

# Learning by Experience in the Project-Based Organization

By

Professor J Rodney Turner and Dr Anne Keegan  
Department of Business and Organization, Faculty of Economics,  
Erasmus University Rotterdam

and

Lynn Crawford  
Department of Design, Architecture and Construction  
University of Technology, Sydney

## Abstract

This paper describes how project-based organizations use structured experience to aid the learning and development of individuals, and how they capture their experience of projects to feed that back into the improved management of future projects and the experiential learning of individuals. We show that successful project-based organizations ensure their project managers obtain a broad range practical experiences following a spiral staircase career. This takes them through lead design and project team leadership and management roles. These organizations also capture project experience through post completion reviews, and codify them in company procedures which are used as part of the development of new project managers and other professionals.

## Introduction

Plato begins the dialogue *Meno* with Meno asking Socrates the question:

*Can you tell me, Socrates, whether virtue is acquired by teaching or by practice; or if neither by teaching nor by practice, then whether it comes to man by nature, or in what other way?* Jowett 1999.

This question recognizes that individuals learn both through formal education and through experience. In the dialogue, Plato suggests that learning obtained through formal education is *knowledge*, the science of cause and effect, derived by philosophers, whereas learning obtained from experience is "*right opinion*", the art of intuition, practiced by poets and statesmen. In both *The Republic* and *The Laws*, (Jowett 1999), Plato says that experience is an essential part of the learning of any trade or profession. In *The Republic*, he further suggests that experiential learning should take place under the guidance of a skilled practitioner, ("sitting next to Nellie"), and that often formal learning should take place after experiential learning, (post-experience learning), so that the science can provide a framework for the experience.

More recently, Polanyi (1967) formulated a schema distinguishing between types of knowledge, particularly between explicit (or objective) knowledge and tacit (or subjective) knowledge. Nonaka and Takeuchi (1995) suggest that implicit knowledge is codified, and transmittable in formal systemic language. Clearly, traditional methods of formal education, including lectures, classroom teaching and book learning are ideal ways of transmitting explicit knowledge. Tacit knowledge, on the other hand, is context specific, and more difficult to communicate through formal education. Nonaka and Takeuchi suggest tacit knowledge includes cognitive and technical elements. Cognitive elements include mental models (paradigms) which help individuals perceive and define their world, whereas technical elements include know-how, crafts and skills. Tacit knowledge is characterized by the phrase "we know more than we can tell", and is acquired through observation, experience and taking part in everyday life. When it comes to the training and education of project managers, it is a vital aspect of their overall knowledge. It is important that the education of project managers should be organized to develop both tacit as well as explicit knowledge.

It is now widely accepted that competence comes from knowledge gained both through formal education and through experience, (Boyatzis 1982). Furthermore, this knowledge must be gained at both the individual level and the organizational level, (Gareis and Huemann 2000). However, many project-based organizations are failing to obtain experiential learning at both the individual and the organizational level, (Pinto 1999; Gibson and

Pfautz 1999). Pinto reports that many organizations repeatedly make the same mistakes on their projects, having failed as an organization to:

- capture their learning from successes and failures on past projects,
- expose apprentice project professionals to organizational learning gained through projects
- encourage project teams and professionals to reflect on their own experiential learning

In the classically managed organization (Huczynski 1996) individual and organizational learning is the realm of the functional hierarchy, (Turner and Keegan 1999). As it is assumed that markets and technologies are slow to change, permanent structures are created which provide stable governance, operational control, leadership, organizational and individual learning, and careers. In particular the functions own and maintain the firms' knowledge, and provide people with careers as they climb the ladder up the functional silo. In the process, the individuals are exposed to the practices of the function, and learn the organizations business through experience.

In the modern environment, with rapidly changing markets and technologies, organizations are adopting project-based ways of working to provide fast, flexible responses to changing customer requirements, (Turner and Keegan 1999). Project-based approaches are expected to overcome perceived weaknesses in classically managed organizations, namely that they are introspective, slow to respond and risk averse. However, in the process, many project-based organizations are losing the strengths of the classical organization, described above. In particular, transient projects are not able to own and maintain the knowledge of the organization, nor provide people with careers. They can provide individuals with useful learning experiences, but the benefit of that can be lost without stable career structures to build an extended, coherent learning experience.

