the results of processes” (Garvin, 1993). Its benefit is to gain “an outside perspective” (Garvin, 1993/94).

Strongly indicative in this study was flexibility when using standards to guide best practice. One approach was a “tailoring process to pick up the standards,” to choose “what to use and not to use,” which “was applicable at the time.” Anything irrelevant was tailored “out and documented.” In addition, a strong finding was strategic support mechanisms. Project steering committees, project offices, and open “consultation with experts” were evident in the larger organisations, while “collegial support and consultation with experts” was evident in the smaller consulting organisations. The project office served as a “set of common resources

across all projects as standards, procedures, processes, and training,” while the project steering committees served as an “oversight role for all the projects.”

The project office and a project steering committee, as strategic level mechanisms, allocate resources, and guide certain courses of learning action (Chandler, 1969). It illustrates a two-way process where strategic objectives support the projects within the organisation, and in turn, projects support the strategic direction (Cleland, 1999; Crawford, 1998/99).

The assumption by prescriptive theorists March and Olsen (1976, cited in Argyris, 1999) that individuals and groups act in self-interest incapable of interaction to learn holistically is questionable in this study. The ‘project office’ and ‘project steering committee’ served as effective learning tools to increase productivity, demonstrate “coherent action” at the strategic level, and oversee the direction of projects to ensure consistency at the organisational level (Argyris, 1999, p. 11). Support tools build the experience from the past knowledge into “strategies and explicit models,” and advance sharing for effective organisational learning (Galagan, 1993; Marquardt, 1997, p. 5; Senge, 1998). The ‘collegial’ nature of sharing in the consulting organisation provided an informal channel to diffuse learning and experience (Briner & Hastings, 1994).

The leverage of continuous improvement in project management requires self-learning and work process improvement (Senge, 1999). In a learning culture, continuous improvement is a “natural by-product of people’s commitment and empowerment” (Ibid. p. 5). At the individual and collective levels, the capability to grasp the ‘big picture’ helps “gain insight into complexity and how to shape change” (Senge, 1999, p. 38). This is strongly suggested in this study by the learning goal to meet or exceed stakeholder needs (requirements) and identified requirements (expectations) to “avoid the same mistakes and pitfalls next time.”

## **8.5 Organisational memory**

The storing of a lesson learned in human memory was a significant finding ( $p < 0.000$ ). Except for the routine acquisition of a lesson learned, all organisational memory processes were significant for ‘sometimes’ or ‘hardly ever’ formally capturing and retaining a lesson learned, finding retrieval a simple process and search mechanisms easing access ( $p < 0.05$ ).

The strong themes that emerged in the qualitative information were the wide manifestation of lessons learned in organisational memory, specifically the strong use of human memory to store lessons learned alongside electronic and paper systems. The organisational strategic objectives, continuous improvement, quality management, the competitive drive to keep ahead, as a media to “share lessons learned,” and to “consolidate and capitalise different experience” drove the use of an OMIS.

### 8.5.1 Organisational memory processes

There was no significant difference in the mean score ( $\mu$ ), between respondents for the acquisition, capture, retention, search, and retrieval of a lesson learned.

#### Acquisition and capture of lessons learned

On average, project practitioners ‘often’ routinely acquired ( $\mu = 3.36$ ), and significantly formally captured ‘sometimes’ or ‘hardly ever’ a lesson learned ( $p < 0.001$ ,  $\mu = 3.57$ ). The qualitative information is similar to the quantitative findings. The acquisition of a lesson learned was moderately indicative of individual capability to scan for a problem, while problem resolution and the capture of a lesson learned was strongly indicative of a collaborative process.

One example was the identification of a problem during “dimensioning” on a project by a project manager, who said, “look we need to take consideration of the project that is coming behind us, and then all the red flags went up because we just didn’t have a big enough hardware environment” to implement the new software. In this example, lessons learned were viewed as “instances” that could “occur at any time during the life of the project,” because “we are implementing application software that is in a brand new environment, so everything we touch is in essence a lesson learned.” The acquisition of lessons learned in this example, compare positively with an ethnographic study of design engineers by Hargadon and Sutton (1997). They found in semi-structured interviews the designers acquired new information by talking with clients to resolve “technological solutions in the current project and for possible later use” (Ibid. p. 733).

The strongly collaborative nature of acquisition is further exemplified in an example where the “interaction” with the “project team, sponsor group, and customers” was to “do follow-ups with representatives to ask how it had gone,” and learn about the clients “perception, and

value” in the “things that went well,” and the “things to address to bring about change.” Another project manager typified this:

It is just a process where we discuss it within the project team, and with any external groups impacted by the problem. We have to judge each situation on its own merit, noting the action we take, so whatever the collective involvement, we reach a consensus in terms of a lesson learned, and we then document that in our database.

The acquisition and capture of lessons learned during the course of a project suggests a continuous cycle of sharing tacit knowledge. Acquisition at project closure strongly suggests that lessons learned were stored in human memory, recalled, and ‘often’ captured during the post project review process. Acquisition into human memory is an expected finding as it is the traditional and ‘obvious’ place to encode the problem or issue (Juran, 1988; Simon, 1991; Walsh & Ungson, 1991). From an effective organisational learning perspective, the organisational response is how the problem is interpreted, and the decision made from the response is what constitutes organisational memory (Walsh & Ungson, 1991).

The effectiveness of the learning process is further enhanced by continually scanning the environment to acquire new knowledge (Cohen & Levinthal, 1990; Kloot, 1997). The capability of its employees, and the transfer of the knowledge internal and external to the organisation is said to advance organisational learning (Huber, 1991; Kloot, 1995). This capability is moderately indicated in this study. The acquisition of lessons learned through problem solving and decision-making during a project in the ‘capacity’ issue example, increases the organisation’s absorptive capacity to acquire new knowledge (Cohen & Levinthal, 1990). Over time, this information “forms the core of an organisation’s memory” (Walsh & Ungson, 1991, p.62).

The finding that practitioners on average ‘often’ acquired and captured lessons learned is positive, given the PMI recommendation to document a lesson learned so it will “become part of the historical database for both the project and other projects of the performing organisation” (Duncan, 1996, p. 81). However, as part of the acquisition and capture process, a weak finding was “what was a meaningful lesson for one person may not be meaningful to another person.” This example illustrates the theory by Walsh and Ungson (1991) that the acquisition of tacit knowledge depends on the variant “schema” or “organisational frames of reference” that may “obscure, simplify, or misrepresent some attributes of the individual decision stimuli and organisational responses” (pp. 62-63). Schemas are the cognitive

structures that “organise and process information that also aid retention and retrieval” (Stein, 1995, pp. 27-28). A meaningful lesson by one person may be difficult to understand for another person. As Duncan and Weiss (1979, cited in Stein & Zwass, 1995) argue, at the collective level, the tacit knowledge acquired “must be communicable (understood by others), and consensual (accepted by others for its validity and utility), as well as integrated” (p. 104).

### **Routine retention and storage**

Practitioners on average ( $\mu = 3.74$ ), significantly ‘often’ routinely retained a lesson learned ( $p = 0.000$ ). The qualitative information supports this finding (if assuming human memory). One project manager said it was the “obvious” place to store lessons learned. This was because “there were always other people you could go and ask about things as you know they are an expert in those areas.” Two other project managers said it was “easier” but “not the ideal way.” As one explained:

You can’t rely on people’s minds, however good they are. One day they are going to walk outside of this organisation and go somewhere else and then you have lost it all.

Hargadon and Sutton (1997) also found strong evidence the designers’ stored “potential solutions” in their minds sourced from previous personal and colleagues design experience and conversations (p. 735). As well, the literature cites strong evidence of tacit knowledge stored in human memory (Juran, 1988; Kim, 1993; Simon, 1991; Walsh & Ungson, 1991). Walsh and Ungson (1991) posit it is at the collective level where individuals store experience in information technologies (Walsh & Ungson, 1991), or what Lukas et al. (1996), in case study research about how marketing channel learn and remember, refer to as the physical capital of organisational memory.

In this study the negative aspect of storing lessons learned in human memory, as cited, was not an “ideal” situation due to attrition and consequential knowledge loss. Employee turnover inhibits cumulative learning by continuously eroding experience (Kim, 1993; Simon, 1991). The negative organisational consequence is the fragmentation of the social system, which Kim (1993) asserts loses the interconnections that have developed among organisational members by sharing tacit knowledge. Fragmented social systems incapacitate “learning and action” since it is the “shared mental models” that make “the rest of the organisational memory usable” (Kim, 1993, p. 45). In response to possible fragmentation, Stein (1995) recommends the practice of open communication to enhance knowledge sharing.



Stein (1995) refers to open communication as the maintenance of organisational memory where the members of the organisation have access to organisational knowledge and expertise. Organisational memory maintenance requires keeping the information up-to-date and relevant to reinforce the social structure. At the same time, the information requires ongoing renewal to avoid "tunnel vision" (Johnson & Paper, 1998, p. 517). 'Tunnel vision' leads to lack of innovation because organisational members fail to scan the external and internal environment for new information (Johnson & Paper, 1998).

Formal electronic organisational memory assumes knowledge is explicit, but what is implicit cannot be stored (Stein & Zwass, 1995). This was weakly suggestive in this study from a positive viewpoint. The project manager used the lessons learned database to search for "something that was similar to the problem situation." This allowed the project manager to "pick up the phone and talk to the individual who logged the similar problem, and get further details." The benefit of the electronic memory was "documented information on the problem," but "talking to the originator of the problem addressed some of the contributing factors" to the current "situation that do not always get documented."

The capability to "talk" with the "originator" suggests an open shared culture, which supports the theory that organisational memory is "more than the sum of individual memories" (Stein, 1995, p. 28). The project manager is an individual, a member of a project team, and a member of the organisation. Stein (1995) suggests this is what enhances the likelihood that information will be shared with other organisational members (Stein, 1995). Stein (1995) uses the metaphor holograms to describe individuals, suggesting they maintain the "values, norms, and images of the organisation" (p. 28).

### **Retrieval and search mechanisms**

The retrieval of lessons learned was on average, 'often' simple ( $\mu = 3.77$ ), while search mechanisms, on average, 'often' enhanced access to lessons learned ( $\mu = 3.69$ ). Significantly, respondents found the retrieval only 'sometimes' simple ( $p = 0.041$ ), and search mechanisms only 'sometimes' enhanced access ( $p = 0.023$ ).

A strong finding in the qualitative information was the informal nature of the retrieval process. The significant practice of storing information in human memory may have influenced this. Even when lessons learned were not routinely acquired in formal memory, a



project manager explained that when you had worked in the organisation “awhile you just start to know whom the people are who would know the answers to questions, and you would approach people directly.” Integral to this approach was the philosophy:

To model a culture where you can say ‘I don’t know,’ where do I find out and the only dumb question is the one not asked? It helps you understand because perhaps you haven’t been communicating as effectively as you could have. You will get two different points of view and you will tap into two different knowledge bases.

The culture of saying ‘I don’t know’ advances learning opportunities (Honey, 1993) but is open to distortion and inaccuracy (Walsh & Ungson, 1991). An individual, through their “cognitive ability,” understands the “why of a decision in the context of an organisation’s history” (Wong & Weiner, 1981, cited in Walsh & Ungson, 1991, p. 67). An understanding comes from the “relationship between a decision stimulus and an organisational response,” but the ‘why’ in a decision “will distort and decay” over time as it passes from one person to another “as part of the organisation’s culture” (Bradley, 1978; Miller & Ross, 1975, all cited in Walsh & Ungson, 1991, p. 68). Hence, retrieval of a lesson learned embedded into the culture can be a conscious process by an individual, but is open to subjectivity when sharing information at the collective level.

Information technology can aid the retrieval process, strongly evident in the qualitative information. Email was a widely used tool. An example was the need to satisfy the decision to search for unknown information about a “software inspection process.” The project manager “went out to the web and did a search as there are networks of people I could tap into so I just put a query out saying who can tell me about this” (in the same organisation). The process was described as “simple and effective” as the project manager knew “some responses” would come back. Hargadon and Sutton (1995) also found strong evidence in an ethnographic study; when people needed help they resorted to email because there was usually responses. The designers retrieved old solutions from memory “in appropriate forms to fit the new combinations they were creating” (Ibid. p. 726). According to the theory by Stein and Zwass (1995), the designers were “capable to retrieve the information reconstructed to satisfy” their request (p. 106).

The ease of retrieval in the email example is assumedly attributed to three factors. First, the email procedure was a repeated practice, which eased retrieval (Walsh & Ungson, 1991). Second, there was assurance what was retrieved would satisfy the goal of the project manager

and third, the project manager had the “ability to search, locate, and decode the desired information” (Stein, 1995, p. 31).

Despite this example, a significant finding was retrieval of lessons learned only ‘sometimes’ a simple process. The effective retrieval of knowledge also depends on “prior knowledge” to enhance learning, and analogic thinking (Cohen & Levinthal, 1990, p. 129; Stein & Zwass, 1995). In a cross-sectional survey of American manufacturing organisations, Cohen and Levinthal (1990) found individuals with prior knowledge associated learning from past events encoded into memory “by establishing linkages with pre-existing concepts” (p. 129). Analogic thinking is a similar process where the individual associates past events when searching for new knowledge by reconstructing words to retrieve the intended information, and decode the new information (Stein & Zwass, 1995).

The barriers to the ease of retrieval were lessons learned stored in hard paper copy such as project workbooks and paper files, moderately to weakly indicated in the qualitative information. The “obvious place to look” for one project manager was in “any paper records that I have” but found electronic retrieval “a far better way of finding stuff, i.e., using search tools.” Project workbooks imposed a barrier because they were “stored away and archived,” and when “starting a new project,” another project manager was not “going to wade through everyone’s workbooks to see what lessons had been learnt from previous projects.” This was an issue for small projects, but a new initiative for larger sized projects was electronic workbooks set up on the Intranet, “a virtual project room, that includes a chat room, and discussion strings.”

Added to this was the moderate finding that an OMIS to store lessons learned was new in the past year, and search results were often irrelevant. For example, a project manager conducted a search in the global OMIS, and “it pulled up a whole lot of stuff, half of it was rubbish and not relevant to your project.” In another case, the lessons learned were produced on a “regional and global” basis by the “Central Metrics Group,” which “might not have a lot of relevance to a local team.” The cost described by one project manager was the “big waste of effort” due to having “to open each document to see if it was relevant.”

The irrelevance of the retrieved information is possibly the result of those who designed the system may not have read the needs of the end user (Stein & Zwass, 1995). This design issue was the finding of research by Shane and Schumacher (1996) to explore the barriers to the

retrieval of information in a project management organisation. They found project knowledge “hard to find and prone to disappear without a trace” (Ibid. p. 3). They attributed the issue to the project management environment, arguing the complexities of projects meant problems were solved in a linear mode in a non-linear environment.

The capture of the past learning is enhanced by the implementation of a search engine, as moderately indicated in this study. In one case, lessons learned were catalogued using “key words and phrases” to note the “nature of the problem and its’ impacts.” The system was enhanced by the dynamic flexibility to “add to that list as well if an appropriate key word was not covered.” For example, “if someone was reviewing a problem they would go to that category and they could access the list and look through it, do a search on that category, see if it relates to any similar problems, and classify it that way.”

Search is a “process by which retained information is selected as relevant to a particular problem or goal of the user” (Stein & Zwass, 1995, p. 106). Stein and Zwass (1995) note the key “meta-requirement” for the search and retrieval of electronic information is the provision of a means for the “retained knowledge” to be “brought to bear on a decision-maker’s problem context or goals” (p. 106). According to Stein and Zwass (1995), the design of the search and retrieval functions should consider five parameters. First, the ability to match and recognise patterns of data, second, prior knowledge of the particular fields, third, “limited natural language processing,” fourth, design consideration to the user’s “goals and preferences,” and fifth, available alternative types of “knowledge representation” (p. 106). In an organisational learning sense, the search and retrieval functions require ‘scripts’ or routines embedded into the social fabric of the organisational systems (Stein, 1995).

### **8.5.2 Manifestations of lessons learned in organisational memory**

Lessons learned are manifested in a wide range of organisational memory media referred to by Lukas et al. (1996), and Walsh and Ungson (1991) as storage bins. The storage bins comprise the physical and social capital, the organisational formations, and the organisational culture (Lukas et al., 1996; Walsh & Ungson, 1991). In this study, lessons learned are manifested strongly at the individual and collective level in the conceptual functional and sociocultural properties of organisational memory (Lukas et al., 1996).

Organisational memory properties	Storage bins	Manifestations of a lesson learned	Indicators from the project managers	
			*Weak indicator (sporadic mention) **Moderate indicator (4/7) ***Strong indicator (7/7)	
Functional properties	Physical capital	Computer memory	▪	I record everything I do (time it takes to do tasks) on a real-time basis during the day in Access database. **
			▪	Project workbooks are set up on the Intranet as an e-room, like a virtual project team web-based site. *
		Documents	▪	In a small project, say half a dozen people, you can run it though a ring binder. **
	Organisational transformations	Individual employees	▪	I remember the solution from two to three years ago, seems awfully familiar, so what happened then? ***
		Transformations	▪	The problem is categorised in terms of severity, impact, and escalation requirements. Then as we go through each step of the resolution the log is updated to reflect the status of the problem. What that gives us is a reference for other projects. **
		Routines	▪	Within our own project, we sit down and we review it (the problem in paper and electronic media) at our weekly project meeting. **
Sociocultural properties	Social capital	Structures	▪	At close out time, we complete a review of what we have learnt. ***
		Interorganisational links	▪	We are also discussing the same activities (with an organisational partner) on a regular basis, to see what the variant, different approaches are, what sort of successes or what the lessons they have learnt are. **
		Roles	▪	One of the big challenges I think is that project by project, individual by individual, you are learning the lessons carried forward, but it is very much tied to the people or the project team. **
	Organisational culture	Norms	▪	It is just a part of the overall philosophy; the information is there so let's use it to everybody's advantage (an electronic system to communicate duplicable implementation software projects in other global subsidiaries). ***
		Values	▪	They sit alongside the Project Managers to provide guidance and support. It is sort of a shared experience, mentors are learning from the practitioners and practitioners are learning from the mentors. **
		Rules	▪	We follow the process the way it has been laid down through experience and the way it is documented on the Intranet. **
			▪	We tend to, as we are going through phase-by-phase of a project, looking at what we recognise that might trip us up in the next phase to prevent it from happening. **
		Talk	▪	You can pick up the phone and talk to the individual who logged the similar problem, and get further details on it if you want. ***

**Table 30 Content of organisational memory – the lessons learned**

Table 30 illustrates the manifestations of lessons learned derived from the qualitative information and illustrated using the conceptual properties of organisational memory based on the model by Lukas et al. (1996). The asterisks indicate the strength of the findings in the qualitative responses and the qualitative information. The model provides clarity in the relationship between effective organisational memory strategies and project success.

Although the model was developed to understand “how marketing channels learn and remember,” the model is focused on “organisational memory as a fundamental result of organisational learning” (Sinkula, 1994, cited in Lukas et al., 1996, p. 240). The marketing channel and lessons learned are intangible communication modes that serve as tools for learning from experience. They illustrate first, how learning occurs in context (lessons learned are media from which to build success and learn from failure), second, how learning and sharing are critical for organisational memory, and third, how the organisational knowledge base builds for future use (Lukas et al., 1996).

### **Functional properties: The physical capital and the organisational formations**

The physical capital comprises the “computer memory, documents, and individual employees, while the organisational formations comprise the transformations, routines, and structures” (Lukas et al., 1996, p. 241). Individuals encode information into human memory because of a learning activity (Walsh & Ungson, 1991). As strongly indicated in this study, but exemplified by one project manager, organisational memory is realised when the “solution from two to three years ago” is purposefully recalled and used collectively when a decision stimuli is activated; “seems awfully familiar, so what happened then?” The project team, led by the project manager, shares the decision stimuli or the problem; “OK, we need to sit down and work through it.” Hence, shared mental models are providing a link between static and active organisational memory (Kim, 1993).

In contemporary organisations, technology provides an enabler for the sharing of lessons learned alongside mental models (Allee, 2000). Although Simon (1991) argues minimal learning is stored in electronic or manual documentation, the qualitative information was moderately indicative of lessons learned manifesting in computer memory and paper documentation at the individual and organisational levels. The OMIS was driven in one case by the “need to keep ahead of the pack.” The benefits already realised were “added efficiency and knowledge management quite overtly.”

However in another case, an OMIS was espoused but not yet implemented owing to the resource constraints imposed by the recent successful “merger program.” The project manager explained the fragmentation of project information; “data is stored in excess of 30 different types of systems throughout the organisation.” “There was a large number of projects with a large amount of information not recorded anywhere, and getting to it has been virtually impossible so the idea is to centralise it so the whole organisation can use it.” Walsh



and Ungson (1991) also perceived this an issue with “decision information” not stored in one place but rather “distributed across different parts of an organisation” (p. 62). This issue became obvious for Hargadon and Sutton (1995) when they observed the retrieval processes by the designers for technological solutions in “brainstorms, and other group-problem activities” (p. 735).

Paper documents were widely used in this study to archive “project workbooks,” and to complement the OMIS for use at the routine weekly project meeting” to “review” lessons learned, or “at a routine lessons learned review meeting at the close of an assignment.” The review event is both the shared property of organisational members to process tacit into explicit knowledge and a routine event at weekly project meetings. The review is a “schema” and a “frame of reference” to deal with the past project history to guide best practice (Walsh & Ungson, 1991, p. 65). The transformations are the input and output processes that illustrate how the routine event is carried out. In this study, the procedure was to “categorise” the lessons learned (input) transformed into an output from the electronic “log” as a “reference for other projects” (Table 30).

### **Sociocultural properties: The social capital and the organisational culture**

Sociocultural properties comprise the social capital (inter-organisational links and roles), and the organisational culture (the norms, values, rules and speech) of organisational memory (Lukas et al., 1996; Walsh & Ungson, 1991). In this study, inter-organisational links were moderately indicated by project client relationships, project stakeholders, and organisational partnerships. Richly cited was an inter-organisational partnership to mutually benchmark the “variant, different approaches, to see what sort of successes or what the lessons learnt were” on a “regular basis with other groups that are doing the same projects in other organisations.” The link provided a platform to build on success and learn from failures, and importantly “housed information” that could be “retrieved about the organisation’s past” (Walsh & Ungson, 1991, p. 67). Hence, organisational memory is also external to the organisation.

Central to this study are the project managers. In themselves, they act foremost in the role of a project manager, and as individuals, they carry the learning from lessons “forward.” As explained by one project manager, lessons learned are “very much tied to the people or the project team” (Table 30). Walsh and Ungson (1991) categorise roles as part of the organisational structure, while Lukas et al. (1996) categorise roles as part of the social capital of organisational memory. The word ‘role’ is a sociological concept that labels “particular



positions” in an organisation based on organisational or “societal expectations” (Walsh & Ungson, 1991, p. 65). Project managers encode certain expectations such as team development and the output of lessons learned as part of the PMI recommended standards of practice. In the example just cited, project managers activated the link between the “individual and the organisational memories” by carrying the lessons learned forward into future projects (Ibid. p. 66).

The sharing of lessons learned was clearly the case in another large global organisation where the norm was to communicate “duplicable implementation software projects in other global subsidiaries” (Table 30). The culture of the organisation, “by virtue of being able to share information and lessons learned” with “global subsidiaries,” was viewed as a “competitive advantage” to “develop market programmes and to better understand the position in the global market.”

Other manifestations of lessons learned embedded in the culture were in rules (Table 30). Rules are the conventional ways of doing things, strongly evident in the process to scan for lessons learned; “we tend to, as we are going through phase by phase of a project, look for what might trip us up in the next phase to prevent it from happening.” Intentional scanning facilitates effective organisational learning by acquiring knowledge to sense for developing “problems or opportunities and acting on them” (DiBella & Nevis, 1998, p. 64; Huber, 1991; McGill & Slocum, 1993). Senge (1992) describes intentional knowledge acquisition as the core meaning of the learning organisation, one that continually expands “its capacity to create its future” (Ibid. p. 14). Lessons learned also manifest in talk or speech, evident in this study as the “further details” not logged in an OMIS, and acquired by picking “up the phone” and talking to the “individual who logged a similar problem.” The sharing of the problem through talk is a “shared framework” that leverages organisational learning to learn new ways of doing things (Argyris, 1999; Walsh & Ungson, 1991, p. 65).

### **8.5.3 Organisational learning strategies and project success**

The core findings in this study are the beliefs by project practitioners that their personal ability to achieve a successful project had significantly improved at the personal level in the past 12 months by the use of effective organisational learning strategies ( $p = 0.009$ ), but not at the organisational level ( $p = 0.179$ ). At the personal level, the storing of a lesson learned in human memory ( $p = 0.024$ ), and sharing a lesson learned between projects ( $p = 0.010$ ), were significant predictors of project success in the past 12 months, while at the organisational

level, sharing a lesson learned at the generic level ( $p = 0.029$ ) was a significant predictor. Project practitioners who generically shared a lesson learned and shared lessons learned between projects, varied in the extent they stored a lesson learned in human memory. Project practitioners who stored lessons learned in human memory 'often,' differed significantly from those who 'sometimes' stored a lesson learned in human memory when sharing a lesson learned between projects. Additionally, project practitioners who stored lessons learned in human memory 'very often' or 'often,' differed from those who 'sometimes' did when generically sharing a lesson learned.

These significant differences provide further evidence the practitioners routinely shared tacit knowledge for later project use. Hargadon and Sutton (1997) also found strong evidence from the observations of the designers who routinely stored "specific knowledge," and routinely maintained and refreshed knowledge until "it could be used" (p. 735). The designers stored "much of the knowledge of potential solutions" in human memory, "in projects they had worked on, or technologies they had read, heard, or talked about" (Ibid. p. 735).

In this study, the respondents' significantly stored lessons learned in human memory but only 'sometimes' routinely acquired and formally retained lessons learned in electronic or paper format. Another notable finding was the recent shift in the past year to implement an OMIS by four of the organisations the participants worked in. This suggests the project managers were in transition about the perception that lessons learned led to competitive advantage. Lessons learned are not a critical aspect of project success in the same sense cost, quality and time are (Duncan, 1994). As one project manager explained, lessons learned are:

Part of that process of improving large and small; you have to keep moving because in my mind there is no such thing as sustainable competitive advantage. There is always another thing, and that is where the continuous improvement comes in; you've got to keep at it.

"Continuous improvement requires a commitment to learning" (Garvin, 1993, p. 19). Lessons learned provided the means to share the tacit learning stored in the organisational memory. This translates into effective organisational learning when the expected results are assessed and acted upon to determine the successes and the failures between the agreed plans and the results. Learning from failure requires working through a problem to close the learning loop by either abandoning the resolution or continuing with the change process in the current or future projects. Effective learning is when the resolution corrects the error and develops a

new paradigm for continuous improvement (double loop). Central to learning is the sharing of mental models that store the significant proportion of lessons learned (Kim, 1993).

This chapter has cross-compared the quantitative and qualitative findings from this study with a range of studies and theory from the literature to learn about the dynamics of lessons learned for project success through organisational learning. The findings compare favourably with the literature, providing a rich descriptive and explanatory discussion. The following chapter leads on from the discussion to close and reflect on the research findings.

## CHAPTER NINE: CLOSURE AND REFLECTION

### 9.1 Introduction

This chapter presents the conclusion, the summary of the findings, the dynamic complexity of lessons learned, the implications and recommendations for project management practice, the strengths and limitations of the research, and a future research agenda. Three causal loop diagrams (CLDs) illustrate the conclusion and examples from the findings (Figure 21, 22, 23). They are specific to this study and not meant to imply cause and effect at the level of the general population of project practitioners, as this study is exploratory only.

### 9.2 Conclusion

The testing of the null hypotheses considers the sharing attributes of a lesson learned, the processes of organisational memory using lessons learned, and the strong organisational learning indicators from the qualitative research findings.

**A\_H<sub>0</sub>** Project practitioners would not report a belief that in the past 12 months the use of effective organisational learning strategies had significantly improved their personal ability to achieve a successful project.

**Project practitioners believe the use of effective organisational learning strategies significantly improved their personal ability to achieve a successful project in the past 12 months (p 0.009).**

**B\_H<sub>0</sub>** Project practitioners would not report a belief that in the past 12 months the use of effective organisational learning strategies had significantly improved the organisation's ability to achieve successful projects.

**Project practitioners do not believe the use of effective organisational learning strategies significantly improved the organisation's ability to achieve a successful project in the past 12 months (p 0.179).**

This study has shown organisational memory plays a significant role in organisational learning in project management by the use of lessons learned at the personal level to achieve project success in the past 12 months. This is significantly evident by storing lessons learned in human memory and sharing a lesson learned between projects. It is reinforced by the

strong suggestion of collaborative systematic problem solving processes to get at the 'root' cause of a problem, continuous improvement through benchmarking, quality management, the flexibility to apply standards, and the moderate suggestion of strategic project support through a project office and a project steering committee. Despite these findings, organisational memory does not play a significant role at the organisational level to achieve project success. Project practitioners 'sometimes' formally capture lessons learned into an OMIS, which in this study is only moderately suggestive as an enabler of learning. This suggests the generic sharing of a lesson learned, as a significant predictor of project success at the organisational level, would depend on sharing the tacit experience stored in human memory.

### 9.3 Summary

The following summarises the findings frame-worked by the research objectives.

#### **The project practitioners**

The research population is predominantly European, male, practiced project management for ten years or less, were significantly non-PMPs, significantly desired to continue a career in project management, and aged mostly between 30 and 45 years. They significantly worked in organisations characterised by organisational learning opportunities.

#### **Lessons learned: Extent of production and behavioural characteristics**

PMPs significantly routinely produce a lesson learned more than non-PMPs, although overall, the production of a lesson learned is not significant (63%,  $p < 0.05$ ). A lesson learned is routinely produced to build capability through organisational learning strategies, to deliver a series of successful projects, to deliver a successful project, and 'often' to meet project expectations. They are a means to not repeat the same mistakes, understand the know-why of a problem, share knowledge, conduct a formal review, continuously improve processes, methods, and performance, a reference for past project successes and failures, a platform to identify and resolve problems, and to build best practice. A lesson learned is mostly produced at project closure in "a post implementation review" and sometimes during a project when they arise unexpectedly or are proactively planned. At the end of a project, the goal is "to look at the successes and failures, document the findings, and learn openly from the lessons learned." During a project the goal is to produce a lesson learned for "ad hoc and unexpected outcomes, and for non resourced issues." Lessons learned are produced about project risk, scope, and communication management.

Producing a lesson learned is a collaborative step problem solving process with the project stakeholders, beginning with encoding of the problem into human memory, followed by informal and formal discussion with colleagues to get at the root cause. The resolution of the problem is strongly suggestive of a consensus decision.

There is a moderate suggestion of lessons learned produced during the life cycle of a project. Lessons learned are not significantly produced at project initiation, execution, and control. Not producing a lesson learned negatively impacts mostly on the desire to deliver a successful project and building capability. Practitioners do not produce a lesson learned because it is not part of the project methodology, there is no time, are keen to get on with the next project, are unaware of the process, practice defensive routines in times of continuous change, and silos of practice that constrain communication between cross-functional units. The result is reinventing things again, a loss of organisational knowledge and resource waste.

#### **Generic sharing of a lesson learned, and sharing a lesson learned within and between projects, and between the external customers of a project**

Overall, project practitioners 'often' share a lesson learned generically, within, and between projects, and with the external customers of a project. Those who share a lesson learned between projects are 'often' significantly more likely to store a lesson learned in human memory than those who 'sometimes' do, while those who generically share a lesson learned are 'very often' or 'often' significantly more likely to store a lesson learned in human memory than those who 'sometimes' do. The key barriers to sharing lessons learned is the failure to talk with other project managers in the same organisation, and the difficulty to apply lessons learned to other projects.

#### **Organisational learning strategies that influence project management learning practices.**

A significant proportion of practitioners produce a learning goal when managing a project to build personal and team capability. Lessons learned embed into continuous improvement practice strongly evident in benchmarking, quality management, and flexibility of project management standards. It is moderately evident that strategic support mechanisms aid continuous improvement of which a by-product is best practice.



## **Organisational memory properties, processes, and manifestations of lesson learned**

Project practitioners significantly ‘all the time or very often’ routinely retain a lesson learned in human memory. On average, they ‘often’ routinely acquire lessons learned, mostly at project closure as part of a collaborative meeting process, and ‘sometimes’ formally capture them. Retrieval is ‘sometimes’ simple and is informal in nature, while search mechanisms ‘sometimes’ enhance access to lessons learned.

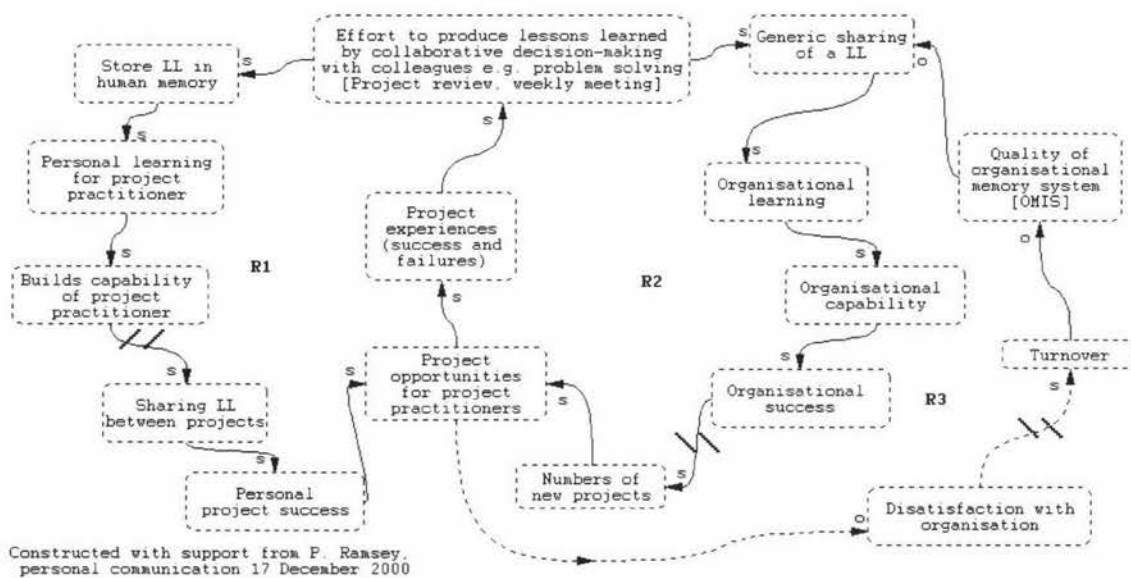
The barriers to acquisition are the variant interpretation of what a lesson learned means and its embedded nature with individuals between projects. Prior knowledge, effective electronic cataloguing, indexing systems, and search engines ease the retrieval of lessons learned from an OMIS. The non-ease of retrieval is constrained by archived paper project workbooks and the absence of an OMIS to manage the dispersed pockets of project knowledge. The consequences of which are lost time, irrelevant data, and wasted effort.

There is a strong suggestion to recall lessons learned from human memory, and a weak suggestion of retrieval from an OMIS, possibly influenced by the recent implementation of an OMIS for most informants in the interviews in the past year. Although moderately to weakly indicated, the benefits of an OMIS are the added efficiency, knowledge management, and storage of repeated tasks. An OMIS is driven by the organisational strategic objectives, project leadership commitment to continuously improve, quality management, the desire to keep ahead competitively, as a media to share lessons learned, and to consolidate and capitalise on different experience. Lessons learned are manifest widely in organisational memory storage bins, indicated strongly to moderately in the physical capital and organisational culture, and moderately in the social capital and organisational formations.

### **9.4 Dynamic complexity in lessons learned**

The research findings represent the variables about the role of organisational memory for learning in project management using lessons learned. The variables are the ‘detail complexity.’ To simplify the ‘detail complexity,’ the key findings are structured into a holistic picture or dynamic complexity of CLDs to show the influences at play (Senge, 1992). CLDs illustrate variables that represent influence or change on another variable linked by a feedback loop of cause and effect. Three reinforcing (R) processes represent changes that generate growth (and collapse) for project success by the use of lessons learned (Figure 21), while five balancing (B) processes represent the limits to growth (Figure 22) (Goodman et al.,

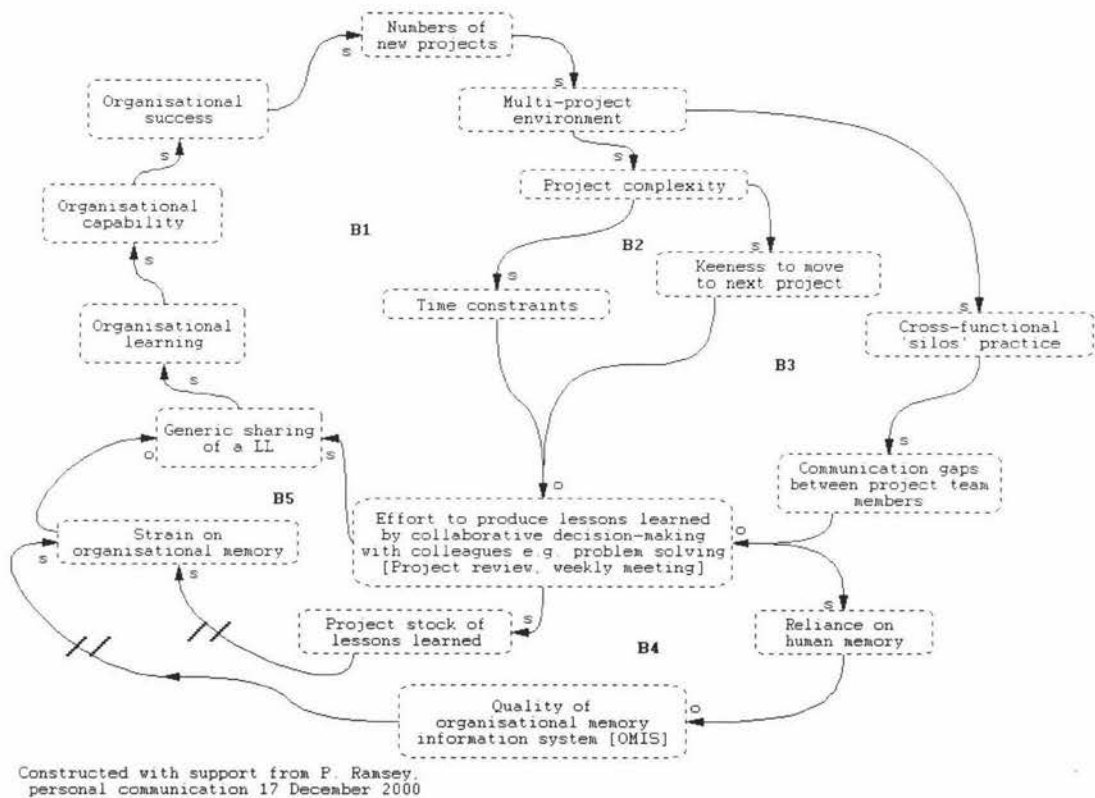
1994). At variant points on the 'chains of influence' between the variables are delays (//), where influence takes a particularly long time to occur. Change in the same direction is represented by 's,' while change in the opposite direction is represented by 'o.' Where change occurs in the same direction, an increase in one variable means an increase in another variable, for example organisational learning increases organisational capability. Links where an 'o' occurs, the idea of opposite is represented, for example as turnover increases (s), the OMIS lowers in quality (o), which creates a strain (s) on the OMIS to manage lessons learned.



**Figure 21 Project growth – the reinforcing processes**

In order to build capability, deliver a successful project and a series of successful projects, project practitioners produce a lesson learned about their project experiences as successes and failures. Their effort has the potential to set in motion two growth processes (R1 and R2) (Figure 21). The action to produce a lesson learned leads to encoding the lesson learned into human memory, and in doing so, individual practitioners increase their personal learning and build personal project management capability. Enhanced personal capability increases confidence to share lessons learned between projects, which contributes to increased project opportunities, and so practitioners have even more project experiences, leading to more opportunities to produce lessons learned. Nonetheless, there is potential for delay between building personal capability and the sharing of a lesson learned between projects. The research findings suggest what is a meaningful lesson for one practitioner is not necessary a meaningful lesson for another, while other practitioners found lessons learned difficult to apply between projects. Figure 21 illustrates these delays built into the reinforcing cycles of growth of the project practitioner's capability to achieve project success shown as R1.

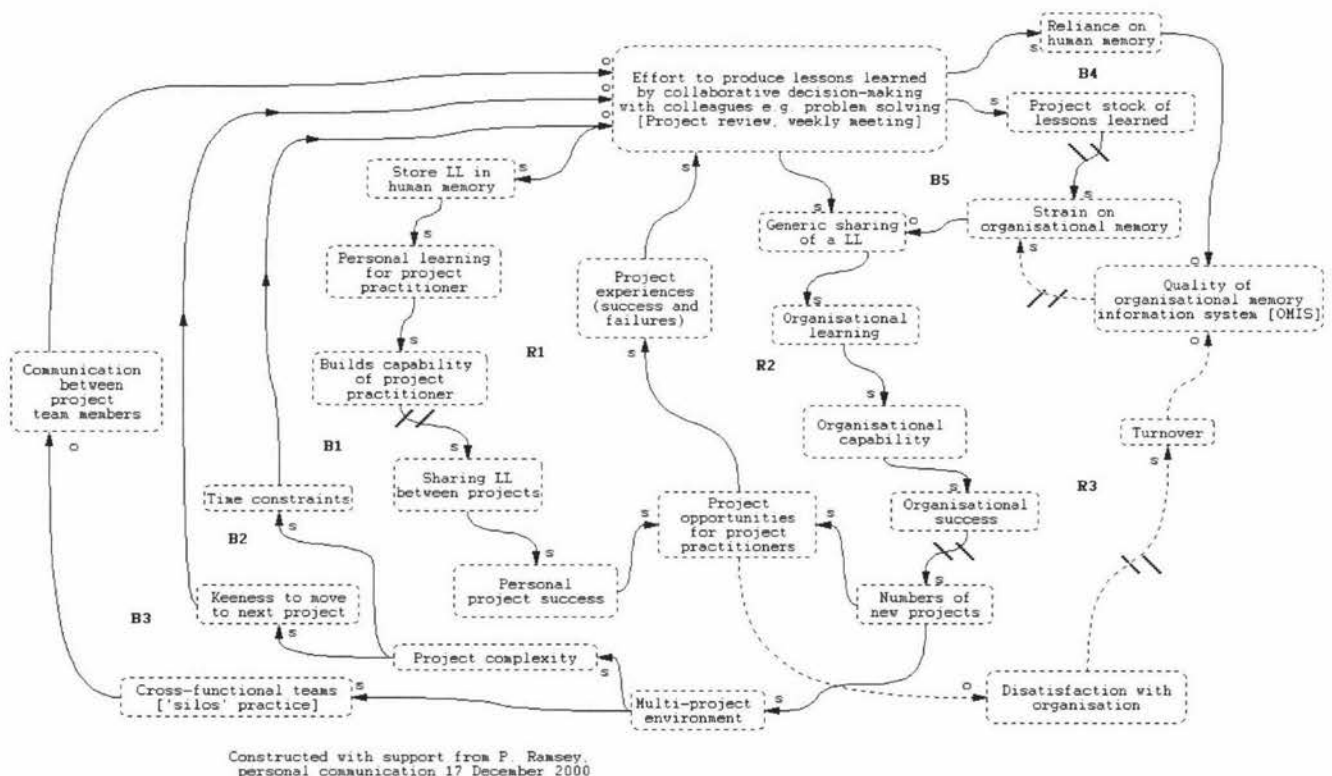
The effort to produce a lesson learned also sets in motion a reinforcing process of organisational learning shown as R2 (Figure 21). The action to produce a lesson learned through a collaborative effort leads to organisational learning enhanced by the generic sharing of a lesson learned. Organisational capability is built, which contributes to organisational success. The number of projects is increased, as is the number of project opportunities for project practitioners. Delay may occur between the increased number of new projects and organisational success owing to subtle influences, suggested in this research by the building of personal capability that may outgrow capability required by the organisational projects. A consequence is the eventual desire by project practitioners to move on. This is illustrated in R3, a reinforcing loop that illustrates change, which over time causes collapse by lowering the quality of the OMIS and reducing organisational learning (Figure 21).



**Figure 22 Project growth - the balancing processes**

The research findings suggest a number of factors may limit the growth of R1 and R2. Five of these factors are shown in Figure 22. As Figure 21 demonstrates, personal and organisational success lead to increased project opportunities for project practitioners. At the same time, as more project opportunities exist, the multi-project environment, and increased project complexity scatters the focus for project practitioners, leading to time constraints (B1),

and keenness to get on with the next project (B2). Cross-functional project teams are prone to silos of practice (B3) that worsen communication gaps (B4). These limiting processes slow R1 and R2, reducing the effort to produce a lesson learned. The reduction in effort to produce a lesson learned by some practitioners increases reliance on human memory (B4), which lowers the quality of the OMIS by fragmenting the project knowledge base. Eventually, the growth in stock of lessons learned by other project practitioners and the reliance on human memory place increasing strain on the OMIS (B5). This process reduces the generic sharing of a lesson learned and hence organisational learning, organisational capability, and organisational success.



**Figure 23 'Limits to growth' archetype**

The CLDs are combined into one diagram to show the relationships 'systems practitioners' term the 'limits to growth' archetype (Figure 23). The archetype is an effective map to deal with 'detail complexity' where cause and effect are "not close in time and space and obvious interventions do not produce expected outcomes" (Senge, 1992, p. 364). The balancing processes of B1, B2, B3, B4, and B5 slow the R1 and R2 growth processes, and the R3 growth and collapse process. As the research findings suggest, the balancing processes limit the organisation's ability rather than the personal ability to achieve project success, owing to the pressure of time constraints, the keenness to move to the next project, silos of practice,

reliance on human memory, and the strain on organisational memory. The implication for project managers is a systems archetype to see the underlying structure and behavioural patterns of lessons learned that are blurred in everyday project management, and to offer insight to “higher leverage actions” where solutions to project success may be failing (Ibid. p. 364).

## 9.5 Recommendations for project management practice

The ‘limits to growth’ archetype presents learning opportunities for project practitioners to benefit from the production of a lesson learned. These form the basis for the recommendations supported by the other key research findings.

- **LEVERAGE PROJECT LEARNING BY BUILDING LESSONS LEARNED INTO EVERYDAY CONTINUOUS PRACTICE AND ALL PROJECT KNOWLEDGE AREAS** to avoid the loss of recall limited by time constraints and the push to move onto new projects as shown in B1 and B2. Lessons learned as everyday practice, will close the gap between when a success or a problem is first discovered, and the review at project closure. Action this by delegating responsibility to the individual who discovered the problem, and use a collaborative resolution process of open dialogue with the project team, project stakeholders and experts.
- **REINFORCE PROJECT LEARNING BY IMPLEMENTING AND USING PROJECT SUPPORT TOOLS** including an OMIS, mentoring, education, and experts, a project office, and a project steering committee. Although the storage of lessons learned in human memory increases personal learning for project practitioners (R1), it appears to limit organisational learning by fragmenting project knowledge (B4) as the knowledge base of lessons learned grows. The additional support tools enable best practice to be shared, encourages project practitioners to be doers and thinkers, lessens the tendency for defensive routines, simplifies complex decision-making by using multiple viewpoints, strengthens and maintains strategic direction and organisational identity, and provides a source of expertise for newcomers.
- **BUILD THE QUALITY OF THE OMIS.** This is important as the resistance to growth by B1, B2, B3, B4, and B5 particularly slow organisational learning (R2). The ‘limits to growth’ suggests that personal capability may grow faster than organisational capability leading to increasing dissatisfaction by practitioners and eventual desire to seek opportunities external to the organisation that matches their project capability. Internal organisational



turnover further destabilises the quality of the OMIS, particularly where there is reliance on human memory to store lessons learned.

- **COMMIT PROJECT LEARNING** by using the learning cycle to observe for project experience. Design solutions that ask, “how do we know that’s true” to get at the ‘root’ cause of a problem to revise or discard existing routines.
- **ACQUIRE NEW PROJECT LEARNING BY INTENTIONAL SEARCH** of the internal and external environment to help resolve problems and build the project knowledge base. At the same time, build search and decoding skills and implement search engines to retrieve the desired information.
- **INCREASE AWARENESS OF LESSONS LEARNED** and how they embed into everyday work conversations and work activities. At the same time, encourage lessons learned that are easily understood and consensual by others.
- **GROW INDIVIDUAL AND TEAM LEARNING CAPABILITY** by standardising lessons learned across projects to benchmark by subject, by sharing project experiences, and by enhancing competency through the global standardised PMP certification process.

### **Implications for project management practice**

The ‘limits to growth’ archetype offers leverage for project practitioners to achieve project success by the use of lessons learned. Senge (1992) advocates the key management principle is not to push the growth processes and “remove the factors limiting growth” (p. 95). Senge (1992) suggests leverage lies in the balancing loops not the reinforcing loops. For example, the decision to shift the reliance on human memory to store lessons learned requires actions that may not have yet been considered. Where the scenario is to implement an OMIS, consideration may have been given to new software and hardware systems, without consideration to change the underlying management philosophy from pre-determined decision-making to one where project team members take self-responsibility for their problems. Additionally, the removal of a balancing loop will not eliminate other balancing processes. In a ‘limits to growth’ archetype “there are always more limiting processes” (Ibid. p 102). In nature, growth always stops eventually. The lesson is that removing the limits to growth may eventually be counterproductive, and change in the reinforcing processes may happen sooner than expected.

## **9.6 Strengths and limitations of the research**

The key strength of this study is the triangulation of the survey, in-depth interviews and the literature to explore a community of project practitioners and gain deeper insight about



lessons learned and the role they play for organisational learning. The use of systems dynamics dramatically complemented this insight about the dynamic complexity of lessons learned in project management practice. Anecdotally from the participants, it was pleasing for them to learn more about New Zealand project management practice.

Nevertheless, three key research strategies limit the findings from this study. First, the research is exploratory and uses a purposive sampling design. Although Morse (1999) says this ensures 'good' participants from which to devolve valid 'stories,' it limits the findings to the target population of project management practitioners. Second, the findings explore the espoused views of the respondents and not the real world actions of using lessons learned in project management practice. Methodological triangulation aimed to limit this bias by cross-comparison of the qualitative and quantitative data with the literature. Third, the research was constrained by the academic year to explore longitudinally the use of lessons learned and the role they play for organisational learning.

For the researcher, this thesis was a continuous interplay of learning to talk the talk, and the skill to walk the talk (Graham, 1995). It was a continuous process of learning from experience to transform the new knowledge generated into an explicit academic construction. In the most, a learning log (reported as lessons learned), documented the cyclical process of gaining insight at unexpected moments, consciously reviewing that experience, making a decision, and moving on in an ideally more effective and productive way (Appendix III). Sometimes these experiences were one of accomplishment, and sometimes they were feelings of antipathy, however the learning generated new knowledge and skills, which is professionally and personally significant.

## **9.7 Implications for further research**

The limitations of this study invite a future research agenda to explore the learning from experience in project management to achieve project success in New Zealand organisations. Although this study showed the extent of use of lessons learned and strong suggestion of organisational learning practice, the findings are tentative and provide an opportunity through future research that is generalisable to the project management community. Building on the findings from this study will gain deeper insight into the competitive advantage by the management of the tacit learning stored in human memory. It is suggested a future research agenda considers the processes, structure, and consequences of organisational memory for

organisational learning in project management, but shifts the research agenda from the needs of the researcher to the needs of the organisation (s) in question using project 'learning histories' (Roth & Kleiner, 1998; Walsh & Ungson, 1991).

All the same, this study opens gaps for future research. Acquiring lessons learned into human memory is significantly evident in this study, but unknown is the level of dependence by individuals on an OMIS, paper documents, consultation with experts or other colleagues to decode or retrieve a lesson learned. For instance, why do some practitioners find it problematical when applying a lesson learned from a previous project in another circumstance and another time frame into a new project? Is this because the experience from past learning is not repeatable, or does continuous change internal and external to the organisation make what was done in the past not applicable for the future? Is it that the input to project planning of "historical experience (e.g., estimating databases, records of past project performance)" does not conceptually relate to lessons learned by project practitioners (Duncan, 1996, p. 40)? Is the problem solving process espoused in this study as getting to the root cause of a problem, in reality a single loop action that applies to the current problem, and not a fundamental change in how activities are conducted in future projects?

Aside the predominance of lessons learned in human memory, the growing trend to implement an OMIS invites further exploration to verify the importance of computer memory for learning. For example, is the recent implementation of an OMIS by most of the organisations the informants worked in a growing trend in global and New Zealand organisations to keep ahead competitively? Another issue is the sometimes irrelevance of lessons learned across global boundaries. What is this attributed too? Is it an issue of cross-cultural communication or an issue of the design of an OMIS? Additionally, is attrition a contributing driver to implement an OMIS as moderately suggested in this study?

Of equal importance are the sociocultural properties of organisational memory. The moderate suggestion of lessons learned stored in the norms and values of practice invite questions about the culture of the organisation. Do pockets of culture in departments or silos of practice, as moderately suggested in this study, impede the sharing of lessons learned at the organisational level? What is the role of strategic planning for the effective use of lessons learned? Are inter-organisational ties a growing trend through partnerships and benchmarking to develop best practice from lessons learned? How do roles influence the sharing of lessons learned?

The findings from this study suggest the acquisition, retention, and retrieval of lessons learned from organisational memory has benefits and costs for learning. What for instance, is the extent of lessons learned received but distorted or inaccurate? What is the sociocultural and physical capacity of the retentive capabilities of organisational memory? Do organisational strategic and operational policies surround organisational memory, and if so, how effective are they for generative learning? What for example, are the positive and negative organisational learning factors in project management that contribute to competitive advantage?

As mentioned, these questions arising from this study are grounded in the research agenda of the researcher. The insight to shift the research agenda to the perspective of the research participant (s) came from this question asked by an informant in one interview: "how can we effectively sit down and record out experience in a useable way that we can then easily reuse?" The question demonstrates the need for practitioners to know how to capture learning and learn from their project experience. This was also the finding by Ross and Kleiner (1998), where managers found it difficult to measure the value of tacit learning and avoid repeating past mistakes.

Ross and Kleiner (1998) developed a six-part learning history process out of a project to "assess the business value of an organisational learning effort in AutoCo." A learning history "tells an organisation its own story" to "better capture and permeate on organisation with learning" (Roth & Kleiner, 1998, p. 44). Similar to an action research methodology (Argyris, 1985), Roth and Kleiner (1998) started with the real situation, planned the research with organisational members who were willing to champion the research, then constructed "reflective interviews" or conversations with internal organisational members and external stakeholders to gain a broad range of viewpoints (Roth & Kleiner, 1998, p. 51). The next steps involved "distilling" the histories into themes and writing the research report assisted by a "small group of internal staff and outsider learning historians" (Ibid. p. 51). Providing the drafted material to the participants validated the histories. The final step involved disseminating the results for discussion with teams and conducting workshops using "reflective conversation" where organisational members self-concluded "about the meaning of the organisation's experience" (Ibid. p. 53).

A learning history methodology using a rigorous research approach, could be applied to the project management community within an organisation, specifically where the organisation is

structured around managing by project in a matrix or projectised organisational structure, or desires to shift from the traditional hierarchical structure. The key constraints of this approach that Roth and Kleiner (1998) found, were the organisational members wanted to be heard in a safe way without inducing blame, they only hear what they want to hear, and few organisations were ready to commit to or invest in learning. Learning histories require patience, an extended timeframe, and keeping in mind the need by the organisation to “know why” (Roth & Kleiner, 1998, p. 57). The benefit of the organisational transformation made possible by the research, is the development of “leadership for learning at all levels” to build “capability to reflect on its past” in an “environment conducive to collective learning” (Ibid. p. 59).

The learning history methodology may not answer all the questions proposed out of this research that traditional quantitative and qualitative methodologies would provide. However, it is believed any further research needs to meet the needs and requirements of the research participants if competitive advantage is to be gained for the organisation from the tacit learning from experience. This study provides a solid platform from which to further explore the role of organisational memory in organisations that practice, or desire to practice organisational learning using project management as a framework.



## REFERENCES

- Abramovici, A. (1999, October). Gathering and using lessons learned. PM Network, 13 (10), 61-63.
- Allee, V. (1997). The knowledge evolution: Expanding organisational intelligence. Boston: Butterworth-Heinemann.
- Allee, V. (2000). Knowledge networks and communities of practice. OD Practitioner online, 32 (4), 1-12. Available: <http://www.odnetwork.org>
- Anand, V., Manz, C. C., & Glick, W. H. (1998). An organisational memory approach to information management. Academy of Management Review, 23 (4), 796-809.
- Argyris, C. (1999). On organisational learning. (2<sup>nd</sup> ed.). Great Britain: MPG Books Ltd, Bodmin.
- Argyris, C., Putnam, R., & McLain Smith, D. (1985). Action science: Concepts, methods and skills for research and intervention. San Francisco: Jossey-Bass Publishers.
- Barker D. A., & Barker, L. L. (1989). Survey research. In P. Emmett & L. L. Barker (Eds.). Measurement of communication behaviour (pp. 168-192). White Plains, New York: Longman.
- Barker, R. T., & Camarata, M. R. (1998). The role of communication in creating and maintaining a learning organisation: Preconditions, indicators, and disciplines. The Journal of Business Communication, 35 (4), 443-467.
- Bennett, F. N. (1994). The great Southland project. In D. Cleland & R. Gareis (Eds.). Global project management handbook (pp. 32-3-32-29). New York: McGraw-Hill, Inc.
- Bordens, K. S., & Abbott, B. D. (1996). Research design and methods: A process approach (3<sup>rd</sup> ed.). Mountain View California: Mayfield Publishing Company.
- Brenneman, W. B., Keys, J. B., & Fulmer, R. M. (1998). Learning across a living company: The Shell companies' experiences. Organisational Dynamics 27 (2), 61-69.
- Briner, W., & Hastings, C. (1994). The role of projects in the strategy process. In W. Briner & C. Hastings (Eds.). Global project management handbook (pp. 15-3-15-23). New York: McGraw-Hill, Inc.
- Calvert, G., Mobley, S., & Marshall, L. (1994). Grasping the learning organisation. Training and Development 48 (6), 38-43.
- Chandler, A. D. (1969). Strategy and structure: Chapters in the history of the American industrial enterprise. USA: Massachusetts Institute of Technology.
- Choo, C. W. (1998). The knowing organisation: How organisations use information to construct meaning, create knowledge, and make decisions. New York: Oxford University Press.



- Cleland, D. (1998). Strategic project management. In M. B. Pinto (Ed.). The Project Management Institute: Project management handbook. (pp. 27-50). Jossey-Bass Publishers: San Francisco.
- Cleland, D. (1999). Project management: Strategic design and implementation. (3<sup>rd</sup> ed.). USA: McGraw Hill.
- Coakes, S. J. & Steed, L. G. (1997). SPSS: Analysis without anguish. Version 6.1 for IBM & Macintosh users. Brisbane: John Wiley & Sons.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. Administrative Science Quarterly, 35 128-152.
- Cook, L. (2000). Facets of wealth in New Zealand: Social capital. In Len Cook, Looking past the 20<sup>th</sup> Century. Statistics New Zealand Te Tari Tatau. Available: <http://www.stats.govt.nz>
- Cooper, K. G. (1998). Four failures in project management. In M. B. Pinto (Ed.). The Project Management Institute: Project management handbook. (pp. 397-424). Jossey-Bass Publishers: San Francisco.
- Crawford, L. H. (1998). Project management competence research project: Progress report. Sydney: University of Technology. Available: <http://www.aipm.com/PMCInvit.html>
- Crawford, L. H. (2000). Improving Performance through Global Communities of Project Management Practice. A paper presented at the PMINZ Conference 2000: A key to the knowledge based economy, 26-28 October, Christchurch, NZ: Project Management Institute.
- Crossan, M. N. Lane, H. W., & White, R. E. (1999). An organisational learning framework: From intuition to institution. Academy of Management, 24 (3), 522-537.
- Davenport, T. O., & Prusak, L. (1998). Working knowledge: How organisations manage what they know. Boston: Harvard Business School Press.
- Davenport, T. O., De Long, D. W., & Beers, M. C. (1998). Successful knowledge management projects. Sloan Management Review. 39 (2), 43-57.
- Davenport, T. O. (1999). Human Capital: What it is and why people invest in it. San Francisco: Jossey-Bass Publishers.
- de Vaus, D. A. (1991). Surveys in social research. (3<sup>rd</sup> ed.). Singapore: Chong Offset Printing Pte Ltd.
- Dibella, A. J., & Nevis, E. C. (1998). How organisations learn: An integrated strategy for building learning capability. San Francisco: Jossey-Bass Publishers.
- Dixon, N. M., & Ross, R. (1999). The organisational learning cycle. In P. Senge, A. Kleiner, C. Roberts, R. Ross, B. Roth, & B. Smith (Eds.). (1999). The dance of change: The challenges to sustaining momentum in learning organisations (pp. 435-443). New York: Doubleday.

- Dodgson, M. (1993). Organisational Learning: A Review of Some Literatures. Organisation Studies, 14 (3), 375-94.
- Dougan, N. (1999). Project organisations that learn – understanding the barriers to organisational learning in project environments – a case study. A paper presented at the proceedings of the International Research Network for Organising by Projects (IRNOPIV) Conference: Sydney 2000.
- Duncan, Q. R. (Ed.). (1996). A guide to the project management body of knowledge: PMI Standards Committee. USA: Project Management Institute.
- Easterby-Smith, M. (1997). Disciplines or organisational learning: Contributions and critiques. Human Relations, 50 (9), 1058-1113.
- Easterby-Smith, M., Thorpe, R., & Lowe, A. (1991). Management research: An introduction. London: Sage Publications Ltd.
- Emory, C. W., & Cooper, D. R. (1991). Business research methods. (4<sup>th</sup> ed.). USA: Richard D. Irwin, Inc.
- Ford, R. C., & Randolph, W. A. (1998). Organisational structure and project management. In M. B. Pinto (Ed). The Project Management Institute: Project management handbook. (pp. 88-108). Jossey-Bass Publishers: San Francisco.
- Frame, J. D. (1995). Managing projects in organisations: How to make the best use of time, techniques, and people. San Francisco: Jossey-Bass Publishers.
- Frame, J. D. (1998). Closing out the project. In M. B. Pinto (Ed). The Project Management Institute: Project management handbook. (pp. 237-246). Jossey-Bass Publishers: San Francisco.
- Fulmer, R. M., & Keys, J. B. (1998). A conversation with Peter Senge: New developments in organisational learning. Organizational Dynamics, 27 (2), 33-42
- Fulmer, R. M., Gibbs, P., & Keys, J. B. (1998). The second generation learning organizations: New tools for sustaining competitive advantage. Organizational Dynamics, 27 (2), 6-20.
- Galagan, P. A. (1993). Helping groups learn. Training & Development, 47 (10), 34-37.
- Garvin, D. A. (1993). Building a learning organisation. Harvard Business Review, 71 (4), 78-91.
- Garvin, D. A. (1994). Building a learning organisation. Business Credit, 96 (1), 19-28.
- Gaskell, G., Wright, D., & O'Muircheartaigh, C. (1993, November). Reliability of surveys. The Psychologist. pp. 500-503.
- Ghuri, P., Gronhaug, K., & Kristianslund, I. (1995). Research methods in business studies: A practical guide. New York: Prentice Hall.

- Goodman, M., Kemeny, J., & Roberts, C. (1994). The language of systems thinking: "Links" and "Loops." In P. Senge, A. Kleiner, C. Roberts, R. Ross, & B. Smith (1994). (Eds.). The fifth discipline field book: Strategies and tools for building a learning organisation (pp. 113-148). USA: Doubleday.
- Gordon, I. A. (Ed.). (1982). The New Collins concise dictionary of the English language. New Zealand Edition. Auckland: Collins.
- Gosling, I. A. (2000). On the job learning: building human capability for competitive advantage. A paper presented at the PMINZ Conference 2000: A key to the knowledge based economy, 26-28 October 2000, Christchurch, NZ: Project Management Institute.
- Hargadon, A., & Sutton, R. I. (1997). Technology brokering and innovation in a product development firm. Administrative Science Quarterly, 42 (4), 716-749.
- Honey, P. (1993). Peter Honey's manual of self-assessment questionnaires. Berkshire: Ardingly House.
- Honey, P., & Mumford, A. (1992). The manual of learning styles. Berkshire: Peter Honey.
- Huber, G. P. (1991). Organisational learning: The contributing processes and the literatures. Organisational Science, 2 (1), 88-115.
- Jick, T. D. (1979). Mixing qualitative and quantitative methods: triangulation in action. Administrative Science Quarterly, 24 602-611.
- Johnson, J. J., & Paper, D. J. (1998). An exploration of empowerment and organisational memory. Journal of Managerial Issues, 10 (4), 503-519
- Juran, J. M. (1988). Juran on planning for quality. USA: The Free Press.
- Kerlinger, F. N. (1986). Foundations of behavioural research. (3<sup>rd</sup> ed.). New York: Holt, Rinehart & Winston, Inc.
- Kerzner, H. (1998). In search of excellence in project management: Successful practices in high performance organisations. New York: Van Nostrand Reinhold.
- Kim, D. H. (1993). The link between individual and organisational learning. Sloan Management Review, 35 (1), 37-50.
- Kloot, L. (1997). Organisational learning and management control systems: responding to environmental change. Management Accounting Research, 8. (1), 47-73.
- Kloppenborg, T. J., & Petrick, J. A. (1999). Leadership in project life cycle and team character development. Project Management Journal, 30 (2), 8-13.
- Kotnour, T. M. (1999). A learning framework for project management. Project Management Journal, 30 (2), 32-38.

- Lientz, B. P., & Rea, K. P. (1998). Project management for the 21<sup>st</sup> century. (2<sup>nd</sup> ed.). San Diego: Academic Press.
- Lukas, B. A., Hult, G. T. M., & Ferrell, O. C. (1996). A theoretical perspective of the antecedents and consequences of organisational learning in marketing channels. Journal of Business Research, 36 (3), 233-244.
- Marquardt, M. J. (1997). The learning organisation – the critical paradigm for corporate success in the 21<sup>st</sup> century. Training and Development in Australia, 24 (2), 3-8.
- Massey University Human Ethics Committee (MUHEC). (1999). Code of ethical conduct for teaching and research involving human subjects. Palmerston North: Massey University.
- McCormack, B., & Hill, E. (1997). Conducting a survey: The SPSS workbook. London: International Thomson Business Press.
- McGill, M. E., & Slocum, J. W. Jr. (1993). Unlearning the organisation. Organisational Dynamics, 22 (2), 67-77.
- Miles, M. B., & Huberman, A. M. (1994). An expanded sourcebook: Qualitative data analysis. (2<sup>nd</sup> ed.). London: Sage Publications.
- Mills, D. Q., & Friesen, B. (1992). The learning organisation. European Management Journal, 10 (2), 146-156.
- Morman, C., & Miner, A. S. (1997). The impact of organisational memory on new product and creativity. Journal of Marketing, 34 (1), 91-106.
- Morris, P. W. (1998). Key issues in project management. In M. B. Pinto. (1998). (Ed.). The Project Management Institute: Project management handbook (pp. 3-26). Jossey-Bass Publishers: San Francisco.
- Morse, J. M. (1999). Approaches to qualitative-quantitative methodological triangulation. In F. Downs. (1999). (Ed.). Readings in research methodology. (pp. 60-84). (2<sup>nd</sup> ed.). Baltimore: Lippincott.
- Mumford, A. (Ed.). (1997). Action learning at work. England: Gower Publishing Limited.
- Nevis, E. C., Dibella, A. J., & Gould, M. (1997). Understanding organisations as learning systems. Available: <http://www.mit.com>
- Noe, R. A., Hollenbeck, J. R., Gerhart, B. & Wright, P. M. (1997). Human Resource Management: Gaining a competitive advantage. (3<sup>rd</sup> ed.). Chicago: Irwin.
- Nonaka, I. (1991). The knowledge creating company. Harvard Business Review. 96-104.
- Nonaka, I., & Takauchi, H. (1995). The knowledge-creating company: How Japanese companies create the dynamics of innovation. New York: Oxford University Press.

- Nunan, T. (2000). Exploring the concept of flexibility. In V. Jakupc, & J. Garrick (2000). (Eds.). Flexible learning, human resource and organisational development: Putting theory to work (pp. 67-84). Routledge: London.
- Olonoff, N. (2000, February). Knowledge management and project management. PM Network, 14, (2), 61-64.
- Pan, S. L., & Scarbrough, H. (1999). Knowledge management in practice: An exploratory case study. Technology Analysis & Strategic Management, 11, (3), 359-374.
- Patton, M. Q. (1990). Qualitative evaluation and research methods. (2<sup>nd</sup> ed.). USA: Sage Publications.
- Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. Health Service Research, 34 (5), 1189-1208.
- Perry, C. (1996). Learning styles and learning outcomes: based on Kolb's learning style inventory. Research information for teachers, 10, pp. 1-4.
- Project Management Institute (PMI). (1999). Professional development program. USA: PMI.
- Quinn, J. B., Anderson, P., & Finkelstein, S. (1996). Leveraging Intellect. The Academy of Management Executive, 10 (3), 7-19.
- Ross, R. Smith, B., & Roberts, C. (1994). The wheel of learning. In P. Senge, A. Kleiner, C. Roberts, R. Ross, & B. Smith (1994). (Eds.). The fifth discipline field book: Strategies and tools for building a learning organisation (pp. 59-64). USA: Doubleday.
- Roth, G., & Kleiner, A. (1998). Learning about organisational learning – Creating a learning history. Available: <http://learning.mit.edu/res/wp/18001>.
- Rowland D. (1999, November). The SoL European Conference. Available: <http://www.sol-ne.org>
- Ryan, S. (1994). The emergence of learning communities. In K. T. Wardman, (Ed.). Reflections on creating learning organisations. USA: Pegasus Communication Ltd. 95-105.
- Schein, E. H. (1996). Three cultures of management: The key to organizational learning. Sloan Management Review, 38 (1) 9-24.
- Schein, E. H. (1997). Organisational learning: What is new. Available: <http://www.mit.com>
- Seagal, S., & Horne, D. (1997). Human Dynamics: A new framework for understanding people and realising the potential in our organisations. Cambridge: Pegasus Communication, Inc.
- Senge, P.M. (1992). The fifth discipline: The practice and art of the learning organisation. Australia: Random House.
- Senge, P. M., & Fulmer, R. M. (1993). Simulations, systems thinking and anticipatory learning. Journal of Management Development, 12 (6,) 21-33.

- Senge, P., Kleiner, A., Roberts, C., Roth, B., & Smith, B. (Eds.). (1994). The fifth discipline field book: Strategies and tools for building a learning organisation. USA: Doubleday.
- Senge, P. (1999). It's the learning: The real lesson of the quality movement. The Journal for Quality and Participation, 22, (6), 34-4. (This article appears in its entirety in the March 1992 issue of The Journal for Quality and Participation).
- Shane, B., & Schumacher, T. (1996). Capturing intellectual assets in a project management organisation. Project Management Journal, XXVII, (4), 3-11.
- Showalter, M. J., & Mulholland, J. A. (1992). Continuous improvement strategies for service organisations. Business Horizons, 82-87.
- Simon, H. A. (1991). Bounded rationality and organisational learning. Organisational Science, 2 (1), 125-134.
- SPSS for Windows. (5 December 1995). Statistical package for social scientists. Release 6.1.3. Standard Version.
- Stein, E. W. (1995). Organisational memory: Review of concepts and recommendations for management. International Journal of Information Management, 15 (2), 17-32.
- Stein, E. W., & Zwass, V. (1995). Actualising organisational memory with information systems. Information Systems Research, 6 (2), 85-117.
- Stempel III, G. H., & Westley, B. H. (1989). Research methods in mass communication. (2<sup>nd</sup> ed.). Englewood Cliffs, New Jersey: Prentice-Hall.
- Sterman, J. D. (1992). System dynamics modelling for project management. Available: <http://web.mit.edu/jsterman/www/SDG/project.pdt>.
- Sugarman, B. (1997). Notes towards a closer collaboration between organisational theory, learning organisations and organisational learning in the search for a new paradigm. 1-30. Available: <http://www.mit.com>.
- Ulrich, D., Jick, T., & Von Glinow, M. A. (1993). High impact learning: Building and diffusing learning capability. Organisational Dynamics, 22, 52-66.
- Vehovar, V., & Batagelj, Z. (1996). The methodological issues in www surveys. Paper presented at CASIC '96, San Antonio. Available: <http://www.ris.organisation/cascio96>.
- Walsh, J. P., & Ungson, G. R. (1991). Organisational memory. Academy of Management Review, 16 (1), 57-91.
- Weber, R. P. (1985). Basic content analysis. London: Sage Publications.
- Wenger, E. (1999). Communities of practice: Learning, meaning, and identity. United Kingdom: The Press Syndicate of the University of Cambridge.



- 
- Wheelwright, S. C., & Clark, K. B. (1992). Revolutionizing product development: Quantum leaps in speed, efficiency, and quality. Canada: The Free Press.
- Wijnhoven, F. (1999). Development scenarios for organisational memory information systems. Journal of Management Information Systems, 16 (1), 121-146.
- Yin, R. K. (1994). Case study research design and methods. (2<sup>nd</sup> ed.). London: Sage Publications.
- Zack, M. H. (1999). Developing a knowledge strategy. California Management Review, 41 (3), 125-145.
- Zikmund, W. G. (1991). Business research methods. (3<sup>rd</sup> ed.). Chicago: The Dryden Press.



APPENDICES

Appendix I Tables

Chapter Three: Methodology

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
EXP_ACT	38.3500	43.7718	.3267	.4899	.7932
ACQ_ROUT	38.6500	46.8487	.3730	.5627	.7762
CAPT_ROU	38.4250	43.4814	.6151	.5526	.7516
RETEN_SI	38.2750	41.9994	.7379	.6904	.7388
RETRIEVE	38.1500	47.7205	.3965	.4398	.7738
SEARCH_M	38.2750	47.4353	.3042	.3956	.7839
STORE_HE	40.0000	51.6923	.0966	.6109	.7979
SHARED	38.8750	45.5994	.6300	.7831	.7556
SHAWI	39.1500	47.9769	.3763	.4788	.7755
SHABE	38.4500	46.0487	.5544	.6485	.7608
SHEX	37.6750	47.4558	.4737	.4412	.7682
PERABIL	39.9250	49.7122	.3574	.7231	.7778
ORGABIL	39.2000	48.4718	.3436	.3542	.7782

Reliability analysis – scale alpha (p. 53)

The overall scale for Cronbach’s alpha is 0.7860. When the items exp\_act (producing a lesson learned against expectation) and store\_he (storing a lesson learned in human memory) are removed the scale increases to 0.7936. This would increase overall reliability. These items were not removed for statistical analysis in this study.

## Chapter Five: Lessons learned

Why produce a lesson learned n = 29		n	% of responses	% of cases
To deliver a successful project	▪ Part of the methodology	4	6.78	13.79
	▪ Provides closure to team members	2	3.39	6.90
Response total		6	10.17	20.69
To deliver a series of successful projects	▪ Try not repeat the error, same mistakes	5	8.47	17.24
	▪ Repeat successes and capitalise on successful solutions	4	6.78	13.79
	▪ Reference or assistance for future projects	2	3.39	6.90
	▪ Leverage lessons from past projects	2	3.39	6.90
	▪ Interproject benefit for other projects	2	3.39	6.90
	▪ To speed development	1	1.69	3.45
	▪ Better pool of project managers	1	1.69	3.45
	▪ Use the lessons again	1	1.69	3.45
Response total		18	30.51	62.07
Building capability	▪ <b>Organisational learning strategies:</b> one source to refer to for successful and non successful lessons and experience; continuous improvement for processes, methods and performance; share project and organisational knowledge; organisational learning; team learning from successes and failures; develop best practice for project management, problem identification and resolution; collection knowledge to improve processes; improve quality; learn from team members, project leaders; and formal capture success and failures.	30	50.84	103.45
	▪ Redefine organisational practice	2	3.39	6.90
	▪ A useful tool, mechanism to improve	1	1.69	3.45
	▪ Builds individual learning	1	1.69	3.45
	▪ Determines how to improve future projects	1	1.69	3.45
Response total		35	59.32	120.69
Total responses		59	100.00	203.44

### Why produce a lesson learned (p. 72)

Why a lesson learned is not produced n = 22		n	% of responses	% of cases
To deliver a successful project	▪ Not part of methodology, culture and practice	4	10.81	18.18
	▪ No time	3	8.11	13.63
	▪ Size of project is too small	3	8.11	13.63
	▪ If no perceived value nothing to produce	3	5.41	13.63
	▪ Produce for a large project only	2	5.41	9.09
	▪ Not a conscious process	2	5.41	9.09
	▪ Ad hoc practice	2	5.41	9.09
	▪ Only when something goes wrong	1	2.70	4.54
Response total		20	54.05	90.90
To deliver a series of successful projects	▪ Keenness to move to next project	2	5.41	9.09
	▪ Informal knowledge recycled to next project	1	2.70	4.54
Response total		3	8.11	13.63
To build capability	▪ Not aware of the process	3	8.11	13.63
	▪ Personal professional expertise (not organisation)	3	8.11	13.63
	▪ Uncertainty over definition of a lesson learned (individual versus team)	2	5.41	9.09
	▪ Recent development of a learning framework	1	2.70	4.45
	▪ Recent implementation of a capture system	1	2.70	4.45
	▪ Area of increasing concern to improve	1	2.70	4.45
	▪ Cannot plan learning – learning goals are infinite	1	2.70	4.45
	▪ Experience and memory (assumed 'head') has ability to capture most learning	1	2.70	4.45
	▪ Organisation in past not interested in own learning	1	2.70	4.45
Response total		14	37.84	63.64
Total responses		37	100.00	168.18

### Why not produce a lesson learned (p. 73)

<b>Production of a lesson learned in project phases n = 33</b>				
<b>Project initiation</b>	<b>Specific events</b>	<b>n</b>	<b>% of responses</b>	<b>% of cases**</b>
	▪ Kick off meeting, project briefing, team awareness	3	4.28	9.09
	▪ Launch product (presentation)	2	2.86	6.06
	▪ Ad hoc	1	1.43	3.03
	▪ Identifying key information	1	1.43	3.03
<b>Response total</b>		<b>7</b>	<b>10.00</b>	<b>21.21</b>
<b>Project planning</b>	▪ Baseline documentation	1	1.43	3.03
<b>Response total</b>		<b>1</b>	<b>1.43</b>	<b>3.03</b>
<b>Project execution</b>	▪ Meetings (progress, team, reviews)	3	4.27	9.09
	▪ Steering Committee management	1	1.43	3.03
	▪ Resolve specific issues	1	1.43	3.03
	▪ Education	1	1.43	3.03
<b>Response total</b>		<b>6</b>	<b>8.57</b>	<b>18.18</b>
<b>Project control</b>	▪ Monthly Steering Committee	2	2.85	6.06
	▪ Reviews (phase, routine, periodic)	2	2.85	6.06
	▪ Post milestones	2	2.85	6.06
	▪ Risk management	1	1.42	3.03
	▪ Change control	1	1.42	3.03
	▪ If something goes wrong	1	1.42	3.03
	▪ Issues log	1	1.42	3.03
<b>Response total</b>		<b>10</b>	<b>14.28</b>	<b>30.30</b>
<b>Project closure</b>	▪ Post implementation review, post project, assignment review/meeting	14	20.00	42.42
	▪ Presentation lessons learned	3	4.28	9.09
	▪ Specific team meeting to build lesson learned consensus	2	2.86	6.06
	▪ Administration closure	1	1.43	3.03
	▪ Post delivery phase	1	1.43	3.03
	▪ 95% project completion before team members disband	1	1.43	3.03
	▪ Prior to handover	1	1.43	3.03
	▪ Milestone achievements	1	1.43	3.03
	▪ If something goes wrong	1	1.43	3.03
	▪ Project closure document	1	1.43	3.03
	▪ Learning framework	1	1.43	3.03
	▪ Interviews with team	1	1.43	3.03
	▪ Formal capture	1	1.43	3.03
<b>Response total</b>		<b>29</b>	<b>41.43</b>	<b>87.87</b>
<b>Throughout life of project</b>	▪ Ad hoc, unexpected outcomes, as issues arise that are not resourced for – logged and resolution sought	10	14.28	30.30
	▪ Completion milestones	3	4.28	9.09
	▪ Informally - lessons not captured	2	2.85	6.06
	▪ Phase / systems lifecycle end	2	2.85	6.06
<b>Response total</b>		<b>17</b>	<b>24.28</b>	<b>51.51</b>
<b>Total responses</b>		<b>70</b>	<b>100.00</b>	<b>209.07</b>

\*\* The % of cases that equals yes.

### Reason to produce a lesson learned in project phases (p. 74)



	<b>n (%)</b>	<b>Mode</b>	<b>p</b>
<b>Project initiation</b>	46 (100)	No	0.0000*
Yes	6 (13)		
No	40 (87)		
<b>Project planning</b>	46 (100)	-	-
Yes	-		
No	-		
<b>Project execution</b>	46 (100)	No	0.0000*
Yes	6 (13)		
No	40 (87)		
<b>Project control</b>	46 (100)	No	0.0007*
Yes	11 (23)		
No	35 (75)		
<b>Project closure</b>	46 (100)	Yes	0.1048
Yes	29 (63)		
No	17 (37)		
<b>Throughout life of project</b>	46 (100)	No	0.0553*
Yes	16 (34)		
No	30 (64)		
<b>Produce a lesson learned</b>	46 (100)	Yes	0.0051*
Yes	33 (71)		
No	13 (28)		

\* Statistically significant at  $p < 0.05$  (Binomial, 2-tailed significance)

### Why produce a lesson learned during the project phases (p. 75)

	<b>n (%)</b>	<b>Mode</b>	<b>p*</b>
<b>Integration management</b>	47 (100)	No	0.381
Yes	20 (43)		
No	27 (57)		
<b>Scope management</b>	47 (100)	Yes	0.559
Yes	26 (55)		
No	21 (45)		
<b>Time management</b>	47 (100)	No	1.000
Yes	23 (49)		
No	24 (51)		
<b>Cost management</b>	47 (100)	No	0.770
Yes	22 (47)		
No	25 (53)		
<b>Quality management</b>	47 (100)	No	0.080
Yes	17 (36)		
No	30 (64)		
<b>Human resource management</b>	47 (100)	No	0.080
Yes	17 (36)		
No	30 (64)		
<b>Communication management</b>	47 (100)	Yes	0.770
Yes	25 (53)		
No	22 (47)		
<b>Risk management</b>	47 (100)	Yes	0.243
Yes	28 (60)		
No	19 (40)		
<b>Procurement management</b>	47 (100)	No	0.000*
Yes	11 (23)		
No	36 (77)		
<b>Produce a lesson learned</b>	46 (100)	Yes	0.003*
Yes	34 (72)		
No	13 (28)		

\* Statistically significant at  $p < 0.05$  (Binomial, 2-tailed significance)

### Production of a lesson learned in the knowledge areas (p. 76)

## Chapters Six, Seven: Organisational learning and organisational memory

To deliver a successful project n = 42		n	% responses	% cases
The demands of scope, time, cost & quality	Identify and manage scope, risk, time to the benefit of the organisation	3	3.16	7.14
	Getting teams members to complete tasks	1	1.05	2.38
Response total		4	4.21	9.52
To meet or exceed stakeholder needs and identified requirements	Stakeholder and team member communication (conflict, politics, personality) needs and improvement	6	6.31	14.29
	Better manage project team	3	3.16	7.14
	How to better to conduct project to be successful (effective and efficient)	3	3.16	7.14
	Regular communication and feedback	2	3.16	7.14
	Overcome problems, issues that emerge	2	2.10	4.76
	Understand customer business, techniques and product requirements	2	2.10	4.76
	Determine project success and failure factors and processes	2	2.10	4.76
	Minimise project risk	2	2.10	4.76
	Clear objectives	2	2.10	4.76
	Up front and better planning (critical project success factor)	2	2.10	4.76
	Regular team meetings and reviews	2	2.10	4.76
	Better control and measurement	1	1.05	2.38
	Sponsor use to overcome barriers	1	1.05	2.38
	Not to re-invent the wheel	1	1.05	2.38
	Maximise hand-back to users	1	1.05	2.38
Response total		28	29.47	66.66
To deliver a series of successful projects				
The competing demands of scope, time, cost & quality	Size similar tasks to more accurately predict timelines	2	2.10	4.76
Response total		2	2.10	4.76
To meet or exceed stakeholder needs and identified requirements	Incorporate learning's, experience from past projects into future projects to improve	3	3.16	7.14
	Avoid the same mistakes, pitfalls next time	3	3.16	7.14
	Learn from the project (management, processes)	2	2.10	4.76
	Leverage of past successes	1	1.05	2.38
	Move faster onto next project	1	1.05	2.38
	Identify documentation processes for future projects	1	1.05	2.38
	Ensure wheels invented available to other projects	1	1.05	2.38
Response total		12	12.63	28.57
To build capability				
The project management processes (phases)	INITIATION	0	0.00	0.00
	PLANNING			
	Learn more about the business	1	1.05	2.38
	Improve user acceptance and buy-in through management processes	1	1.05	2.38
	EXECUTION			
	Improve team development, performance	3	3.16	7.14
	Learn more about managing team and senior management politics	1	1.05	2.38
	Learn new technology from team	1	1.05	2.38
	To learn and thoroughly understand subject, details, and processes	1	1.05	2.38
	CONTROL			
	Collect knowledge to improve processes	2	2.10	4.76
	Improve project management ability	2	2.10	4.76
	Improve quality and accuracy	2	2.10	4.76
	Continuous improvement processes, methods and practices	2	2.10	4.76
	Learn when 'it' happens	1	1.05	2.38
	CLOSURE			
	Improve project delivery process	2	2.10	4.76

	▪ If project goes wrong	1	1.05	2.38
<b>Response total</b>		<b>20</b>	<b>21.05</b>	<b>47.62</b>
<b>The product or service</b>	▪ Learn more about clients business	1	1.05	2.38
	▪ Enhance self understanding about clients business	1	1.05	2.38
<b>Response total</b>		<b>2</b>	<b>2.10</b>	<b>4.76</b>
<b>Learning levels</b>	<b>PERSONAL</b>			
	▪ Build and improve project management skills, methodology, processes, refine management technique to achieve best practice, improve performance, expand soft skills, redefine best practice, learn aspects that ensure lessons of improvement, to a better project manager	8	8.42	19.04
	▪ Learn lessons through discussion with project manager	2	2.10	4.76
	▪ Constantly reaffirm and refine knowledge base and tool set	1	1.05	2.38
	▪ Document new ideas and innovations	1	1.05	2.38
	▪ Reduce stress, workload	1	1.05	2.38
	▪ Technical learning	1	1.05	2.38
	▪ Broaden skill base promotion prospects	1	1.05	2.38
	▪ Find new knowledge to improve	1	1.05	2.38
	<b>TEAM</b>			
	▪ Refine management technique to achieve and redefine best practice	2	2.10	4.76
	▪ Upskilling at least one new team member	1	1.05	2.38
	▪ Idea generation	1	1.05	2.38
	▪ Better understand how cross-functional teams can work together	1	1.05	2.38
	▪ Build network	1	1.05	2.38
	▪ 'Grow' team members	1	1.05	2.38
	<b>ORGANISATIONAL</b>			
	▪ Build organisational knowledge to improve	2	2.10	4.76
	▪ Share experiences with wider group	1	1.05	2.38
	▪ Improve organisation's project management skills	1	1.05	2.38
<b>Response total</b>		<b>27</b>	<b>28.42</b>	<b>64.28</b>
<b>Total responses</b>		<b>95</b>	<b>100.00</b>	<b>226.17</b>

### Learning goals when managing a project (p. 87)

Sharing lessons learned	n (%) <sup>*</sup>	All the time n (%)	Very often n (%)	Often n (%)	Some-times n (%)	Hardly ever n (%)
Lessons learned shared	47 (100)	1 (2)	14 (30)	13 (28)	19 (40)	- (-)
Lessons learned shared within projects	47 (100)	4 (9)	18 (38)	12 (25)	12 (25)	1 (2)
Lessons learned shared between projects	47 (100)	- (-)	8 (17)	15 (32)	18 (38)	6 (13)
Lessons learned shared between external customers of projects	47 (100)	- (-)	2 (4)	5 (11)	17 (36)	23 (49)
<b>Organisational memory processes</b>						
Acquisition a routine process	47 (100)	2 (4)	11 (23)	11 (23)	14 (30)	9 (19)
Formal capture a routine process	47 (100)	1 (2)	10 (21)	7 (15)	19 (40)	10 (21)
Retention a routine process	47 (100)	1 (2)	4 (8)	17 (36)	9 (19)	16 (34)
Retrieval a simple process *	47 (100)	- (-)	6 (13)	9 (19)	21 (45)	11 (23)
Search mechanisms enhance access *	47 (100)	2 (4)	7 (15)	11 (23)	13 (28)	14 (30)
Storage in human memory	47 (100)	17 (36)	21 (45)	5 (11)	3 (6)	1 (2)

\* Missing values transformed with the serial mean

### Sharing a lesson learned and organisational memory processes (p. 88)

Producing a lesson learned measured against expectations	n (%) <sup>*</sup>	All the time n (%)	Often n (%)	Not sure n (%)	Sometimes n (%)	Hardly ever n (%)
Lesson learned against expectations	33 (100)	4 (12)	11 (33)	3 (9)	8 (24)	7 (21)

### Producing a lesson learned against expectations (p. 77)

Beliefs about the use of lessons learned	n (%)	Strongly agree n (%)	Agree n (%)	Uncertain n (%)	Disagree n (%)	Strongly disagree n (%)
Personal ability	46 (100)	11 (24)	22 (48)	10 (22)	2 (4)	1 (2)
Organisational ability	47 (100)	3 (6)	18 (38)	19 (40)	4 (8)	3 (6)

### Personal and organisational ability to achieve project success (90)

Organisational learning opportunities	n (%)	P *	Mode **	n (%)	Mode ***	p
1A A systematic process for identifying development needs	47 (100)	0.381	1A	7 (100)	1A	1.000
1B The identification of development needs is haphazard	27 (57)			4 (57)		
2A People make decisions on their own initiative without seeking permission	23 (43)			3 (43)		
2B People first get clearance/approval when making decisions on their own initiative	47 (100)	0.144	2B	7 (100)	2B	1.000
3A The 'system' constrains the decision how best to go about meeting personal objectives	18 (38)			3 (43)		
3B There is a relatively free hand in the decision to how best to go about meeting personal objectives	29 (62)			4 (57)		
4A Objectives are agreed through a collaborative process	47 (100)	0.000*	3B	7 (100)	3B	1.000
4B Objectives are told/not told to employees	14 (30)			3 (43)		
5A When a problem is to be solved more effort goes into getting a 'quick fix' than into a thorough diagnosis of problems	33 (70)			4 (57)		
5B When a problem is to be solved as much effort goes into diagnosis as into the solution	47 (100)	0.000*	4A	7 (100)	4A	0.015*
6A It is OK to say you don't know and/or to be open about problems	41 (87)			7 (100)		
6B It is not OK to admit not knowing and/or that a problem exists	6 (13)			0 (0)		
7A Things stay relatively constant	46 (100)	0.184	5B	7 (100)	5B	0.125
7B Things constantly change	18 (39)			1 (14)		
8A Quantity comes first, i.e. consistent emphasis placed on the 'numbers game,' production and the like	28 (61)			6 (86)		
8B Quality comes first, i.e. consistent emphasis placed on improving the quality of products and services	47 (100)	0.000*	6A	7 (100)	6A	0.015*
9A People are encouraged to conform and 'stick to the rules'	38 (81)			7 (100)		
9B People are encouraged to experiment and try different ways of doing things	9 (19)			0 (0)		
	47 (100)	0.000*	7B	7 (100)	7B	0.453
	7 (15)			2 (29)		
	40 (85)			5 (71)		
	47 (100)	0.144	8B	7 (100)	8B	0.015*
	18 (38)			0 (0)		
	29 (62)			7 (100)		
	47 (100)	0.243	9A	7 (100)	9A	1.000
	28 (57)			4 (57)		
	19 (40)			3 (43)		

\* Binomial (2-tailed significance  $p < 0.05$ )

\*\* Survey respondents

\*\*\* Participants in interviews

### Organisational learning opportunities (survey and interview) (p. 94)

## Qualitative analysis start list codes

<b>PM: PROJECT MANAGEMENT</b>	<b>PM</b>	<b>1.</b>
PM: ROLE	PM-RL	1.1
[DRIVERS/ COMPETENCE/POSITIVE/NEGATIVE/OUTCOMES]	DR/CO/POS/NEG/OUT	
PM: SUCCESS	PM-SUC	1.2
LESSONS LEARNED [INDIVIDUAL/ PROJECT/ORGANISATIONAL/ STABILITY]	LL/IND/PR/OR/STA	
PM: LESSONS LEARNED	PM-LL/IND	1.3.1
[INDIVIDUAL/SHARED/ NOT SHARED/FORMAL/NOT FORMAL/ROUTINE/NON ROUTINE] -	SH/NSH/FOR/NFOR/ROU/	
INTRAPROJECT/INTERPROJECT/INTRA-ORGANISATIONAL/ INTER-ORGANISATIONAL/ESPOUSED/PRACTICED]	NROU/INTRAP/INTERP/I	
[CUSTOMER/EDUCATION/LEARNING/TRAINING]	NTRAO/INTERO/ESP/PR	
[SHARED DEPENDS]	ACT	
TACIT- [SHARED TRANSFORMATION]	CUST/ED/LEA/TRA	1.3.2
[SHARED STRATEGIC OPERATIONAL]	SH/DEP	1.4.3
[PHASE/ LIFE PROJECT]	TAC/SH/TRANS	1.4.4
PRODUCE DO NOT	SH/STR/OP	1.4.5
PROJECT MANAGEMENT-CONTEXT PM KNOWLEDGE	PH/LIFE	1.4.6
MANIFESTATIONS [sops]	PROD/PNOT	1.4.7
MANAGEMENT [PROCESSES PRACTICES EFFECTIVE NON EFFECTIVE]	PRM/CO/KN	1.4.8
	MANF	1.4.9
	MAN/PRO/PRAC/EFF/NE	1.4.10
	FF	
[REINVENTING WHEEL PAST MISTAKES NEWCOMERS/ BENEFITS/COSTS]	REW/PASM/NEW/BEN/C	1.4.11
CONSTRAINTS [COMPLEXITY/TIME]	OS	
CONTINUOUS IMPROVEMENT	CON/COMPL/TI	1.4.12
PM: TOOLS	CONIM	1.4.13
PM: STRATEGIC MANAGEMENT [OPERATIONAL MANAGEMENT]	TLS	1.5
PM: PROBLEM SOLVING [LEARNING GOAL/ FORMAL/NOT FORMAL/- ROUTINE/ NON-ROUTINE]	STR/MAN/OP	1.6
PM: PROCESSES [COMMUNICATION /PHASES/FRAMEWORK/ EFFECTIVE/NOT EFFECTIVE/PPR/OBJECTIVE PROCESS]	PROB/LEAG/FOR/NFOR/	1.7
PM: HRM	ROUR/NROUT	
PM: CHARACTERISTIC [PROJECT ISSUES/DEMAND OR/COMPLEXITY/DYNAMIC/INTRAORGANISATIONAL/DYNAMIC PROCESS]	PROC/PH/FR/EF/NEFF/PP	1.8
	R/OBJPR	
	PM-HRM	1.9
	PM-	1.10
	CHAR/PR/IS/DEMF/COM	
	PL/DYN/INTRAO/DYNPR	
	OC	
	PM-	
	PR/TEMFRAG/ATT/IT	
<b>ORGANISATIONAL MEMORY</b>	<b>OM</b>	<b>2</b>
OM: PROCESSES	OM-PROC	2.1.1
ACQUISITION [ROUTINE/ NON-ROUTINE/ EFFECTIVE/NOT EFFECTIVE/FORMAL/INFORMAL/DEPENDS]	ACQ/ROU/NROU/EF/NEF	2.1.2
CAPTURE [FORMAL/NOT FORMAL/-ROUTINE/ NON-ROUTINE/ EFFECTIVE/NOT EFFECTIVE/ NOT ASSESSED/DEPENDS]	/FOR/NFOR/DEP	
RETENTION [ROUTINE/ NON-ROUTINE/ EFFECTIVE/NOT EFFECTIVE/DEPENDS]	CAP/FOR/ROU/NROU/	2.1.3
RETRIEVAL [ACCESS EASY/ NOT EASY/EFFECTIVE/NOT EFFECTIVE/DEPENDS]	EF/NEF/NASS/DEP/DEP	
SEARCH MECHANISMS [EFFECTIVE/ NOT EFFECTIVE/DEPENDS]	RET/ROU/NROU/EF/NEF	2.1.4
	F/DEP	
	RETR/AC/EAS/NEAS/EF/	2.1.5
	NEF/DEP	
	OM-	2.1.6
	PROC/SEAM//EFF/DEP	
CAPTURE [HEAD]	CAP/HD	2.1.7
COMPETITIVE ADVANTAGE	COAD	2.1.8
OM: OBJECTIVES [STRATEGIC/ TACTICAL]	OB/STR/TACT	2.2.1
OM: TOOLS [IMPLEMENT/RECENT/ ELECTRONIC/TECHNICAL-MANUAL/CONSTRAINTS/EASE/ORGANISATIONAL-WIDE/EFFECTIVE-NOT]	TLS/IMPL/EL/REC/MAN	2.3.1
OM: MANIFESTATIONS SOCIOCULTURAL/ PHYSICAL	U/CONS/EAS/ORW/NEF/	
[INTERNAL/EXTERNAL/CONSTRAINTS][bins]	EF	
OM: ISSUES [AMBIGUITY UNCERTAINTY/NOT CAPTURED]	MAN/SOC/PHY/INT/EXT/	2.4.1
OM: CHANGE [OUTCOMES]	CONS	
OM: BENEFITS/COSTS	ISS/AMB/UNC/NCAP	2.5
OM: MANAGEMENT [EFFECTIVE/NOT EFFECTIVE/SUPPORT]	CH/OUT	2.6
	BEN/COST	2.7
	MAN/EFF/NEFF/SUP	2.8

ORGANISATIONAL LEARNING	OL	3
OL: LEARNING	OL-LEA	3.1.1
PAST EXPERIENCE TACIT	LEA/PEX/TAC/IND/PR/O	
INDIVIDUAL/PROJECT-GROUP/ORGANISATIONAL/KNOW WHY /	R/KNH/PROC/PRAC/ROU	
PROCESSES-PRACTICES/ ROUTINE/ NON ROUTINE/	/NROU/EXT/INT	
EXTERNAL/INTERNAL]		
INFLUENCE	INF/WKPRAC/	3.1.2
[WORK PRACTICE]	ROU/NROU/GEN/ADAP/	
	EXT/INT	
EXPLICIT KNOW WHY	EX/KNW/IND/OR/PR/RO	3.1.3
INDIVIDUAL/GROUP/ORGANISATION / PROJECT / ROUTINE/ NON	U/NROU/GEN/ADA/INT/	
ROUTINE/GENERATIVE/ADAPTIVE/INTERNAL/EXTERNAL]	EXT	
STRATEGIES	STR/IND/OR/INTROR	3.1.4
[INDIVIDUAL/GROUP/ORGANISATIONAL/INTRA ORGANISATIONAL]		
INDIVIDUAL	IND/DIF/EAS/DEP	3.1.5
DIFFICULTIES/EASE/DEPENDS		
LEVELS [INDIVIDUAL-GROUP-ORGANISATION]	LEV/IND/GRP/OR	3.1.6
OUTCOMES	OUT/POS/NEG/INN/OR/C	3.2.1
POSITIVE NEGATIVE /INNOVATION/ ORGANISATION/COMPETITIVE	OMAD	
ADVANTAGE		
OUTCOMES	OUT/WH/HOW-	3.2.2
WHAT/HOW-IS LEARNED/ KNOWLEDGE USE/ DOERS THINKERS	KN/DO/THINK	
SINGLE LOOP [NON REFLECTION-ACTION]]	SL/NREF/AC	3.2.3
DOUBLE LOOP [REFLECTION-ACTION]	DL/REF/AC	3.2.4
OL: UNLEARNING [UNCERTAIN]	OL-UNLEA/UNCER	3.3
OL: LEARNING MEASUREMENT	OL-LEA/MEA	3.4
OL: COMMUNICATION	OL- OM/CHAR/OP/CL/	3.5
[CHARACTERISTICS/ OPEN CLOSED/TYPE/ TIMING /MODES/ AMOUNT	TYPE/MD/TI/AM/FEED/C	
FEEDBACK /COMMITMENT/EFFECTIVE/NOT EFFECTIVE]	OMT/EF/NEF	
OL: ESPOUSED	OL-ESP	3.6
OL: PRACTISED	OL-PRA	3.7
OL: ENABLERS	OL-	3.8
[TRAINING ACTIVITIES/BEST PRACTICE/BEST PRACTICES / COMMON	ENA/TRAC/COPRO/PRA	
PROCESSES / PRACTICES/BARRIERS/ POLICY/SUPPORT/ STANDARDS/	C/	
RECENT/EMPLOYMENT/MENTOR]	BAR/OL/SUP/STAN/REC/	
	EMP/MENT	
OL: COMMUNITIES PRACTICE	OL-COMPR	3.9
BENEFITS/ COSTS [POWER FRAGMENTATION]	OL-COMPR	3.10.1
	BEN/COST/POWER/FRA	
	G	
TYPE [VIRTUAL COLLOCATED]	TYPE/VIR/COL	3.10.2
OL: DEFENSIVE ROUTINES	OL-DEFR/OR/PR/IMP	3.11
[ORGANISATION/PROJECT/ IMPACTS/ ERROR – LEARNING/	/ERROR/LEA/TRAD	
TRADITIONAL]		
OL: CULTURE	OL-CUL	3.12
[ORGANISATIONAL/ POCKETS/ GLOBAL]	OR/POC/GLOBAL	
OL: SENIOR MANAGEMENT	OL-SEN/MAN	3.13
SUPPORT/NON/[LEADERSHIP PARTICIPATION]	SUP/NONS/LEAD/PART	
OL: CHARACTERISTICS	OL-CHAR	3.14.1
TRANSFORMATION-REINVENTING	TRAN/REINV	3.14.2
PROBLEM SOLVING SYSTEMATIC/QUALITY	PROB/SYS/QUA	3.14.3
DECISION MAKING COLLABORATIVE/EFFECTIVE/NOT EFFECTIVE	DECM/COLL/EFF/NEFF	3.14.4
CULTURE TRUST/FLEXIBILITY/WORK SATISFACTION	CUL/TRU/FLEX	3.14.5
	/WK/SATIS	
[LEARNING/GENERATIVE]	LEA/GEN	3.
		14.6
BENCHMARKING/PARTNERSHIPS/ BEST PRACTICE	BEN/PART/BP	2.
		14.7
KNOWLEDGE TRANSFER / MANAGEMENT [EFFICIENT/NOT]	KNOTRA/MAN/EF/NEFF	3.
		14.8
CONTINUOUS IMPROVEMENT/ PERFORMANCE	CONTIMP/PERIM/REG/N	3.
IMPROVEMENT/REGULAR / NON REGULAR	REG	14.9
OL: COMPETENCY	COMPE	3.15.1
SYSTEMS THINKING	SYST	3.15.2
PERSONAL MASTERY	PERMAS	3.15.3
MENTAL MODELS	MENM	3.15.4
SHARED VISION	SHVIS	3.15.5
TEAM LEARNING	TEMLEA	3.16.6



OL: CAPABILITY	OL-CAP	3.17
[QUESTION EXPERIMENT ADAPT INNOVATE]	QUES/EXP/ADAPT/INOV	
EXPERIENCE TO EFFECTIVE ACTION [PRODUCTIVE NON PRODUCTIVE]	EXPEFAC	3.18
<b>SETTING / CONTEXT</b>	<b>SC</b>	<b>4</b>
SC: INDUSTRY / BUSINESS TYPE	SC-IND/BUST	4.1
SC: ORGANISATION	SC-OR	4.2.1
[STRUCTURE- TRADITIONAL PRACTICE /FLAT-CONSU/GLOBAL/ NATIONAL/ POSITIVE NEGATIVE-RIGIDIFY/ ETHNIC]	STR/TRAD/PRACT/FLAT - CONS/GLO/NAT/POS/NE G/RIG/ETH	
DEPARTMENT/UNIT	DEP	4.2.2
SC: COMPETITIVE ADVANTAGE	SC-COMPAD	4.3
SC: CUSTOMER	SC-CUST	4.4
SC: ORGANISATIONAL CHANGE	SC-OR/CH	4.5
CONTINUOUS/ RAPID/ EFFECTS/ EXTERNAL/INTERNAL/RESPONSIVENESS	CON/RAP/EF/EXT/INT/R ES	
SC-INDIVIDUAL	SC-IND	
SC-HRM = SOFT/HARD = TECHNOLOGY [MANAGEMENT DIFFICULTIES]	SC- HRSOFT/TEC/HD/DIFMA N	
SC: HRM SYSTEMS [REWARD SKILL ID]	SC-HRM	4.6
<b>DEFINITION SITUATION</b>	<b>DS</b>	<b>5</b>
DS: PARTICIPANT PERCEPTION TOPIC	DS-PA/PERT	5.1
<b>PERSPECTIVES</b>	<b>PE</b>	<b>6</b>
PE: NORMATIVE DEVELOPMENTAL CAPABILITY [TYPE]	PE-NOR/DE/CAP	6.1
<b>EVENTS</b>	<b>EV</b>	<b>7</b>
EV: POWER [GENDER/KNOWLEDGE]	EV-PO/GEN/KN	7.1
EV: SPECIFIC ACTIVITIES IRREGULAR	EV-SPA/IR	7.2
<b>STRATEGIES [participant]</b>	<b>STR</b>	<b>8</b>
STR: COMMUNICATION	STR-COM	8.1
STR: METHODS	STR-MET	8.2
STR: TECHNIQUES	STR-TEC	8.3
<b>RELATIONSHIPS</b>	<b>REL</b>	<b>9</b>
REL: UNOFFICIAL DEFINED PATTERNS (cliques]	REL-UNDEP	NA
<b>METHODS</b>	<b>MET</b>	<b>10</b>
MET: PROBLEMS	MET-PROB	NA
MET: SUCCESSES	MET:SUC	NA
MET: RESEARCH PROCESS	MET-RPR	NA
<b>EMERGING CAUSAL LINKS</b>	<b>CL</b>	<b>11</b>
CL: NETWORKS	CL-NET	NA
CL: RECURRENT PATTERNS-Within site	CL: PATT	NA
Intra site	CL: PATT/WS	NA
CL: EXPLANATORY CLUSTER [researcher]	CL: PATT/OS	NA
CL: EXPLANATORY CLUSTER [respondent]	CL-EXPL	NA
	CL-EXPL/RES	NA
<b>QUERIES</b>	<b>QU</b>	<b>12</b>
QU: SURPRISES	QU-!	NA
QU: PUZZLES	QU-Q	NA

## Appendix II Forms

### Survey

QUESTIONNAIRE NUMBER

### Questionnaire

#### **The role of organisational memory for learning in project management using lessons learned**

“We all learn something on the job every day” (Boynton<sup>1</sup>, 1999). The purpose of this survey is to determine the extent of the *lessons learned* (learning from experience) in a project management environment. The assumption is that the capture of *lessons learned* allows everyone to tap into those lessons and build a knowledge base for the organisation. In this context, the knowledge base refers to organisational memory or the stored information that can be used for decision-making.

The survey should take you approximately 10 to 15 minutes to complete. Your responses will remain confidential and your name will not appear in any publication.

*It is assumed that filling in the questionnaire implies consent. You have the right to decline to answer any particular questions. Thank you.*

#### **INSTRUCTIONS FOR COMPLETING THIS QUESTIONNAIRE**

1. Where boxes are provided please ✓ tick.
2. Where space is provided, please write any comment you may wish to make.
3. If you have any questions regarding any aspect of this questionnaire, please contact the researcher Isobelle Gosling.
4. When you have completed the questionnaire please put the questionnaire in the self addressed and stamped envelope and send it to the researcher by **19th July 2000**.

Isobelle Gosling [Address & contact details]

<sup>1</sup> Boynton, A. (1999). *Management by learning, building a smart organisation: An interview with Andrew Boynton*. Celemiab 1998 Annual Report. Celemiab International AB. (Andrew Boynton is a professor of management at the International School for Management Development (IMD), Lausanne, Switzerland, and director of the school's Executive MBA Program.

Section One: Demographic

1. What is your professional job title?

2. Please indicate the industry type you work in?

Agriculture, Forestry and Fishing

Mining

Manufacturing

Electricity, Gas and Water Supply

Construction

Wholesale Trade

Retail Trade

Accommodation, Cafes and Restaurants

Transport and Storage

Communication Services

Finance and Insurance

Property and Business Services

Government Administration and Defence

Education

Health and Community Services

Cultural and Recreational Services

Personal and Other Services

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

3. Please indicate the number of years working in project management?

Less than 5 years

6– 10 years

11 – 15 years

16 – 20 years

More than 20 yrs

4. Are you a project management professional (i.e. ‘PMP’ as defined by the Project Management Institute)?

Yes

No

5. My career goal is to continue working in project management?

Yes

No

Unsure

6. What is your sex?

Male

Female

7. Please indicate your age group?

Aged 19 years of age or less

20 - 25 years

26 - 29 years

30 - 35 years

36 - 40 years

41 - 45 years

46 - 50 years

51 - 55 years

Aged 56 or more years

8. Which ethnic group do you identify with?

New Zealand Maori

European

Pacific Island

Please state which Pacific Island ethnic group \_\_\_\_\_

Other

## Section Two: Project Management<sup>2</sup>

9. When you manage, lead or co-ordinate a project what are your learning goal (s)?

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10. Do you produce lessons learned as a routine part of the project output<sup>3</sup>?

Yes

No

If yes please go to Q. 11

If no please go to Q. 12

11. If you do produce a lesson learned, why do you do this?

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12. If you do not produce a lesson learned as part of your project management practice, why do you not do this?

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<sup>2</sup> Based on Kotnour, T. M. (1999). A learning framework for project management. *Project Management Journal*. 30. (2) 32-38.

<sup>3</sup> **Lesson learned** is something learned from experience e.g., why something worked the way it did, or did not.

13. When do you produce a lesson learned? *Please tick each box that applies and note which event e.g. kick-off meetings.*

Project Initiation

Please indicate at what specific event (s)-----  
-----  
-----

Project Execution

Please indicate at what specific event (s)-----  
-----  
-----

Project Control

Please indicate at what specific event (s)-----  
-----  
-----

Project Closure

Please indicate at what specific event (s)-----  
-----  
-----

Throughout the life of the project

Please indicate at what specific event (s)-----  
-----  
-----

I do not produce a lesson learned

14. What do you broadly produce a lesson learned about? *Please tick each box that applies.*

Integration Management

Scope Management

Time Management

Cost Management

Quality Management

Human Resource Management

Communications Management

Risk Management

Procurement Management

I do not produce a lesson learned

15. How often do you produce a lesson learned measured against expectations? *Please tick one that most applies to you.*

Activities that meet expectations

All of the time

Often

Not sure

Sometimes

Hardly ever

I do not produce a lesson learned

### Section Three: Lessons Learned & Memory Systems

In the next set of questions, I am going to ask you about managing lessons learned in the informal and formal (electronic and non-electronic) memory in your organisation. Memory is where lessons learned (knowledge), are 'stored,' and used when needed by the individuals in the organisation.

For the next set of questions, please pick a number from the scale to show how often you do or do not carry out these processes and write it in the column to the right of the question.

**1 = All of the time**  
**2 = Very often**  
**3 = Often**  
**4 = Sometimes**  
**5 = Hardly ever**

16. Is the acquisition of lessons learned a routine process?
17. Is the formal capture of lessons learned a routine process?
18. Is the retention of lessons learned a routine process?
19. Is the retrieval of lessons learned a simple process?
20. Do search mechanisms enhance the access of lessons learned?
21. Do you store a lesson learned in your head?
22. Are lessons learned shared?
23. Are lessons learned shared within projects?
24. Are lessons learned shared between projects?
25. Are lessons learned shared between the external customers of the projects?

For the next set of questions, please pick a number from the scale to show how often you agree or disagree with each statement and write it in the column to the right of the question.

**1 = Strongly agree**  
**2 = Agree**  
**3 = Uncertain**  
**4 = Disagree**  
**5 = Strongly disagree**

#### To what extent do you agree with the following?

26. My use of lessons learned has significantly improved my personal ability to achieve project success in the past 12 months.
27. The use of lessons learned has significantly improved my organisation's ability to achieve project success in the past 12 months.

**Project success** here means the ability to meet or exceed stakeholder needs and expectations from a project (Project Management Book of Knowledge - PMBOK).



### Section Four: Lessons Learned & Learning Opportunities

In the next set of questions, I am going to ask you to assess the extent to which the organisation in which you work takes learning opportunities.

Please place a tick ✓ in the box beside the statement that most closely applies to you. If both statements apply then tick the one that most applies to you, however marginal the difference (Honey, 1993<sup>4</sup>).

1 A In my organisation<sup>5</sup> there is a systematic process for identifying development needs

1 B In my organisation the identification of development needs is rather haphazard

2 A In my organisation people make decisions on their own initiative without seeking permission

2 B In my organisation people first get clearance / approval when making decisions on their own initiative

3 A In my organisation the 'system' constrains me in deciding how best to go about meeting my objectives

3 B In my organisation I have a relatively free hand in deciding how best to go about meeting my objectives

4 A In my organisation objectives are agreed through a collaborative process between me and my leader

4 B In my organisation I am told / not told what my objectives are

5 A In my organisation when there is a problem to be solved more effort goes into getting a 'quick fix' than into a thorough diagnosis of the problems

5 B In my organisation when there is a problem to be solved as much effort goes into the diagnosis as into the solution

6 A I work in an organisation where it's OK to say you don't know and / or to be open about your problems

6 B I work in an organisation where it's not OK to admit you don't know and / or that you have problems

7 A I work in the sort of place where things stay relatively constant

7 B I work in the sort of place where things constantly change

8 A In my organisation quantity comes first, i.e. consistent emphasis is placed on the 'numbers game,' production and the like

8 B In my organisation quality comes first, i.e. consistent emphasis is placed on improving the quality of products and services

9 A My organisation tends to encourage people to conform and 'stick to the rules'

9 B My organisation tends to encourage people to experiment and try different ways of doing things

<sup>4</sup> Honey, P. Dr. (1993). *Peter Honey's manual of self-assessment questionnaires*. Auckland: Training Media Services Ltd.

<sup>5</sup> 'Organisation' refers to the 'firm' / 'company' you work within

Now that you have completed the questions in **Section Four** on learning opportunities, you may like to score them. Award yourself one point where the box corresponds with a '1' in it and no points each time the statement you ticked corresponds with a box with an '0' in it.

<b>1 A = 1</b>	<b>1 B = 0</b>
<b>2 A = 1</b>	<b>2 B = 0</b>
<b>3 A = 0</b>	<b>3 B = 1</b>
<b>4 A = 1</b>	<b>4 B = 0</b>
<b>5 A = 0</b>	<b>5 B = 1</b>
<b>6 A = 1</b>	<b>6 B = 0</b>
<b>7 A = 0</b>	<b>7 B = 1</b>
<b>8 A = 0</b>	<b>8 B = 1</b>
<b>9 A = 0</b>	<b>9 B = 1</b>
<b>Please add your scores and place your result in the shaded box</b>	
<b>1 A/B</b>	<b>2 A/B</b>
<b>3 A/B</b>	<b>4 A/B</b>
<b>5 A/B</b>	<b>6 A/B</b>
<b>7 A/B</b>	<b>8 A/B</b>
<b>9 A/B</b>	<b>9</b>

If you scored five (5) or more points then I would like to invite you to take part in an interview in the very near future (year 2000). This will involve one but no longer than two hours of your time. Before the interview, I will ask you to complete a self-assessment questionnaire on 'learning from experience.' The interview is based on the ways learning takes place that influences project management practice, and where and in what format lessons learned are stored.

- I will not need to examine any organisational documents.
- The interview will be at a time and place convenient for you.
- I will ask you for written consent before the interview.
- The draft results will be available to you for any suggestion and comment before the final thesis report is completed.
- The research is conducted in the strictest confidence and no identifying names or reference will be made to you in any report.

**If you would like to participate in the interview, please indicate here** Yes      No

**Please telephone, e-mail or fax me if you would like further information**  
**Please refer to the front page for contact details**  
**If you prefer you may attach a contact number & name on a separate sheet of paper to the questionnaire.**

Please note your name, telephone number and, or e-mail address if you wish to take part (thank you).

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*Thank you for your time and support to complete this questionnaire. Please return the questionnaire in the prepaid envelope. ☺*



## THE ROLE OF ORGANISATIONAL MEMORY FOR LEARNING IN PROJECT MANAGEMENT USING LESSONS LEARNED

### INFORMATION SHEET-SURVEY

My name is Isobelle Gosling. I am a member of the PMI and would like to invite you to take part in a survey.

- The purpose is to explore *learning from lessons learned in a project management environment*. *Organisational memory* is broadly defined in this study as the place where lessons learned (knowledge) are stored, and used when needed by individuals in an organisation.
- The intention of this study is to complete a Masters thesis at the College of Business, Massey University.
- Your participation in this survey will:
  - Build understanding how learning from experience can enhance project performance through effective learning;
  - Enable the sharing of your expertise with newcomers to project management.
- Participation will involve approximately ten minutes of your time to complete and return one questionnaire in a pre-paid envelope.
- As part of the questionnaire, you are invited to complete an assessment on learning based on the organisation where you work.
- You are then invited to assess these questions and determine a score between '0' and '9.' If you have a score with '5' or more points, you are invited to participate in the second phase of the research. This will involve the completion of a self-assessment questionnaire about learning from experience, and one semi-structured in-depth interview about your experience with using lessons learned.
- If you express an interest to be interviewed, I will ask you to note your contact details on the questionnaire so I may be in touch with you within one working week.
- Your participation is voluntary (your choice). You have the right to:
  - Decline to participate;
  - Refuse to answer any particular questions;
  - Withdrawal from the study at any time;
  - Ask any questions about the study at any time during participation;
  - Provide information on the understanding that your name will not be used unless you give permission to the researcher;
  - Be given access to a summary of the findings of the study when it is concluded.
- The raw research data is confidential to the researcher and the academic supervisors.
- The information will be electronically captured and analysed. The published information will be in an aggregated format and will be destroyed after six years.
- The results will be available in summary form in early 2001 at a PMI branch meeting.
- When you have completed the questionnaire (and even if you did not answer every question), please place it in the accompanying self-addressed and stamped envelope.

#### Contact details

##### Researcher

Isobelle Gosling  
 10 Tui Crescent  
 Waikanae  
 Telephone +64 4 385 5999 ext. 6147

##### Supervisors

Phil Ramsey  
 [Dr Peter Mellalieu]  
 Telephone +64 6 356 9099  
 College of Business Massey University

## PROPOSAL LETTER PMI

10 Tui Crescent  
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February 15, 2000

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 Resource Management  
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 Palmerston North,  
 New Zealand  
 Telephone: 64 6 356 9099

XX  
 Membership Coordinator  
 Project Management Institute New Zealand Chapter – PMINZ XX Branch  
 XX  
 XX  
 XX

Dear X

### **Re: The role of organisational memory for learning in project management using lessons learned**

Thank you for your time discussing the proposed research '*the role of organisational memory for learning in project management using lessons learned*' with the Wellington branch of the Project Management Institute New Zealand Chapter.

For the year 2000 I am a Masters student in the Department of Human Resource Management at the College of Business, Massey University. My experience in project management is as a team member and project leader in social science and medical research. During this time, I have developed a strong desire to explore the idea of using lessons learned throughout the project and storing these in the memory of the organisation. The assumption is that effective learning from lessons learned will enhance the ability to better manage projects and enhance project performance.

I would like to invite the members of the Wellington branch of the Project Management Institute, Wellington Chapter, to be part of this study. The study will explore learning in project management and the management of lessons learned.

Participation by the members of this branch will involve the completion of a questionnaire. Members are invited via the questionnaire to participate in one in-depth semi-structured interview at a time and venue convenient for them. Members who volunteer will be invited to complete one self-assessment questionnaire based on 'learning from experience.' Completion of this ten-minute questionnaire is *before* the interview.

At the interview, each participant will receive notes on learning from experience based on international research. The interview is tape-recorded but the participant will have control of the tape-recorder. The interview will ideally last one but no longer than two hours. All raw research material is treated in the strictest confidence and no personal or organisational identifying data will be electronically captured or produced in any output reports, papers, or presentations without prior written permission. Each participant has the choice on the written consent form to make comment and suggestions on the draft transcript analysis and receive a summary report of the results. The study is currently undergoing ethical approval from Massey University and is subject to academic supervision.

By participating in this research the members will have the benefit of taking part in developing and expanding the knowledge for effective learning in project management in a New Zealand context. It is hoped this new knowledge is of practical use for managing lessons learned to enhance individual and project performance and contribute to the competitive advantage for the organisation. Foremost the member's will be sharing their

expertise with others that may be contemplating the use of project management principals and practices within the PMBOK framework.

The proposed time frame for the survey is April to May 2000. The key concern I have is the most appropriate distribution channel and the exact membership numbers. At this stage I contemplate using the postage system, or alternatively handing out the questionnaire to members at the April / May branch, and posting out the remainder of the questionnaires for those that did not attend this meeting.

If you have any further queries please contact me at +64 4 385 5999 ext. 6147 or e-mail [igosling@wnmeds.ac.nz](mailto:igosling@wnmeds.ac.nz). Alternatively you may telephone my supervisors Phil Ramsey (Human Resource Management), or Peter Mellalieu (Department of Management Systems) on telephone +64 6 350 5608 at the College of Business, Massey University.

Thank you for your time to consider this proposal.

Yours sincerely

Isobelle Gosling PMP

Attached: draft questionnaire (yet to be pilot tested).



COLLEGE OF BUSINESS

## THANK YOU LETTER PMI



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Work Fax +64 4 385 5898

E-mail [igosling@wnmeds.ac.nz](mailto:igosling@wnmeds.ac.nz)

17 August 2000

XX  
Membership Coordinator  
<Address>

Dear X

### **Re: The role of organisational memory for learning in project management using lessons learned**

I would to thank you and the committee for your support for the above research project. Additionally I would like to extend my appreciation to the XX members. Overall, the response for the survey and the interviews was excellent. I am now at the stage of capturing and analysing the data. I would be happy to share the findings along with the background of the research to a PMI branch meeting in early 2001.

Yours sincerely

Isabelle Gosling





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## THE ROLE OF ORGANISATIONAL MEMORY FOR LEARNING IN PROJECT MANAGEMENT USING LESSONS LEARNED



Department of Human  
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New Zealand  
Telephone: 64 6 356 9099

### INFORMATION SHEET – SEMI-STRUCTURED IN-DEPTH INTERVIEW

You are invited to take part in a research study to examine the processes and behavioural aspects by which lessons learned are acquired, stored, and retrieved when working in a project management environment. This research is being completed as partial fulfilment of the requirements of the Master of Business Studies.

#### Nature of the study

A key challenge for New Zealand businesses using project management is to manage learning and store knowledge for the future. A lesson learned is knowledge learnt from experience. It is informal knowledge often stored in the minds of people. This knowledge becomes new knowledge when members of a group or organisation share it. It can become explicit knowledge when it is stored formally in repositories such as documents and computer memory.

#### What is involved for you?

One self-assessment questionnaire based on 'learning from experience,' which you are invited to complete *before* the interview. This will take approximately six to eight minutes of your time. At the interview, I will provide you with notes on learning from experience based on the work by Honey (1993).

#### A face-to-face interview where I will ask you about your:

- Learning strategies you and your organisation may use that may influence project management, including:
- Lessons learned and project success, learning tools and techniques, development as a project management practitioner, and
- Lessons learned and storage, sharing, and issues you may have concerning their use in project management.

If you agree to participate, you will be asked to sign a consent form.

The interview will be at a time and place that is convenient for you. It is an 'open-conversation' to talk about your experience with lessons learned. Ideally, it will last no longer than one hour. You may be asked to follow up the interview with comments that you may wish to make at a later stage via e-mail or the telephone.

#### Your rights

Your participation is entirely voluntary (your choice). You do not have to take part in this study. If you do agree to take part, you are free to withdraw from the study at any time, without having to give a reason. A tape-recorder will record the dialogue. You will have control over the tape-recorder.

You have the right at any time before, during, and after the interview to

- Ask any question about the research;
- Refuse to answer any question;
- Ask the researcher to leave at any time;
- Turn the tape-recorder off;
- Examine any electronic or paper notes taken;
- Read and amend any subsequent transcription;
- Terminate contact at any time;
- Be given access to a summary of the findings of the study when it is concluded.

No material will be used in the report that could possibly identify you or the organisation you work for. The researcher will transcribe the audiotapes, analyse the research results and manage any documents relevant to this research. The raw research material is only available to the researcher and the academic advisers.

The study has received ethical approval from the Massey University Human Ethics Committee. Please feel free to contact the researcher if you have any questions about this study.

### Research results

You will have a choice to receive a summary of the research results. The final report will be catalogued at Massey University.

### Contact details

<b>Researcher</b>	<b>Student Contact</b>	<b>Contact</b>
Isobelle Gosling Massey University Masters Student (BBS, PMP)	10 Tui Crescent Waikanae	Work +64 4 385 5999 / 6147 Work Fax +64 4 385 5898 Home +64 4 904 7921 E-Mail <a href="mailto:igosling@wnmeds.ac.nz">igosling@wnmeds.ac.nz</a>
<b>Supervisor</b>	<b>Supervisor Contact</b>	<b>Contact</b>
Phil Ramsey Lecturer Human Resource Management	Department Human Resource Management College of Business Private Bag 11 222 Massey University Palmerston North	Telephone +64 6 356 9099 Fax +64 6 350 5608
<b>Supervisor</b>	<b>Supervisor Contact</b>	<b>Contact</b>
Dr Peter Mellalieu Lecturer Management Systems	Department of Management Systems College of Business Private Bag 11 222 Massey University Palmerston North	Telephone +64 6 356 9099 Fax +64 6 350 5608



COLLEGE OF BUSINESS

## THE ROLE OF ORGANISATIONAL MEMORY FOR LEARNING IN PROJECT MANAGEMENT USING LESSONS LEARNED

### CONSENT FORM – SEMI-STRUCTURED IN-DEPTH INTERVIEW



Department of Human  
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Private Bag 11 222,  
Palmerston North,  
New Zealand  
Telephone: 64 6 356 9099

I have read and understood the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand I have the right to withdraw from the study at any time and to decline to answer any particular questions.

I agree to provide information to the researcher on the understanding that my name will not be used without my permission.

The information will be used only for this research and publications arising from this research project.

*Please circle your relevant response*

- |   |     |    |
|---|-----|----|
| ▪ I consent to the interview being audio taped  | YES | NO |
| ▪ I wish to receive a copy and make comment or suggestions on the draft version prior to the final report | YES | NO |
| ▪ I wish to receive a summary of the results  | YES | NO |
| ▪ I wish the audio tapes to be destroyed following completion of this research project                    | YES | NO |

I also understand that I have the right to ask the audiotape to be turned off at any time during the interview.

I agree to participate in this study under the conditions set out in the Information Sheet.

**Participant's signature:** \_\_\_\_\_

**Researcher's signature:** \_\_\_\_\_

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

*The participant will retain a copy of the consent form.*

**Contact summary sheet**  
(generic example)

<b>Contact type</b> Main research	<b>Site</b> Organisational private workspace
<b>Time required</b> Commenced discussion off-tape 1910-1935: Interview 1935-2030	<b>Contact date</b> 15/06/00 <b>Date summarised:</b> 15/06/00
<b>Method</b> Face-to-face interview 'A'	<b>Today's date</b> 01/15/01

1. **Main issues / themes?** LL actively used as part of knowledge management system; continuous improvement in managing LL as part of embedded project management process i.e. embedded into standard processes
2. **People, events, situation?** At organisation CBD sole contact with interviewee – [Job role] – one of three / flowed well
3. **Which research questions/variables did contact bear on most centrally?** XX a contact summary e.g. sales of day to events i.e. the everyday tacit experiences used for future benefit – refer interview transcript
4. **What new hunches, speculations, propositions suggested by contact?** Personal belief of contact the LL need to be embedded into the processes/practices e.g. quality management system-quality objective TQM main focus for outcomes of project management. This belief is or should be part of the culture and have easy access i.e. electronic or in hard paper form. Also LL are an element of the completion of assignments, not yet done throughout the life of the project. This had been done this way for 3-5 years.
5. **Where should I place most energy during next contact – information?** Continue with the how and why questions focusing on effective/non effective management LL
6. **Background/setting to site i.e. mission, structure, size, other points** Mission refer to business card – espoused as well on the wall of the main waiting area of offices, as well as consultants PMI and university qualifications.

**Self assessment questionnaire:** Knowledge & skills 9 / attitudes & emotions 10.

National organisation. Excellent interview with not enough time to talk about LL.

## Semi-structured interview

### INTERVIEW GUIDE 7 May 2000

<p><b>Knowledge and skills about learning and the attitudes and emotions about learning self-assessment - questionnaire</b></p>	<p>Self-assessment (preceded by introductions)</p> <p><b>Learning from experience thoughts</b></p> <ul style="list-style-type: none"> <li>Thoughts with the learning from experience self-assessment questionnaire?</li> <li>Anything further?</li> </ul> <p>Proceed with listening and, or probing e.g. "Could you say something more about that," or "Do you have further examples of this." Hand notes on learning from experience to interviewee and note assessment scores.</p>
<p><b>Determine effective, non-effective organisational learning strategies that influence project management learning practices</b></p> <p>"Catchall phrase describing what we have learned from experience" (Juran, 1988). Juran (1988, p. 308) describes learning from lessons learned as "the result from decisions and actions that have brought good and bad results."</p>	<p><b>Systematic problem solving</b></p> <ul style="list-style-type: none"> <li>Satisfy the needs of the project what [quality] initiatives do you use to solve problems [regularly – sometimes]?</li> <li>More about these [quality] initiatives in terms of acquiring new knowledge [learning]?</li> </ul> <p><b>Experimentation with new approaches</b></p> <ul style="list-style-type: none"> <li>Type of [search] and [test] activities that you undertake [regularly – sometimes] to search for new knowledge?</li> </ul> <p><b>Learning from own experience and past history</b></p> <ul style="list-style-type: none"> <li>Using lessons learned when you manage a project, what type of [learning] tools and techniques (e.g.) do you [regularly] use to [gain new knowledge - learn] from these lessons learned?</li> <li>More about how you go about this process?</li> <li>Effectiveness you perceive this process to be for you in terms of [gaining new knowledge learning]?</li> </ul> <p><b>Learning from the experiences and best practices of others</b></p> <ul style="list-style-type: none"> <li>Using lessons learned what type of [learning] tools and techniques does your organisation [regularly] use to learn from lessons learned.</li> <li>More about how your organisation goes about this process?</li> <li>Effectiveness you perceive this process to be for your organisation in terms of [new knowledge – learning]?</li> </ul> <p><b>Transferring knowledge</b></p> <ul style="list-style-type: none"> <li>Using lessons learned; can you tell me about the tools and techniques that your organisation [regularly] uses to transfer lessons learned between projects?</li> </ul> <p><b>Using lessons learned and project success</b> (the ability to meet or exceed stakeholder needs and expectations from a project).</p> <p><b>Project success-influenced by OM processes-</b></p> <ul style="list-style-type: none"> <li>Achieving project success - contribution lessons learned has had in the past 12 months for you personally. (Sharing, acquisition, capture, retrieval) benefits/problems</li> </ul> <p><b>Project success-influenced by OM processes- organisation</b></p> <ul style="list-style-type: none"> <li>Achieving project success - contribution lessons learned has had in the past 12 months for your organisation. (Sharing, acquisition, capture, retrieval) benefits/problems</li> </ul> <p><b>Manage projects</b></p> <ul style="list-style-type: none"> <li>The influence of [using] and [sharing] lessons learned to manage projects?</li> </ul> <p><b>Sharing-organisational direction</b></p> <ul style="list-style-type: none"> <li>Sharing lessons learned supports [fits] the strategic direction of your organisation in terms of (culture -organisation)?</li> </ul> <p><b>Continuous performance / learning improvement</b></p> <ul style="list-style-type: none"> <li>Connection between using lessons learned and new project members picking up what is required more quickly than before you used lessons learned on a [regular] basis?</li> </ul>
<p><b>Determine the organisational memory properties</b></p>	<p><b>LL-Store where current project BINS</b></p> <ul style="list-style-type: none"> <li>Where in your organisation you store lessons learned?</li> </ul> <p><b>LL-store between projects</b></p>

<p><b>and manifestations of lessons learned</b></p>	<ul style="list-style-type: none"> <li>▪ Examples of this? LL-store_customers</li> <li>▪ Examples of this? shared-within projects</li> <li>▪ Examples of this? shared-between projects</li> <li>▪ Examples of this? shared-between external customers / stakeholders</li> <li>▪ Examples of this? Transfer ease of access, search mechanisms – quick enough</li> <li>▪ Examples of this? Anything else using LL</li> </ul> <p>Personal satisfaction</p> <ul style="list-style-type: none"> <li>▪ Do you find work more meaningful / satisfying using lessons learned?</li> </ul> <p>Project team satisfaction</p> <ul style="list-style-type: none"> <li>▪ Do you find that project team members are more satisfied / meaningful using lessons learned?</li> </ul> <p>Thank you. If there is anything else you think about you may telephone or e-mail me. My contact details are on the information sheet. I look forward to sharing the draft transcriptions with you.</p>
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## SELF-ASSESSMENT QUESTIONNAIRE

### LEARNING FROM EXPERIENCE

Learning from experience e.g. learning from lessons learned in project management, is such a basic process that most of us take it for granted. According to Honey (1993), most people assume it 'just happens.'

This questionnaire has twenty-four paired items designed by Honey (1993) to help assess your effectiveness as a learner from your experiences.

First, please read each pair of statements. Then place a tick ✓ in the box beside the statement that most closely applies to you. If both statements apply then tick the one that most applies to you, however marginal the difference (Honey, 1993<sup>6</sup>).

1a I often find time to review my experiences e.g. lessons learned.	1b I rarely find time to review my experiences.
2a I am the sort of person who volunteers to do things.	2b I believe you should think twice before volunteering.
3a I can describe the stages I need to go through in order to maximise my learning from experience.	3b I undoubtedly learn from experience but cannot describe the process I need to go through to improve the way I do it.
4a I believe that the effort you put into something and the benefits you gain are not necessarily associated.	4b I believe that the more effort you put into something the more you stand to get out of it.
5a I tend to keep my experiences to myself and/or share them with people who are close to me.	5b I tend openly to share my experiences with other project team members and other projects.
6a When things are going well, I tend to leave them alone.	6b When things are going well, I look for ways to make them go even better.
7a A few days after a meeting, I find I can recall the main points of what happened and who said what to whom.	7b A few days after a meeting, I find I can remember the main points but the detail of who said what to whom has faded.
8a I believe that the main thing is to get things done and not too think too much about learning.	8b I believe that everything that happens, good or bad, planned or unplanned, has learning potential.
9a When attending a training session where the situations are artificial, I often find it difficult to identify lessons that apply to work.	9b Even in a training session where situations are artificial, I usually find it easy to identify lessons that I can apply back at work.
10a I believe that you are never too old to learn.	10b I believe that the older you get the more you become set in your ways.

<sup>6</sup> Honey, P. Dr. (1993). *Peter Honey's manual of self-assessment questionnaires*. Auckland: Training Media Services Ltd.

11a	I deliberately put effort into learning from experience.	11b	I learn from experience 'naturally,' i.e. without investing conscious effort.
12a	I find it easy to be spontaneous.	12b	I find it difficult to be spontaneous.
13a	I express my thoughts hesitatingly.	13b	I express my thoughts fluently and precisely.
14a	I am good at asking questions, even when there is a risk to my self-esteem.	14b	I tend not to ask all the questions I want to in order to minimise risk to my self-esteem.
15a	I rarely think about my own self-development needs.	15b	I constantly take stock of my own development needs.
16a	When someone criticises me I feel curious.	16b	When someone criticises me, I feel defensive and/or annoyed.
17a	I tend to wait for feedback to be offered by other people.	17b	I ask for feedback about my performance from other people.
18a	When I am uncertain about what to do to solve a problem or handle a situation, I feel so uneasy that I'm compelled to find an answer quickly.	18b	When I am uncertain about what to do to solve a problem or handle a situation, I like to explore alternatives and weigh the pros and cons of each before deciding what to do.
19a	I find it difficult to translate many of my ideas into feasible actions.	19b	I am good at translating my ideas into feasible actions.
20a	I am fascinated to find out more about myself.	20b	I am not inclined to look into myself too deeply.
21a	When I am in a new, unfamiliar situation, I am able to involve myself in what is happening.	21b	When I am in a new, unfamiliar situation, I tend to hang back and proceed with caution.
22a	I tend to feel guilty about sitting and thinking rather than being active and doing.	22b	I feel okay about sitting and thinking rather than being active and doing.
23a	When my performance is criticised by other people, I ask them questions to clarify what they think I need to do to improve.	23b	When my performance is criticised by other people, I tend to explain and justify why I behaved as I did under the circumstances.
24a	When things keep changing, any feelings of excitement are outweighed by my feelings of insecurity.	24b	When things keep changing, my feelings of apprehension are outweighed by my feelings of excitement.

*Please go to next page*

SCORE KEY

You are now scoring yourself for the self-assessment questionnaire. Please circle or tick the score in the columns that match what you have indicated as your answer on the pervious two pages. Then add each column entering the sum in the box below (subtotal). Next, sum the subtotals for columns ‘A’ and ‘B,’ then ‘C’ and ‘D’ (totals). Finally, go to the next section and interpret your scores.

1a	1	1b	0	2a	1	2b	0
3a	1	3b	0	4a	0	4b	1
5a	0	5b	1	6a	0	6b	1
7a	1	7b	0	8a	0	8b	1
9a	0	9b	1	10a	1	10b	0
11a	1	11b	0	12a	1	12b	0
13a	0	13b	1	14a	1	14b	0
15a	0	15b	1	16a	1	16b	0
17a	0	17b	1	18a	0	18b	1
19a	0	19b	1	20a	1	20b	0
21a	1	21b	0	22a	0	22b	1
23a	1	23b	0	24a	0	24b	1
Subtotal				Subtotal			
Total				Total			

Knowledge and Skills about Learning  
(Maximum score = 12)

Attitudes and Emotions about Learning  
(Maximum score = 12)

INTERPRETATION

The weighting for the scores differ slightly.

Plot your scores onto the chart below.

Knowledge and Skills about Learning	Attitudes and Emotions about Learning	
12 / 11	12	Very High Scores
10 / 9	11 / 10	High Scores
8 / 7 / 6	9	Moderate Scores
5 / 4	8 / 7	Low Scores
3 / 2 / 1 / 0	6 / 5 / 4 / 3 / 2 / 1 / 0	Very Low Scores

The weighting is based on the scores obtained by one hundred and fifty North American and British managers drawn from a cross-section of different organisations and functions (Honey, 1993, 5.18).

Please bring the two scores with you to the interview. I will provide you with notes detailing each paired item. These notes are “thought-starters to generate ideas on what you can do” (Honey, 1993, 5.18). (These ‘notes’ are excluded from the Appendices).

**Thank you for your time to complete this self-assessment questionnaire on effective learning from experience. I look forward to talking about this further with you at the interview.**



## CONFIRMATION INTERVIEW LETTER

Isobelle Gosling  
10 Tui Crescent  
Waikanae

Work Phone +64 4 385 5999  
Work Fax +64 4 385 5898  
E-mail [igosling@wnmeds.ac.nz](mailto:igosling@wnmeds.ac.nz)

26 July 2000

<Address>

Dear X

**Re: Research: The role of organisational memory for learning in project management using lessons learned**

Thank you for volunteering to take part in an interview and to complete a self-assessment questionnaire. As you are aware, the intention of the research is for the partial completion of a Masters thesis at the College of Business, Massey University.

This letter is to formalise that process and provide further information regarding this research project.

Your participation in the interview will:

- Develop and expand the knowledge for effective learning in project management in New Zealand.
- Provide practical ideas to manage lessons learned to enhance personal and project performance and contribute to competitive advantage for the organisation.
- Contribute to the knowledge base in the use of project management principals and practices within the PMBOK framework.

The interview will involve:

- Written consent.
- Approximately one to two hours of your time.
- Participation is voluntary (your choice).

You have the right to:

- Decline to participate.
- Turn the tape recorder off at any stage of the interview.
- Refuse to answer any particular questions.
- Withdrawal from the study at any time.
- Ask any questions about the study at any time during participation.
- Provide information on the understanding that your name will not be used unless you give permission to the researcher.
- Be given access to a summary of the findings of the study when it is concluded.

Other:

- You may receive a copy and make comment or suggestions on the draft version prior to the final report.
- The raw research data is confidential to the researcher and the supervisors.
- The information will be electronically captured and analysed.
- The published information will be aggregated and will be destroyed after six years.
- The results will be available in summary form in 2001 at a PMI branch meeting.

I am looking forward to the interview that we have arranged for Tuesday August 8<sup>th</sup> 2000 at 10 am: Venue: XX.

Thank you. Your support for this research is appreciated.

Yours sincerely

Isobelle Gosling (PMP)

**Contact details:**

Researcher

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Department of Human  
Resource Management  
Private Bag 11 222,  
Palmerston North,  
New Zealand  
Telephone: 64 6 356 9099

## THANK YOU LETTER

10 Tui Crescent,  
Waikanae

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Work E-Mail [igosling@wnmeds.ac.nz](mailto:igosling@wnmeds.ac.nz)  
Home E-Mail [amnz@world-net.co.nz](mailto:amnz@world-net.co.nz)

01/15/01

<Address>

Dear X

**Re Research: The role of organisational memory for learning in project management using lessons learned.**

Thank you for your time and valuable contribution to this research. I will be in contact with you when I have the draft transcript analysis completed. I expect this to be in August, September 2000. Please contact me if there is anything that may be of interest or concern for you.

Thank you. Your support is appreciated.

Sincerely

Isobelle Gosling





## REFUSAL LETTER



Department of Human  
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01/15/01

<Address>

Dear X

**Re Research:** The role of organisational memory for learning in project management using lessons learned

Thank you for your time to complete the questionnaire for the above research. As we discussed on the telephone I said I would get back to you regarding an interview following your leave. I now have enough interviews and I would like to thank you for volunteering. The response from the survey for interviews has been excellent.

However, on request, I would be happy to send you the learning from experience self-assessment questionnaire and the notes that go with the questionnaire for your personal use. Additionally, if you would like to receive a copy of the research results please contact me at +64 4 385 5999 ext. 6147 or [igosling@wnmeds.ac.nz](mailto:igosling@wnmeds.ac.nz).

Your voluntary contribution to this research is very much appreciated. Thank you.

Yours sincerely

Isobelle Gosling

## Appendix III Management

### Ethics application

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#### MASSEY UNIVERSITY HUMAN ETHICS COMMITTEE APPLICATION FOR APPROVAL OF PROPOSED TEACHING/RESEARCH PROCEDURES INVOLVING HUMAN SUBJECTS

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(Abridged version – final approval by peer review Department of Human Resource Management, College of Business).

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#### 1.0 DESCRIPTION

##### Justification

A key challenge for New Zealand businesses using project management is to manage learning and store knowledge for the future. This is imperative if projects are going to be successful to meet or exceed customer satisfaction through balancing e.g., the competing demands of time cost and quality, customer needs and expectations, organisational needs and expectations. An important output of project management is lessons learned. Lessons learned are what are learned from project experience and is the informal knowledge often found in the minds of people. This knowledge becomes new knowledge when organisational members share it. It can become explicit knowledge when it is stored formally in repositories such as computer memory and documents. The informal and formal knowledge makes up the organisational memory, which is both the result of, and an important construct of organisational learning. Organisational learning builds on past knowledge and experience and is broadly the systematic and collective learning by individuals so the organisation can achieve the results it desires. Organisational memory has consequences for the organisation, specifically the effectiveness of the learning and ultimately sustainable competitive advantage. If lessons learned are not preserved, cost, time and quality are eroded through repeating past mistakes, which inhibits continuous improvement in individual and organisational performance. The proposed research asks the broad question: *what is the role of organisational memory for learning in a generative way (creating new knowledge) from lessons learned in a project management environment.*

##### Key Outcome

The better understanding and explanation of the behavioural patterns of formal and informal lessons learned intraproject and interproject, the structure (manifestations) of lessons learned, and where these are stored in organisational memory.

#### 1.2. Objectives

**Overall Objective:** to investigate and explain the role of organisational memory on learning in project management using lessons learned as a focus. Specifically the intention is to explain the relationship between the effectiveness of organisational memory to manage lessons learned and continuous project performance improvement through project learning. Continuous project performance improvement in this context is measured against a successful project defined by the research participants, the learning process cycle, and the Project Management Institute Project Management Body of Knowledge (PMBOK) guide.

##### Research Objectives

1. Identify the demographic and professional background of persons practicing project management.
2. Identify the learning aims or goals for persons who practice project management.
3. Determine the number of respondents that practice lessons learned.
4. Determine the behavioural aspects of lessons learned
5. i.e. the how, why (and why not used), and when
6. What happens with lessons learned once created, and
7. The sharing of a lesson learned interproject, intraproject and intra organisation.
8. Determine effective, non-effective organisational learning strategies that influence project management learning practices.
9. Determine the organisational memory properties and manifestations of lessons learned.

##### The variables in the survey are:

##### Demographic

- Job title, industry type, years working in project management, project management professional (PMP) status, sex, age bracket, ethnic group

##### Organisational learning and project management

- Learning goals when lead a project
- Lesson learned: routine use, why and why not, when based on project phases, what about based on project management knowledge areas, type activities

### **Organisational memory and project management**

- Memory systems and lesson (s) learned: routine acquisition, capture retention, retrieval; access (formal and informal)
- Memory systems and lesson (s) learned: sharing; sharing intraproject, interproject and intra-organisational
- Memory systems and lesson (s) learned: *significantly improved* personal and organisational ability to *manage projects*
- Learning organisation learning screening indicator.

### **Hypothesis**

The greater the use of effective strategies for organisational learning the more likely that project practitioners (directors, managers, leaders, co-ordinators) will report a belief that

- Their personal ability to achieve a successful project has significantly improved at a personal level in the past 12 months, and
- Their organisation's ability to achieve successful projects has significantly improved in the past 12 months.

### **1.3. Procedures for Recruiting Participants and Obtaining Informed Consent**

Recruitment of research participants will take place over three phases:

- The survey
- The self-assessment 'learning from experience' questionnaire, and
- The semi-structured in-depth interviews.

### **PILOT TEST-SURVEY**

#### **Informed Consent**

- Informed consent is implicit with completion and return of the questionnaire to the researcher via a pre-paid stamped addressed envelope.

#### **Recruitment**

- Persons with project management experience who preferably are members of a Project Management Institute (PMI) branch will be personally approached face-to-face by the researcher and asked to complete the questionnaire and feedback sheet.
- Four but no more than six persons will be asked to peer review the questionnaire.
- The target group will be professional colleagues of the researcher.

### **ACTUAL SURVEY**

#### **Informed Consent**

- Informed consent is implicit with completion and return of the questionnaire to the researcher via a pre-paid stamped addressed envelope.

#### **Recruitment**

- Permission to conduct the actual research will be by an informal telephone conversation and e-mail stating the research intentions to the relevant member of the PMI Committee.
- Following this informal communication, a formal letter (on Massey University letterhead) will be sent via post to the committee of a branch of PMI confirming the research intention.
- Following approval from the PMI committee, and subject to MUHEC ethical approval (subsequent HRM Department, Massey University), the researcher will briefly introduce the research at a branch meeting, inviting the PMI members to participate in the survey.
- The self-completion questionnaire will be handed out at the same branch meeting the research announcement is made. Participation is voluntary. A cover letter explaining the survey will be enclosed with each questionnaire. A self-addressed, pre-paid envelope addressed to the researcher will be supplied with each questionnaire.
- An e-mail reminder will be sent along with the PMI branch announcements at two weeks following the handout of the first round of questionnaires.
- A follow up announcement regarding an invitation to participate in the research will be made at the following branch meeting one month later. Again, those members who express a desire to complete the survey, and who were absent at the previous meeting, will be handed out the questionnaire, along with the cover letter and a self-addressed, pre-paid envelope addressed to the researcher.
- An e-mail reminder will be sent along with the PMI branch announcements at two weeks following the handout of the second round of questionnaires.

### **PILOT TEST - SELF-ASSESSMENT 'LEARNING FROM EXPERIENCE' QUESTIONNAIRE & SEMI-STRUCTURED IN-DEPTH INTERVIEW**

#### **Informed Consent**

- Permission to use this questionnaire is by verbal consent from Training Media Services Ltd, Auckland. The estimated time of completion is 6 to 8 minutes. Two persons will be invited to complete the questionnaire.
- The same Consent Form, Information Sheet, and letter of invitation will be used in the pilot test as in the actual interview except for the addition of the words **PILOT TEST** electronically written on these three documents and removed for the actual research.
- Written informed consent will be completed before commencement of the self-assessment 'learning from experience' questionnaire and the interview.

### Recruitment

- Two potential participants will be verbally invited by the researcher to complete the questionnaire and trial the interview questions.
- The purpose is to time the interviews, ensure the questions flow well and are understood by the interviewee. These interviews will not be tape-recorded.
- The interview will be at a time and place convenient for the participants.

### ACTUAL SELF-ASSESSMENT QUESTIONNAIRE & INTERVIEW

#### Informed Consent

- Before completion of the self-assessment 'learning from experience' questionnaire each potential participant will be asked to sign the Consent Form (refer attachment **Consent Form**) in the assumption this person will participate in the semi-structured interview.
  - Signing of the Consent Form will take place before commencement of the self-assessment questionnaire and after the potential research participant has read the Information Sheet, had time to absorb their role in the research, and discuss any concerns with the researcher, and or academic supervisor.
  - The research participants will receive one copy of the signed Consent Form. The researcher will retain the second signed copy.
- The researcher will provide the Consent Form, the Information Sheet and the self-assessment 'learning from experience' questionnaire face-to-face to the participant after the postal distribution of the letter of invitation to participate. The researcher within one working week following the letter of invitation will initiate this process.
- At the time of the interview but before commencement, the researcher will state verbally that participation is entirely voluntary; the participant will have control of the tape recorder, may decline to answer any questions, and may withdrawal from the research at any time.

#### Recruitment

- Potential participants are persons who have:
  - Completed the questionnaire.
  - Scored five or more points in the screening criteria in Section Four, Lessons Learned and Learning Opportunities, of the questionnaire. The screening criteria reflect some characteristics of a 'learning organisation' derived from Peter Honey's manual of self-assessment questionnaires (Honey, 1993); i.e. a score with five or more points indicates an organisation characteristic of organisational learning. The person who volunteers to participate in a semi-structured interview is a person who practices project management (assumed through membership of PMI and completion of the survey, and who works in an environment characteristic of a 'learning organisation').
  - Indicated 'yes' to participate in Q. 27 of the survey questionnaire.
  - Noted their name, telephone number, and or e-mail address for the researcher to contact them.
- Three but no more than five potential participants will be invited by the researcher to participate in the semi-structured in-depth interview.
- Where the situation arises that there be more than five potential participants, systematic selection will be based on the five highest scores indicated in Section Four (learning organisation characteristics) of the questionnaire.
  - A letter will be sent via e-mail attachment or postal address (where no e-mail address is provided) to those persons who are not participating due to more persons volunteering than required.
- Where the situation arises that there are no potential participants, a review of the results of Section Four of the questionnaires will take place. The objective will be to systematically select those respondents with the highest scores, and who have left a contact number.
  - A letter will be sent to those persons inviting them to participate in the in-depth interview. The same procedure for recruitment is outlined as follows.
- Following an expression of interest to participate, contact by the researcher will be by a formal letter of invitation on Massey University letterhead.
- Within one working week following the letter of invitation to participate the researcher will arrange a face-to-face meeting with the potential participant to build rapport, provide the Consent Form, the Information Sheet and the self-assessment 'learning from experience' questionnaire.
- Within three working days following the face-to-face receipt of the Consent Form, the Information Sheet, and the self-assessment 'learning from experience' questionnaire, the researcher will telephone the research participant to set up an appointment time and date. The intention is to complete signing of the Consent Form, discuss any potential issues the research participant may have and arrange a further date, time and venue to conduct the semi-structured in-depth interview.
- The participant will be invited to complete the self-assessment 'learning from experience' questionnaire between the time of this meeting and the interview. The interview will take place as soon as feasible following the second meeting at a venue, time and place convenient for the participant.

#### 1.4. Procedure in which Research Participants will be involved



- **Pilot Questionnaire:** self-completion and return of the questionnaire by pre-paid envelope.
- **Actual Survey:** self-completion and return of the questionnaire by pre-paid envelope. The decision to participate in the semi-structured in-depth interview. The participant will indicate their intention by writing their name on the pre-determined place on the questionnaire and return of the questionnaire to the researcher by pre-paid post.
- **Pilot self-assessment 'learning from experience' questionnaire:** After trial by the researcher, two persons will be invited to complete the questionnaire and provide verbal feedback on their experience to the researcher.
- **Pilot semi-structured in-depth interview:** The same two persons who voluntarily completed the self-assessment questionnaire will be invited to participate in the interview. The researcher will note their feedback on wording, understanding, and experience of the interview. The researcher will derive further feedback through self-observation and intuition based on a strong background in research interviewing.
- **Actual self-assessment 'learning from experience' questionnaire:** Self-completion and summing of scores, which will take approximately 6 to 8 minutes. The participant is invited to note the score and bring that score to the semi-structured interview.
- **Actual semi-structured in-depth interview:**
  - Dialogue about the *self-assessment 'learning from experience' questionnaire*. The participants will have the choice to receive notes about learning from experience derived from Honey (1993).
  - The interview will be audio taped.
  - Using a semi-structured interview guide, the participant will be interviewed about their experience with lessons learned through 'story telling' in an open manner. The questions will be based around the
    - Effective, non-effective organisational learning strategies that influence project management learning practices, and
    - The organisational memory properties and manifestations of lessons learned.

#### 1.5. Procedures for handling information and material produced in the course of the research including raw data and final research report(s)

- The questionnaires will be coded and electronically captured into Microsoft Access, Microsoft Excel and, or Nud\*ist, and Statistical Package for Social Sciences (SPSS). No personal or organisational names will be recorded as part of the data set.
- The researcher will self-transcribe the tapes into a computer file.
- The computer files and audiotapes will be available exclusively to the researcher and the research supervisor.
- The respondents will be invited to comment if they wish the audiotapes to be destroyed at the completion of the research on the Consent Form.
- The draft version of the transcriptions will be made available to the research participant for comment prior to the final report.
- A summary of the results will be made available to all research participants.

### 2.0 ETHICAL CONCERNS

#### 2.1 Access to Participants

- Initial access is through the PMI Branch Committee. Members of a PMI branch will have the research explained verbally at a monthly branch meeting and be invited to participate. The researcher is a member of the International Project Management Institute and a PMI branch.

#### 2.2. Informed Consent

- Along with the *Information Sheet* and *Consent Form*, the researcher will provide additional verbal information to address the needs of the individual participant.
- At all phases of the research project the research participants are free to decide to retract consent and, or withdrawal from the study at any time.
- The name and contact details of the researcher and academic research supervisors will be available at all times documented on the *Information Sheet*.

#### 2.3. Anonymity and Confidentiality

- **Anonymity:** The raw research data will be numerically coded and referred to as such. Any names and contact details of participants provided to the researcher for research purposes will not be captured. Anonymity of other respondents is through absence of contact details. Participation is on an individual basis.
- **Confidentiality:** The raw research material will be available only to the researcher and the academic supervisors.
  - All research documents will be stored in a secure filing cabinet and a computer using a password.
  - The Consent Form and the questionnaire will be stored in separate files.
  - The researcher will maintain confidentiality at all stages of the research to not reveal personal or organisational identities of research participants.
  - Any contact details i.e. e-mail addresses; telephone numbers, mailing addresses will be destroyed by the researcher following completion of the research project.

- The audiotapes will be destroyed at the completion of the research project at the request of the participants noted on the Consent Form.

#### **2.4. Potential Harm to Participants**

- The research is not expected to cause physical or psychological harm to the participants. The sharing of insights into learning from experience with the researcher is expected to be insightful and positive for the participants.
- Where the researcher or any other participant perceives that psychological harm may eventuate e.g. embarrassment or worry, then that person (s) has the right to withdrawal from the study. In such an event, an appropriate person e.g. the research supervisor will be asked to follow-up such a concern with the participant (s).
- A pilot phase will ensure the research is appropriate for the research participants and meet the research objectives.

#### **2.5. Potential Harm to Researcher (s)**

- The research will be conducted with professional persons.
- A project plan will ensure appropriate planning of resources i.e. time, cost and person (myself) are able to complete the thesis within one academic year.

#### **2.6. Potential Harm to the University**

- The research project is conducted under academic supervision with all stages of the research subject to academic approval by the supervisor.

#### **2.7. Participant's Right to Decline to Take Part**

- At any stage of the research, the respondents, regardless of written consent, will have the right to retract from that consent and not participate.

#### **2.8. Uses of the Information**

- The information will be made available to the academic community and the Project Management Institute e.g. as a basis for further research, and for practical application in the form of recommendations for managing lessons learned in project management.

#### **2.9. Conflict of Interest/Conflict of Roles**

- My research role at PMI is believed in no way to conflict with my membership of PMI or any voluntary activities that I may be involved in at PMI or related service organisations. To the contrary, professional development as a Project Management Professional (PMP) is encouraged to maintain status as a PMP, as is research in project management to build knowledge and promote best practice that may be evaluated by members of the PMI on a global scale.
- My professional role at the Wellington School of Medicine is believed in no way to conflict with my role as a research student. My workplace is aware of my student position and supports this role in terms of work flexibility.

#### **2.10. Other Ethical Concerns**

- It is believed there are no other ethical concerns that may arise from this research.

### **3.0 LEGAL CONCERNS**

#### **3.1. Legislation**

3.1.1. Intellectual Property legislation e.g. Copyright Act 1994

3.1.2. Human Rights Act 1993

3.1.3. Privacy Act 1993

The original data of any published material will be kept 6 years and stored securely.

3.1.4. Health and Safety in Employment Act 1992

3.1.5. Accident Rehabilitation Compensation Insurance Act 1992

3.1.6. Employment Contracts Act 1991

#### **3.2 Other Legal Issues**

- It is believed there are no other legal concerns that may arise from this research.

### **4.0 CULTURAL CONCERNS**

- The research will be conducted in a culturally diverse settings i.e. participants are expected to reflect the ethnically diverse New Zealand community.
- The research will be conducted under the principles of the Treaty of Waitangi in terms of consultation and partnership where this may arise in the course of the research.

### **5.0 OTHER ETHICAL BODIES RELEVANT TO THIS RESEARCH**

#### **5.1. Ethics Committees**

- This application will be referred to no other ethic committees.

#### **5.2. Professional Codes**

- As a member of the New Zealand Project Management Institute I am obliged to work within the *Project Management Professional Code of Conduct*: Project Management Institute (USA, 1999).

### **6.0 OTHER RELEVANT ISSUES** The research will be self-funded.



## Pilot test report

### The role of organisational memory for learning in project management using lessons learned

This report presents the findings of the pilot test for the survey and interview conducted in March and April 2000. It consists of the objectives, background, response rate, results, discussion, and conclusion. The appendix contains the raw comments made by the respondents; Contact Summary Sheet, Excel, and SPSS data capture design examples, revised Questionnaires and Interview Guide. For the purpose of this appendix, the changes to the questionnaire are noted here from the original, with the final version noted in Appendix I (the full original questionnaire is not reproduced).

#### Objectives

The overall objective of the pilot test was to:

##### Questionnaire:

- Determine the average time taken to complete the questionnaire to derive an approximate time for the actual survey.
- Gain feedback on the:
  - Clarity of instructions.
  - Clarity of wording.
  - Ease to complete.
- Gain feedback on other respondent issues.

##### Interview:

- Determine the time taken for the respondent to complete the self-assessment questionnaire.
- Determine the time frame to conduct the interview.
- Gain feedback on the clarity of instructions and wording of the self-assessment questionnaire.
- Gain feedback on other respondent issues.

The intention is research that boosts the response rate, enhances validity and reliability through response accuracy, completion, and reduces respondent load in terms of time.

#### Background

##### Questionnaire

Six persons were invited to participate in the pilot test. The criteria were voluntary participation and familiarity with project management principles and practices. Each person was asked a second time either in person, by telephone, or e-mail to confirm his or her intention. All appeared willing and happy to participate. Where applicable each respondent was provided with an addressed and stamped envelope. A feedback sheet was attached to the front of each questionnaire for respondent comment.

The review involved:

- Sequentially coding each questionnaire on receipt from the respondent.
- Reading and checking each questionnaire for completion of all items.
- Electronically documenting verbatim all comments.
- Analysing and categorising the comments by colour computer code against the pilot test objectives.
- Grouping by theme the comments and determining any patterns.
- Determining against the research objectives and the literature the necessity for any changes in the questionnaire format and words. It was not the intention to change the content or meaning of the questionnaire but enhance the probability of accurate and full completion.
- Making changes methodically and documenting the changes.
- Capturing the data into Excel to determine codes and error.
- Transferring the data to SPSS to determine codes, labels, and error.
- Running some basic descriptive statistics in SPSS to get a feel for the data.

##### Interview

One person was approached to trial the interview. It involved:

- Reading of the Information Sheet and signing of the Consent Form.
- Respondent completion of the self-assessment questionnaire.
- One face-to-face interview.
- Post interview documentation of comments on site through dialogue.
- Off-site completion of field notes on the Contact Summary Sheet.

Both phases of the pilot test were documented in the progress report to supervisor (not included).

### Response Rate

The response rate for the questionnaire was 100% (6/6). An e-mail reminder was sent to two persons who delayed the return of the pilot test. The person who was invited to pilot test the interview did so. Although several persons were informally approached, only one person agreed to be interviewed owing to persons actually 'sparing' the time.

### Results

#### Participants

All six persons in the pilot test survey practiced project management. Three worked in management occupations, while the remaining three worked in professional occupations as classified according to the New Zealand Standard Classification of Occupations (NZSCO95). The respondents worked in the insurance, business, health, and service industries. All were male, had an average of six to ten years' experience in project management, with half stating that project management was not a career goal.

Half produced lessons learned as a routine project management activity, however when asked if lessons learned were stored in their heads, all said 'all of the time' or 'very often.' Four said the acquisition of lessons learned was sometimes or 'hardly ever' a routine activity. Nevertheless, all shared lessons learned with four sharing lessons learned within and between projects. Three agreed that using lessons learned significantly improved their personal ability to achieve project success in the past 12 months, while the other three were uncertain. Only one respondent agreed that using lessons learned significantly improved their organisation's ability to achieve project success in the past 12 months, while three were uncertain and two disagreed.

The mean score for the screening criteria was 4.5 with the minimum being '1' while the maximum being '8.' The results of the organisational learning score indicated that three participants would have been eligible for an interview, although none volunteered (this was not the intention of the pilot test).

The one person who participated in the interview practiced project management as part of a general management role in the health sector. The interviewee was female with ten years management experience. The interview was conducted in their home. An audiotape was not used with the researcher taking brief notes at the conclusion of the interview when asking about how 'things could have been done differently to improve the interview process.'

Two of the seven participants were members of the Project Management Institute (PMI), while the others were not. To avoid respondent burden, it was the intention not to target members of the PMI. Overall these characteristics provide a profile of those participants in the pilot test. This profile provides an indication of their ability and knowledge to complete the questionnaire and respond to the interview questions in a robust way.

#### Questionnaire

- Five of the six respondents completed all 40 items. One respondent missed two items (Q.9 on learning goals, and Q.15 on activities measured against expectations). This respondent completed the questionnaire in the shortest time and had not heard of lessons learned).
- The average time was 14.8 minutes (74 minutes/5 persons). One respondent did not note their time.
- Most said the clarity of instructions, wording and ease of completion was fine, although one respondent made several comments regarding the clarity of wording.
- Three respondents were concerned about sections three and four in terms of ease of completion and wording.
- Two respondents were concerned about the survey written in the first person.

#### Interview

All questions on the interview guide were asked in the interview. The completion of the self-assessment questionnaire took 20 minutes (including review), and the interview was completed in one hour. The key issues were

##### Self-assessment questionnaire:

- Wording that was ambiguous in Q. 4A / 4B and 7A / 7B.
- Instructions to complete the score were hard to follow.
- The table format for summarising the scores was unclear.

##### Interview:

- The use of cues and leading questions that would bias the results towards answers desired by the researcher (interviewee).
- Too much wording on interview guide, which inhibited flow (interviewer).

## Discussion

Overall, the six questionnaires were accurately completed with responses relevant to the research objectives. The interview went well in terms of time, and the questions appeared to be understood by the interviewee. The use of an audiotape for the actual interviews is essential as it was found that close listening was required to pick up on responses that would flow into the next question. There would have been no time to take notes without severely disrupting the flow of dialogue.

## Time

It is estimated that the questionnaire for the actual survey will take between 10 and 15 minutes to complete. The experience of conducting the pilot interview boosts confidence that there will not be the risk of excess respondent burden for the interviewee if the interview stays focused.

## Clarity of instructions – questionnaire

Overall the clarity of instructions was mentioned as “fine.” Two respondents were concerned that the instructions were in the first person and were contextual, for example “should you be asking the question in first person, and not sure by the organisation or me.” The decision is to retain the first person. The aim is to survey individual’s perceptions and not that of the organisation.

## Clarity of wording – questionnaire

Two said the clarity of wording was “fine or very good.” One respondent made the majority of comments, and included adding other categories, for example:

- Industry categories were not always agreed with or understood (“has typical international flavour-I always struggle to find a clear picture for NZ Science”).
- Indecision whether project management is a career goal.
- Age groups were not detailed enough for “building experience gradually.”
- Replacing the word ‘sex’ with ‘gender,’ and replacing ‘does not apply’ with “I don’t produce a lesson learned” (Q. 13, 14, 15).
- The wording in Q. 15 with the respondent suggesting, “any time an activity does not meet expectations” (implies a misunderstanding of this question).
- PMBOK acronym, the words ‘organisation,’ ‘acquisition,’ and ‘environment’ not understood.
- Page 7 “needs more work to make it more friendly to read.”

## As a result, the following changes have being made:

- Q. 2: The words “Based on The Australian New Zealand Standard Industrial Classification 1996, New Zealand Use-level one (ANZSIC96)” is added.
- Q. 5: the choice ‘unsure’ is added.
- Q. 7: ages regrouped: changed

Q. 7 FROM	Q. 7 TO
Aged 19 years of age or less	Aged 19 years of age or less
20 – 29 years	20 - 25 years
30 – 39 years	26 - 29 years
40 - 49 years	30 - 35 years
50 - 59 years	36 - 40 years
Aged 60 or more years	41 - 45 years
	46 - 50 years
	51 - 55 years
	Aged 55 or more years

- Q.6: the word ‘sex’ is retained as it implies biological male/female while gender is a socially constructed concept (Statistics New Zealand).
- Q.13, 14: the words ‘does not apply’ changed to *I don’t produce a lesson learned*. This is more in line with the context of the survey.
- Q.15: the wording is changed to promote understanding and ease of completion **FROM**

Q. 15. What type of activities do you produce a lesson learned about? Please tick <u>one</u> box that most applies to you. 1 - 6	Activities that meet expectations all of the time Activities that meet expectations very often Activities that meet expectations often Activities that meet expectations sometimes Activities that meet expectations hardly ever Does not apply
---	--

**TO**

<b>Q. 15.</b> How often do you produce a lesson learned measured against expectations? Please tick <u>one</u> that most applies to you. 1 - 5	Activities that meet expectations Very often Often Sometimes Rarely Never
---	--

- Q.27: PMBOK written in full i.e. (Project Management Book of Knowledge - PMBOK).
- Page 7 wording now reads If you scored five (5) or more points then I would like to invite you to take part in an interview in the very near future (year 2000). This will involve one but no longer than two hours of your time. Before the interview, I will ask you to complete a self-assessment questionnaire on 'learning from experience.' The interview is based on the ways learning takes place that influences project management practice, and where and in what format lessons learned are stored.
  - I will not need to examine any organisational documents.
  - The interview will be at a time and place convenient for you.
  - I will ask you for written consent before the interview.
  - The draft results will be available to you for any suggestion and comment before the final thesis report is completed.
  - The research is conducted in the strictest confidence and no identifying names or reference will be made to you in any report.

### Ease to complete – questionnaire

Four respondents mentioned the ease to complete the questionnaire was *fine* with one respondent appreciating that it was *good-not to lengthy*. Three respondents mentioned issues with Sections three and four. These were the scoring system, numbering, and layout. One mentioned it was easier to *tick a scale than write a number*, when referring to section three. Other issues were lines to close, and typos on pages three and seven.

To ease completion the following questionnaire changes were made:

- The scale layout was not changed (Section three). The writing of a number chosen from a scale list promotes accuracy forcing the respondent to think about their choice.
- The numbering in section four was changed from A, B, C etc to 1A-1B, 2A-2B.
- The scoring table on page seven was changed accordingly.
- The typos were corrected.

### Self-assessment questionnaire

The main changes were abbreviation of the wording and shifting 'personal satisfaction working in project management' and 'sustainability of organisational learning' to the closure questions. These did not flow well in the section on the effectiveness / non-effectiveness organisational learning strategies.

### Interview

The main change is a more conscious effort not to lead the interviewee during the interview.

### Conclusion

The pilot test enhances transparency in the research process by seeking feedback from persons familiar with project management principles and practice. The comments made are considered invaluable to promote reliability and validity of the results. They also represent a consultation process where the expertise of persons consulted benefits the overall credibility of the research. The changes are believed to enhance the robustness of the research project.

### Appendices

#### Raw data comments

<b>Coding:</b> a. Respondent one b. Respondent two c. Respondent three d. Respondent four e. Respondent five f. Respondent six	<b>Colour coded themes</b> Clarity of instructions [yellow] Clarity of wording [dark pink] Ease of completion [green] Time [blue]
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#### Time:

- a. No time noted (rich relevant comments)
- b. 7 minutes (full response, minimal comments);

- c. 15 (full response, rich comments);
- d. 25 (full response, rich and detailed comments);
- e. 12 (full response, rich comments)
- f. 15 (full response, rich comments)

#### **Clarity of instructions:**

- a. First a minor: in sections 3 & 4 – should you be asking the question in 1<sup>st</sup> person?
- b. See comments→
- c. Good-no problems
- d. Very good
- e. Fine
- f. Page 6. Section Four: 'log' not clear perhaps should be marked as 1A – B etc

#### **Clarity of wording:**

- a. Fine
- b. See comments→
- c. Q.2 has typical international flavour-I always struggle to find a clear picture for NZ Science
- d. Very good
- e. OK but definition of lessons learned may have added to precision
- f. No comment

#### **Ease to complete:**

- a. Good-not too lengthy also
- b. Fine
- c. Section Four would be a little clearer if set out as
  - 1. (a) (b) rather than continuous "numbering" from A-R
  - 2 (a) (b) this would entail some consequential changes in your summary. I struggled a little with your use of "encourage/discourage: in section four-that implies an active process, whereas it happens more through unwritten/unspoken "culture"
- d. Very good
- e. Fine but no shaded 'box' Q. 28
- f. No comment

#### **Other respondent comments:**

- a. I liked the scoring in section 4.
- b. Good luck with this! A lot of questions are contextual & I didn't know if you meant me or generally
- c. I've been working awhile in project management methodology for the organisation, which has an objective redressing the sorts of issues raised in your questionnaire. Couple of typos on back page Cheers XX
- d. None made
- e. Results in light of difference between organisational culture & my own views!!!!
- f. Top of page 7 could be clearer

#### **Examination of questionnaire**

##### **a. Every item completed**

- Q.2 respondent added another category;
- Q. 11 & 12 completed both (? My comments Did not follow instructions or simply chose to respond to both – respondent's organisation going through implementation of a knowledge management process);
- Scored 7/9 but volunteered NOT to participate in interview "can't afford the time."

##### **b. Every item completed: Comments are extensive and are:**

- Q.2 respondent added additional categories
- Q. 5 added 'undecided' asking about career goal to continue working in PM
- Q.6 replace 'sex' with 'gender'
- Q.7 noted age group mistake (missing 20 years)
- Q.8 questioned the words 'identify with' and added other ethnic categories
- Q.9 Using the word 'your' implies 'me' i.e. personal
- Q.10 as for Q.9 i.e. produce lessons learned "but not for me but for the process and organisation."
- Q.13 "confused: do you mean when do I produce an actual lesson learned, or when do I set up the 'lesson learned collection process?' The words "Does not apply" suggested to "I don't produce a lesson learned."
- Q.14 the words "Does not apply." suggested to "I don't produce a lesson learned." In addition added one category "any issue that has caused a problem."
- Q.15 the words "Does not apply." suggested to "I don't produce a lesson learned. In addition added one category "any time an activity does not meet expectations."
- Q.16 the word 'acquisition' suggested 'gathering'
- Q.22 again not sure by "me or the organisation"
- Q. 26-27 suggested wording change in scale from 'uncertain' to "neutral"
- General – spacing for lines to small adjusted to font '12'
- Section Three: "easier to tick a scale than write a number":



- PMBOK – queried acronym
- Section Four: “you need to define ‘organisation’ & ‘environment’ for the respondent (organisation =? My clinical group or my service): poor layout – use two columns instead of three)” when referring to self-assessment table in Section Four.
- P. 7 needs more work to make it more friendly to read
- Scored 5/9
- c. Every item completed**
- Scored 4/9
- d. Two items not completed**
- Q. 12 a good question-I should. “The concept has never been introduced by my peers.” (On talking about lessons learned).
- Scored 2/9
- e. Every item completed**
- Scored 1/9
- f. Every item completed**
- Scored 8/9

### Data capture - examples

The image shows two screenshots of data capture interfaces. The top screenshot is a Microsoft Excel spreadsheet titled 'Data capture\PM\_quest' with a 'Demographic' dialog box open. The dialog box contains fields for Quest Num, Job Title, Job Code, Industry, Yrs PM, PMP Stat, Career, Sex, Age, and Ethnicity. The bottom screenshot is an SPSS for Windows window titled 'SPSS for Windows - [c:\my documents\pmquest.sav]'. It displays a data table with columns: ques\_num, job\_titl, industry, years\_pm, pmp\_stat, career, sex, and age\_or.

ques_num	job_titl	industry	years_pm	pmp_stat	career	sex	age_or
1	1	2	12	3	1	1	0
2	2	1	15	3	0	2	0
3	3	1	17	2	0	0	0
4	4	2	15	2	0	0	0
5	5	2	15	4	0	1	0
6	6	1	11	2	1	0	0



## Project plan



<b>Prepared by</b>	Isobelle Gosling
<b>Date Issued</b>	16 January 2000
<b>Revised</b>	06/02/00; 16/02/00; Final revisions 02/12/00, 16/12/00
<b>Project Name</b>	<b>The role of organisational memory for learning in project management using lessons learned.</b>

### Project Scope

<b>Project Objective</b>	<ul style="list-style-type: none"> <li>To conduct a three-stage research project for a thesis (114.899) to complete the partial fulfilment of the requirements of the Master of Business Studies in Human Resource Management, College of Business, Massey University.</li> <li>Start date 20/09/1999</li> <li>End date 31/01/2001</li> </ul>
<b>Project Stakeholders</b>	<ul style="list-style-type: none"> <li>Branch - Project Management Institute New Zealand (PMINZ)</li> <li>Project management practitioners</li> <li>Academic supervisors: Phil Ramsey (Peter Mellalieu withdrew).</li> <li>Work</li> <li>Family</li> </ul>
<b>Stakeholder Needs</b>	<ul style="list-style-type: none"> <li><b>Supervisor:</b> a mutually consultative academic student relationship</li> <li><b>Potential respondents:</b> consultation and feedback that is timely, appropriate and addresses ethical principles</li> <li><b>Work:</b> Full time project manager and clinical researcher</li> <li><b>Family:</b> a parent</li> </ul>
<b>Stakeholder Requirements</b>	<ul style="list-style-type: none"> <li><b>Supervisors:</b> a thesis that achieves excellence</li> <li><b>Potential research:</b> research conducted using the principles of informed consent, confidentiality, minimises harm, is truthful, socially sensitive and professional</li> <li><b>Work:</b> project management and clinical research</li> <li><b>Family:</b> a balanced parent</li> </ul>
<b>Final Deliverable</b>	<ul style="list-style-type: none"> <li>A research thesis (114.899) bound and completed by 31<sup>st</sup> January 2001</li> </ul>
<b>Project Cycle Stage</b>	<ul style="list-style-type: none"> <li>Start at stage one (Initiation &amp; Feasibility) and end at stage four (Report &amp; Closure).</li> </ul>
<b>Stakeholder Criteria for Acceptance</b>	<ul style="list-style-type: none"> <li><b>Supervisor:</b> academic excellence</li> <li><b>Potential research:</b> research that meets the level of Masters thesis, standards of scientific competence and integrity at all stages of the research process</li> </ul>

### Project Interim Deliverables

Interim Deliverable	Review	Approval	Reason to ensure
Massey HRM Department Acceptance	Academic Standard	Supervisor	Thesis can proceed
Acceptance Research Proposal	Academic Standard	Supervisor	Research design robust
Acceptance Draft Literature Review	Academic Standard	Supervisor	The research is in context and the literature is central to the proposed research
Acceptance Project Plan	Academic Standard	Supervisor	The stakeholder expectations are clarified and to limit the project
Acceptance Ethics Application	Ethics Principles –	Supervisor	Research protects the participants, university and the researcher
Survey & Interview data Field Collection	In-line with stakeholder expectations	Supervisor	On time as agreed to by stakeholders
Acceptance Data Analysis	Academic Standard	Supervisor	Robustness and relevance
Acceptance Thesis	Academic Standard	Supervisor	Academically excellent
Project Closure	Supervisors	Supervisor	Project is complete to needs & requirements

Project Milestones		
<ul style="list-style-type: none"><li>▪ Initiation phase</li><li>▪ Massey HRM Department acceptance</li><li>▪ Acceptance research proposal</li><li>▪ Acceptance project plan</li><li>▪ Acceptance ethics application</li><li>▪ Survey in field (main survey)</li><li>▪ Interviews in field</li><li>▪ Acceptance data analysis</li><li>▪ Acceptance final draft thesis</li><li>▪ Bind thesis</li><li>▪ Project closure (to Massey University Registry)</li></ul>	<ul style="list-style-type: none"><li>▪ 20/09/99</li><li>▪ 31/10/99</li><li>▪ 31/01/00</li><li>▪ 31/01/00</li><li>▪ 18/02/00</li><li>▪ 15/05/00</li><li>▪ 26/06/00</li><li>▪ 10/11/00</li><li>▪ 15/12/00</li><li>▪ 15/01/00</li><li>▪ 31/01/00</li></ul>	<ul style="list-style-type: none"><li>▪ Met</li><li>▪ Met</li><li>▪ Partially met</li><li>▪ Assumed</li><li>▪ Delayed</li><li>▪ Met</li><li>▪ Met</li><li>▪ Partially met</li><li>▪ Met</li><li>▪ Met</li><li>▪ Met</li></ul>
Project Priorities		
<ul style="list-style-type: none"><li>▪ Monitor plan against task completion fortnightly</li><li>▪ Monitor costs against budget monthly</li></ul>		
Project Constraints		
<ul style="list-style-type: none"><li>▪ Solo researcher</li><li>▪ Limited budget</li><li>▪ Fulltime work and family commitments</li></ul>		
Project Risk		
Risk Factor	Risk Level (High, Medium, Low)	Contingency Plan
<b>Project:</b> participant access	Medium	<ul style="list-style-type: none"><li>▪ Consultation with PMINZ</li></ul>
<b>Project:</b> interim and final deliverables completed on time, are robust and of an excellent standard	Low	<ul style="list-style-type: none"><li>▪ Consultation with supervisor</li><li>▪ Consultation with work</li></ul>
<b>Personal &amp; Psychological:</b> stress triggers with family, work and community service commitments	Low	<ul style="list-style-type: none"><li>▪ Dialogue with son (also studying)</li><li>▪ Consultation with work to negotiate increased flexibility in working hours</li><li>▪ Apply for leave from women's service group</li></ul>
<b>Physical:</b> fitness maintained	Low	<ul style="list-style-type: none"><li>▪ Self reminder to keep fit</li></ul>
<b>Financial:</b> administrative costs may overrun within projected budget	Low	<ul style="list-style-type: none"><li>▪ Consultation with supervisor</li></ul>
Project Resources		
<b>Personal</b>	Solo research project with input and academic support from one supervisor	
<b>Financial</b>	Self funded	
<b>Physical</b>	Fieldwork conducted in an organisational setting with administration done at home of researcher	
PROJECT MANAGEMENT – LESSONS LEARNED - ORGANISATIONAL MEMORY		
Research		
<p>In the year 2000, I am inviting members of a PMI branch to participate in a survey. As well, I hope to interview three or four PMI members. The objective is to determine the role of organisational memory for learning in a generative way (creating new knowledge) from lessons learned in a project management environment. Lessons learned are a catchall phrase from what we learn from experience (Juran, 1988). The purpose of the research is to complete a Masters thesis in Human Resource Management at the College of Business, Massey University.</p> <p>This survey is based at the XX branch. If you would like to know more about this research please contact Isobelle Gosling at <a href="mailto:igosling@wnmeds.ac.nz">igosling@wnmeds.ac.nz</a> or telephone +64 4 385 5999 ext. 6147. I look forward to your support and thank you for this opportunity.</p>		
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<b>Resource</b> (estimates)	<b>Exp. Hrs.</b>	<b>Actual Hours</b>	<b>Rate</b>	<b>Exp Cost</b>	<b>Actual Cost</b>	<b>Variance</b>
<b>Initiation / Feasibility - Phase I</b>						
Massey University Fee				1570	1570	0
Hours	5	5	25	125	125	0
<b>Planning &amp; Design - Phase II</b>						
Hours	750	700	25	18750	17500	1250
Materials				100	134	-34
<b>Research Execution - Phase III</b>						
Hours	510	400	25	12750	10000	2750
Materials				150	150	0
<b>Conclusions &amp; Report - Phase IV</b>						
Hours	562	800	25	14050	20000	-5950
Materials (binding = \$47 per copy, paper = \$31 per ream)				100	296	-196
<b>TOTAL</b>	<b>1827</b>	<b>1905</b>		<b>46025</b>	<b>48205</b>	<b>-2180</b>
<b>TOTAL MATERIALS (\$)</b>					<b>2150</b>	<b>-230</b>
<b>TOTAL HOURS</b>		<b>1905</b>				<b>-78</b>
Academic Year = 36 weeks @ 12.5 hours per week = 450HRS*4=1800HRS exp Time unpaid (self-funded project)						
Actual time per week average estimated @ 67 wks (Oct99-Jan21) equates to 28 hrs per wk						
Time allocation according to days estimated in timeline						

[illegible]

<b>Project Review (Lessons learned derived from learning log)</b>		
<b>What went well</b>	<b>What happened</b>	<b>Comment</b>
Overall learning	Academically, professionally (and technically) the learning is huge and totally beneficial.	The thesis process is a huge learning curve even with a background as a researcher. Much time spent on self-learning through reading and doing. I would have liked to have had some postgraduate guidelines e.g., the thesis process, where to go for operational support, tips, Massey contacts (much is assumed).
Project plan (milestones, risk factors)	Project plan actioned as embedded professional practice. Milestones met except ethics (refer below). No major risk issues. PMI championed research – very supportive.	Gantt chart guided progress-useful reference tool. A plan is a key tool to refer to, assess progress, document, and clarify initial intentions. Decision to withdrawal from voluntary work successful, as was flexibility in work hours necessary to complete thesis work.
Pilot test	Very satisfying process to learn the research meets the needs for what it was intended.	Absolutely and necessary process in all research (as is ethics application). Almost requires doing before ethics application to polish actual research processes.
Learning log	Diary kept of work on a weekly basis completed usually after 2-3 days straight work on thesis.	Very beneficial to release frustrations, reflect on progress, mull over uncertainties and refer to for change in processes – the why and how (a personal log of 'growth').
<b>What did not go well</b>	<b>What happened</b>	<b>Comment</b>
Technological issues	Two computer failures and one printer issue meant purchase of a new computer and toner.	Very expensive and not considered part of costs (general overhead cost and unavoidable). Always backup (no major work lost, except time).
Ethics application	Rejected first application owing to perception of uncertainty over survey anonymity of electronic distribution. An operational issue that was in negotiation with PMI at the time. A challenging process.	Supervisor consulted by MUHEC. Application peer reviewed by HRM department. Suggest a closer consultation with supervisor and although extensive MUHEC guidelines provided, the application is open to variant interpretation; suggest tighter template.
Literature review	Found this a difficult process with prolific literature.	Suggest writing up core findings from previous research separately for each concept and design of research tools. Requires many rewrites. Decide ground rules first, e.g., grammar, format, and build around research objectives.
Questionnaire	Decision to place demographic questions at front, which included ethnicity (one respondent refusal). Eliminated 'planning' phase from Q. 13 even missed at pilot when checked by PMPs.	Place demographic questions at end of questionnaire and consider carefully whether ethnicity is required as this question is sensitive. Ensure all elements are included in questionnaire as elements can easily be eliminated even with a pilot test. Suggest a face-to-face review of questionnaire with expert (s).
Editing	Ongoing editing and proofing.	Beg, borrow or steal some ones time. I did ask people but it is a big 'ask' when everybody is very busy. Suggest voluntary or paid follow postgraduates who may like to share editing process of major academic work!



## On the job learning: building human capability for competitive advantage<sup>i</sup>

Isobelle Gosling PMP

### Abstract

Twenty first-century projects function within a globally and nationally competitive marketplace characterised by a continuous stream of new knowledge. Project management practitioners can capitalise on this new knowledge and gain a unique, hard to imitate, competitive advantage for their organisations. Broadly, two types of knowledge exist. First is the explicit knowledge or the 'know why' found in, for example, training to deliver skills. Second is the tacit, hard to imitate new knowledge, or the 'know how,' commonly referred to in project management as lessons learned.

Lessons learned are the successes and failures learnt from experience. The greatest potential of lessons learned is to share them at the individual, team, organisational and inter-organisational levels, (inter-organisational where competitive advantage is not challenged). Enhancement of individual task performance leads to successful project performance and ultimately effective organisational performance. A popular model to manage new knowledge is organisational learning, or the capability to do something better than others. Competent organisational learning is effective and productive when embedded in humans and technology. When the experiential learning is continuously renewed and shared, some of the cited benefits include not repeating past mistakes, management support to maintain strategic direction over time, building and support of a project learning environment, and provision of diverse repositories for future reference.

Capturing and sharing knowledge intraproject, interproject intra-organisational, and within an inter-organisational partnership enables past learning to be brought to bear on present decisions. This capability is vital in projects that are characteristically complex and function within a global business economy based on knowledge assets traditionally absent on the balance sheet. Western management is only recently recognising the value-added potential of experiential knowledge widely recognised in Japanese management as a learning and competitive tool.

Project practitioners can capitalise on experiential knowledge by becoming effective learners from experience. The simplicity of this learning process is exponential. New knowledge shared collectively openly enhances trust, and, in turn, mistakes become transparent providing tools for learning opportunities. An interactive workshop presents the learning wheel at the individual, project team, and organisational levels, illustrating how learning from experience can build human and organisational capability. Small groups will discuss ideas to share lessons learned at the project team and organisational levels. Closure is by group dialogue of these ideas. A post conference handout of the ideas generated by the workshops will be completed and disseminated.

**Key words:** Organisational Learning, Knowledge Management, Learning Cycles, Lessons Learned

### Introduction

*Wisdom gained with experience, a critical form of human capital, has value that should not be lost*<sup>1</sup>

For the past century, manufacturing and service organisations have functioned within an economy based on the industrial model. Today the emphasis has shifted to a model where human capital is a significant player in organisational competitive advantage. The OECD defines human capital as "the knowledge, skills, competencies and other attributes embodied in individuals that are relevant to economic activity"<sup>2</sup>.

Lessons learned are a key project management tool to build business performance capability. However, because individuals are the agents for learning, business performance capability cannot be built effectively until strategically relevant individual learning is captured and collectively shared. To leverage individual knowledge, skills, and competencies, it is recommended the project manager do three things<sup>3</sup>. First, they must identify what learning needs to take place within the current project. Second, a structure is required to encourage reflective learning and sharing from the lessons learned. Third repositories, processes, and systems are necessary to capture and build the new knowledge.

This paper discusses what project managers can do to build human capability and manage learning in an environment characterised by warp speed knowledge expansion and where change "is all there is"<sup>4</sup>. First organisational learning is discussed followed by knowledge management and its relationship with project management. Next discussed are the individual, team, and organisational learning from experience cycles. Finally, the paper concludes with a summary of the key points.



## Organisational learning

### Meaning

Over the past several decades, organisational learning has been explored to ascertain its meaning by a multiplicity of researchers in a multiplicity of management disciplines. Although definitions vary there is a general consensus that it is a dynamic and systematic generative change process where the outcome from learning from experience is effective and productive action to produce the results the organisation collectively desires<sup>5, 6, 7</sup>.

Organisational learning is “learning by individuals and groups in the organisation<sup>6</sup> (p. 1).” It differs from the learning organisation, which Schein (1997: 1) says is “collective learning by the whole organisation.” An organisation is said to be competent when it develops the capability to transform the learning from experience into skilled action. In other words, its members have learnt to share new learning in a culture of trust and communication openness. As Graham (1995) puts it, the organisation has the systematic capability to sustain continuous performance because it has learnt to ‘talk the talk’ and ‘walk the talk’<sup>8</sup>.

### Capabilities

Senge (1992) describes four capabilities to learn: personal mastery, mental models, shared vision and team learning<sup>7</sup>. Together these capabilities encompass systems thinking, or a vast set of tools and principles that interrelate as a shared process. Personal mastery is the capability to close the gap between what is desired and where one stands currently. A person’s mental model or the way they view the world shapes the tension created by this desire. When there is a collective sharing of learning to achieve a desired process or direction, then the group or organisation builds shared vision. The shared vision is accomplished through team learning that creates synergy.

This ‘ideal’ is subject to certain constraints. Foremost is knowing what lessons learned to capture? When a learning philosophy is embedded at the strategic level with senior management support, and diffused at the project level, then added value from organisation learning can be realised<sup>9</sup>. Hence, lessons learned that add strategic value, drive organisational, and project performance, can be deemed worthy of capture<sup>3</sup>. However, capturing all lessons learned can overload learning and hence be non-productive.

Capturing learning is constrained by defensive routines evident in human behaviour<sup>5, 10</sup>. Defensive routines translate as ‘skilful routines’ that are viewed by Argyris (1999) as error that individuals activate to hide embarrassment<sup>5</sup>. Defensive routines are learnt and embedded in childhood and are acted out unconsciously by individuals in the workplace. In projects they manifest for example, as tasks not completed on time, as undiscussable issues, or the shifting of blame to organisational politics. At worst, defensive routines serve as barriers to effective learning. The result is team de-motivation, inhibited learning, limited continuous quality improvement, and limited project and organisational performance capability.

### The challenge

What does organisational learning mean in the real world of project management? Singularly organisational learning and project management are important business trends<sup>11</sup>. Together their coexistence is a challenge as suggested by the recent growth in articles in the project management literature. Foremost, project management is task-orientated operationalised within a linear and definitive time frame, while organisational learning is non-linear expressed in continuous organisational behaviour. Numerous examples in case study research have shown project management and organisational learning can mutually coexist to encourage reflective learning and sharing from the lessons learned.

Specific real world examples are British Petroleum, the US army and Xerox<sup>3, 12</sup>. All are well documented illustrating the practice of learning from experience within project management. British Petroleum focus on task-based activities and use case studies derived from an established post-project review appraisal unit to derive lessons as an integral part of strategic planning. It works by employing a peer review process with an emphasis on performance. Before significant new tasks are undertaken, individuals or groups invite peers with expert relevant knowledge or recent experience to provide input<sup>3</sup>. A reciprocal process builds trust and shares expertise. Project review action at British Petroleum reduced oil drilling cycle time saving millions of dollars<sup>3</sup>.

Another example is the US army who employ an after action review (AAR) to generate new learning<sup>3</sup>. The army creates “local value” by emphasising individual learning and then opens access to this learning to other army members<sup>3</sup> (p. 73). The lessons are “aggregated, validated and synthesised to produce organisational learning” in an AAR<sup>3</sup> (p. 73). Suggested is a weekly AAR with the objective to compare, consolidate, and

summarise identified lessons learned that can improve individual performance. These summaries are then reviewed at six weekly intervals to modify product or service development to further enhance team learning. Once the product or service is implemented, a project closure total review AAR provides a basis for experiential learning. AARs ask five questions: "what was the purpose of the action, what happened, what was learned, what do we do now, and who else should we tell" (p. 70). The benefits are twofold. Product or business solutions are modified in a continuous learning cycle, and training is implemented that is work related<sup>3</sup>.

These examples illustrate knowledge management processes (the way things are formally espoused) and the way things are actually done (practices). Processes assume a stable business climate that reengineers people and information in a structured coordinated way to create value and efficiency<sup>13</sup>. In an unpredictable business climate, information and people management needs to focus on effectiveness. This stance is bottom up where management capitalises on innovative ways that workers get things done. An example is Xerox field reps that get together regularly to share stories about actual practices. To diffuse and share these best practices globally they are later documented on an Intranet database. Motivation for the field reps to participate is by way of their name published with best tips and promotion to a panel of experts known as the 'Tiger Team'<sup>3,13</sup>.

## Knowledge management

### Meaning

Hence learning from experience is central to knowledge management. Olonoff (2000)<sup>10</sup> suggests that project managers, at best, might have a 'fuzzy' understanding of knowledge management, considering experts differ on what knowledge management means. To clarify this 'fuzzy' understanding it is important to differentiate between knowledge and information. A working definition of knowledge is "experience or information that can be communicated and shared"<sup>4</sup>.

In other words, knowledge is codified. It provides some insight and meaning within a certain context. Information is a part of knowledge but it lacks inferred meaning. At an individual level knowledge can be sourced from the blending of information, social interaction and at project review meetings. At the team and organisational levels, knowledge can consist of shared understandings and corporate 'know-why' that provides development potential. The interaction between knowledge and action drives organisational change. This is what knowledge management is all about?

### The challenge

The transformation of knowledge from the individual to the team and the organisation is at the heart of organisational learning. The challenge for project managers is to build systematic practices in team development so learning from experience is a way of life i.e., a core individual, team, and ultimately an organisational competency<sup>14</sup>. As Nonaka and Takeuchi (1995) suggest, it is a spiralling dynamic process of tacit knowledge conversion to explicit knowledge codification, combination of knowledge, and learning<sup>15</sup>. Put in practical terms a team member suggests an alternative solution to the current design problem based on past technological solutions (tacit knowledge). The new knowledge gets built into the current project scope (explicit knowledge). The learning is internalised when the alternative solution is used and acknowledged formally by the project stakeholders (explicit→tacit). The team member then talks about the design solution with a colleague (s), further stimulating new solutions (tacit→ explicit).

Learning from experience is also about unlearning where irrelevant knowledge is discarded in order to make way for new relevant knowledge. This is because change is not something to worry about but is something that is always there<sup>4</sup>. Hence, knowledge must be managed as an effective continuous information and knowledge creating process, not simply as an efficient process.

Knowledge management is hence a generative process characteristic of organisational learning. It can embed into project management practice and principles. As cited in PMBOK, lessons learned are a project output that comprises historical information<sup>16</sup>. For example, they can serve as a tool to analyse product development and provide input to product or service description. Project quality can be enhanced through continuous experimentation and revision of past successes and failures. In turn, the revised product design output can become input into quality control. When acknowledged at the senior management level, experiments and revisions can be embedded into quality policy with lessons learned serving as historical information to identify future risk.

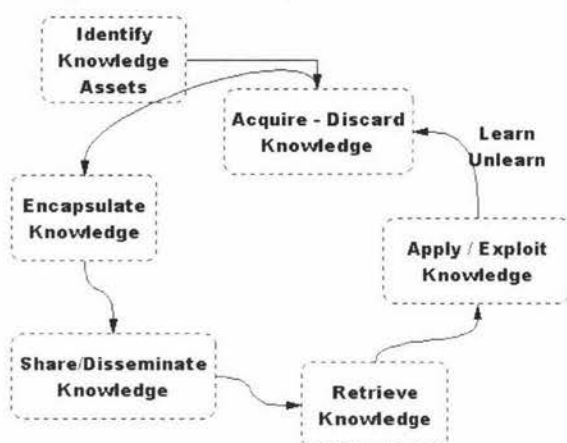
These examples emphasise that project management espouses procedural and conceptual knowledge as part of its body of knowledge to action its principles. The procedural tacit knowledge of lessons learned is a learning tool. As Pinto (1998) states, 'lessons learned' bridge results "to and from end-users" to "conduct concurrent evaluation" throughout the project life cycle to gain valuable insight at the post-project phase<sup>17</sup> (p. 50). Failing

to learn from experience or “failure to know what’s what” by individuals and subsequently by organisations is perceived by Pinto as “the most pervasive failure in all project management” because it erodes competitive advantage<sup>16</sup> (p. 243).

### Knowledge cycle

To create and share knowledge and hence capitalise from lessons learned throughout the project life cycle several stages are suggested. Paramount is recognising that individuals are the agents for learning but it is at the project team level where knowledge is continuously built.

Tan (2000) proposes that the first stage is to identify the important knowledge and note where it is stored<sup>18</sup> (Figure 22). The process involves mapping existing knowledge whether tacit (in someone’s head), or explicit (in project documents). To capture this new knowledge it must be known where it is created, for example during a team development session. The essence to knowledge capture is its’ retention in manual or computer memory. This stage is twofold. The knowledge source needs to be indexed using key word search tools (e.g., categorised as project team development sessions), and secondly, documented, for example on an Intranet. In this way, knowledge sources are readily contactable.



Source Adapted from Tan (2000)

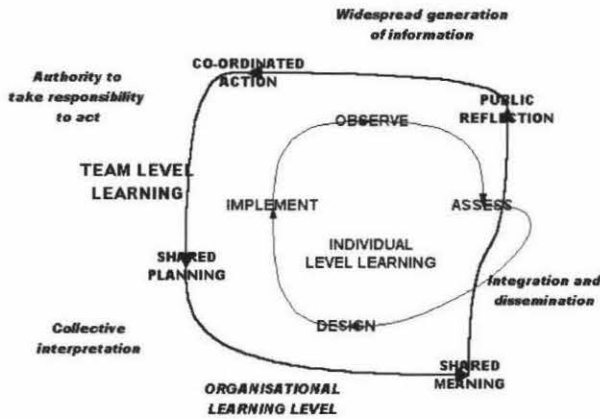
### The knowledge cycle<sup>18</sup>

The sharing and diffusion of knowledge depends however on a supportive culture and an action strategy to ‘push’ or ‘pull’ the learning where it is required<sup>17</sup>. Project teams can be included on distribution lists that identify their knowledge needs, and new knowledge summaries can be e-mailed to project teams accordingly. When knowledge is needed urgently, it can be ‘pulled’ or retrieved from a knowledge-based system.

### Learning cycles

Managing knowledge effectively does not guarantee that the individual, the project team, or the organisation will learn from their experience. A richly cited process to achieve this is the Kolb (1976, cited in Honey, 1996) learning cycle<sup>19</sup>. Before discussing the learning cycle, it is useful to have an understanding of what learning is.

Allee (1997) defines learning “as gaining knowledge, comprehension, or mastery through experience or study”<sup>4</sup>. In an organisational learning sense, this is a holistic definition because it considers the ‘know-how’ (tacit knowledge through experience) and the ‘know why’ (explicit knowledge through comprehension). When the ‘know-how’ and ‘know why’ are interrelated, new learning is generated in a two-part action that Argyris (1999) refers to as double-loop learning<sup>5</sup>. In other words, the learning from experience is first reviewed or reflected upon. Next, a decision is made as to a future course of action. Implementing the new learning concludes the cycle. Hence, the underlying structure is examined as to why the experience was successful or not successful. The individual, team, and intra-organisational learning cycles are illustrated in Figure 23.



Source: Kim, 1993; Ross et al., 1994

### Individual, team, and organisational learning cycles<sup>20</sup>

Effective learners from experience embrace and seize learning opportunities in their professional and personal life<sup>18</sup>. It is a blueprint for continuous improvement. Instead of adaptation and maintenance of the status quo, learning from experience is about changing what is done for the better. When learning is shared, it becomes an exponential process spiralling from the individual to the team and organisation in a continuous and dynamic way<sup>20</sup>. Sharing new knowledge in turn enhances trust so mistakes become transparent processes to learn from.

Embedding the learning into the memory of the organisation by knowledge management processes cited earlier has documented benefits. These include not repeating past mistakes, management support to maintain strategic direction over time, building, and support of a project-learning environment, and provision of diverse repositories for future reference. Capturing and sharing knowledge intraproject, interproject and across the organisation enables past learning to be brought to bear on present decisions. This capability is vital in projects that are characteristically complex and where cause and effect are separated significantly by time and space<sup>22, 23</sup>.

### Summary

This paper has focused on the human resource needs of building generative learning capability to sustain competitive advantage in a knowledge era. Project managers can capitalise from lessons learned and develop individual and team learning competencies by identifying learning events, determining learning structures, and sustaining learning by building and maintaining capture, storage and retrieval systems at the project and organisational levels.

This three-pronged approach to knowledge management ensures lessons learned are effective and productive tools to achieve successful projects and the results the organisation strategically desires. Organisational learning is a useful management model for projectised organisations to sustain this capability. This model acknowledges that non-relevant knowledge must make way for new knowledge. A platform for learning and unlearning is the learning cycle that can be applied at the individual, project team, organisational and intra-organisational levels. Reflective action, sharing lessons learned interproject, intraproject, and intra-organisationally could overcome the defensive routines and mistrust that individuals and organisations exhibit when faced with embarrassment.

Embedding lessons learned into distributed technologies, work processes and practices, products, and services avoids losing that unique, hard to imitate experiential learning when projects disband or project team members leave the organisation. Building human capability contributes to successful projects that in turn build continuous performance improvement and organisational competitive advantage. As Laurence Prusak (1997, cited in Allee, 1997) says<sup>4</sup>

The only thing that gives an organisation its competitive edge – the only thing that is sustainable – is what it knows, how it uses what it knows, and how fast it can know something new! (p. 8).



## References

1. Davenport, T. O. (1999). Human Capital: What it is and why people invest in it. San Francisco: Jossey-Bass Publishers.
2. Cook, L. (2000). Facets of wealth in New Zealand: Human capital as vital enablers for economic and social change. In Len Cook, Looking past the 20th Century (p. 1). Statistics New Zealand Te Tari Tatau. <http://www.stats.govt.nz>.
3. Cross, R., & Baird, L. (2000). Technology is not enough: Improving performance by building organisational memory. Sloan Management Review, 41 (3), 69-78.
4. Allee, V. (1997). The knowledge evolution: Expanding organisational intelligence. Boston: Butterworth-Heinemann.
5. Argyris, C. (1999). On organisational learning. (2nd ed.). Great Britain: MPG Books Ltd, Bodmin.
6. Schein, E. H. (1997). Organisational learning: What is new. <http://www.mit.com>.
7. Senge, P.M. (1992). The fifth discipline: The practice and art of the learning organisation. Australia: Random House.
8. Graham, A. K. (1995). Organisational learning: Medical metaphor and corporate practice. In S. Chawla, & J. Renesch. (Eds.). Learning organisations: developing cultures for tomorrow's workplace. (pp. 444-460). Oregon: Productivity Press.
9. Briner, W., & Hastings, C. (1994). The role of projects in the strategy process. In W. Briner & C. Hastings (Eds.). Global project management handbook. New York: McGraw-Hill, Inc. 15-3-15-23.
10. Kloppenborg, T. J., & Petrick, J. A. (1999). Leadership in project life cycle and team character development. Project Management Journal, 30 (2), 8-13.
11. Olonoff, N. (2000, February). Knowledge management and project management. PM Network, 14 (2), 61-64.
12. Garvin, D. A. (1993). Building a learning organisation. Harvard Business Review, 71 (4), 78-91.
13. Brown, J. S., & Duguid, P. (2000, May / June). Balancing act: How to capture knowledge without killing it. Harvard Business Review, 78 (3), 73-80.
14. Switzer, J. (1996). Managing human capital. Banking strategies, 72 (6), 50-55.
15. Nonaka, I., & Takeuchi, H. (1995). The knowledge-creating company: How Japanese companies create the dynamics of innovation. New York: Oxford University Press.
16. Duncan, Q. R. (Ed.). (1996). A guide to the project management body of knowledge: PMI Standards Committee. USA: Project Management Institute.
17. Pinto, M. B. (Ed.). (1998). The Project Management Institute: Project management handbook. Jossey-Bass Publishers: San Francisco.
18. Tan, J. (2000, March / April). Managing knowledge - how to do it - a practical case study. The British Journal of Administrative Management, 19 (12), 12-16.
19. Honey, P. Dr. (1993). Peter Honey's manual of self-assessment questionnaires. Berkshire: Ardingly House.
20. Ross, R. Smith, B., & Roberts, C. (1994). The wheel of learning. In P. Senge, A. Kleiner, C. Roberts, R. Ross, & B. Smith (1999). (Eds.). The fifth discipline fieldbook. USA: Doubleday.
21. Quinn, J. B., Anderson, P., & Finkelstein, S. (1996). Leveraging Intellect. The Academy of Management Executive, 10 (3), 7-19.
22. Sterman, J. D. (1992). System dynamics modelling for project management. <http://web.mit.edu/jsterman/www/SDG/project.pdt>.
23. Wheelwright, S. C., & Clark, K. B. (1992). Revolutionizing product development: Quantum leaps in speed, efficiency, and quality. Canada: The Free Press.

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