At Erasmus University Rotterdam, we are conducting an international research project into the management of project-based organizations, investigating how they provide stable governance, operational control, leadership, organizational and individual learning, and careers. We define a project-based organization as:

*an organization in which the majority of products made or services supplied are against bespoke designs for customers.*

The project-based organization may be stand-alone, making products for external customers, or a subsidiary of a larger firm, making products for internal or external customers. It may even be a consortium of organizations which collaborate to make products for third parties. The organizations interviewed are listed in Exhibit 1.

## **Exhibit 1: Organizations Interviewed**

In this paper we report on experiential learning practices used by successful project-based organizations. In the next section we describe the role of experience in the competence development of individuals and organizations. We then consider how project-based organizations structure learning experiences for individuals, and why the eclectic nature of projects requires this experience to be broad and sweeping in nature, (spiral staircase career), rather than narrow and constrained, (climbing the ladder up the functional silo). We then describe how project-based organizations use procedures to capture experience from projects, and feed that back into the management of future projects, and into the developmental experience of individuals. We end by comparing outcomes in organizations adopting these practices to those which fail to adopt experiential learning practices.

### **Experiential Learning in Project Management Competence Development**

Experiential learning is a key contributor to the competence development of both individuals and organizations. The project management competence of organizations is dependant on that of individuals and is generally accepted as encompassing the knowledge, skills, attitudes and behaviours that enable the consistent delivery of desirable results (Boyatzis 1982; Heywood *et al* 1992; Frame 1999). Project competent organizations provide environments that foster and sustain competent project management teams and through them, effective resource utilization and successful project outcomes. Considerable attention has been given to identifying the skills required by project management practitioners (Pettersen 1991; Thamain 1991), and there is general agreement that, to be effective, competence should encompass knowledge and understanding of:

- generic project management practices
- the technology of the project or project application area
- the organization(s) in which the project is located
- the market in which the organization(s) are operating

In addition, effective project personnel need leadership skills (Slevin and Pinto 1991) and what Frame (1999) describes as social competencies including teamwork, political, diversity, communication and listening skills.

Research shows that the majority (85%) of project personnel have gained their knowledge, both explicit and tacit, through experiential learning. Most project personnel recruited by organizations hold a qualification or first degree (Crawford and Gaynor 1999; PMI 1999)(Crawford and Gaynor 1999; Project Management Institute 1999). However, project management degree qualifications are rare and an international cross industry sample of project personnel found that less than 15% of project personnel currently hold any form of project management certification or registration (Crawford and Gaynor 1999).

Professional associations have attempted to codify the pathway of project management competence development through standards and associated certification programs. Several standards have been developed to describe the practice of project management; to provide guidelines for those involved in managing projects; to provide commonly accepted definitions of terms and processes; and as a basis for assessment of aspects of project management competence for professional certification or registration. These include:

- A Guide to the Project Management Body of Knowledge (PMBOK® Guide, Duncan 1996)
- ICB: International Project Management Association (IPMA) Competence Baseline (Caupin *et al* 1999)
- Australian National Competency Standards for Project Management (AIPM 1996)
- PRINCE 2, (CCTA 1996).

The third of these was developed within the Australian Qualifications Framework, AQF, (Heywood *et al* 1992); and other performance based competency standards for project management developed as part of the United Kingdom's National Vocational Qualifications, NVQ, (OSCEng 1997; MCI 1997; CISC 1997). There are other standards for project management, such as BS6079 (BSI 1996) and ISO10,006 (ISO 1998), but neither forms the basis for assessment or certification of individuals. The standards listed focus on generic project management knowledge, skills and practices. They do not attempt to address technology, organization or market specific competence. Apart from the IPMA Competence Baseline, the standards do not attempt to codify the desirable personality characteristics that contribute to project management competence.

The standards themselves do not prescribe how project management competence should be developed, but the associated certification programmes do. Evidence of competence required by the certification programmes includes:

- evidence of academic and other qualifications (not necessarily in project management)
- exams (multiple choice, short questions, essays)
- self assessment
- interviews
- exercises, tasks and simulations
- evidence of experience (project report, record of experience, portfolio of evidence of competence)

Evidence of experience, in one form or another, is consistently required by all certification programmes and is the key factor in determination of the level at which certification will be awarded. The most rigorous of the certification programmes in terms of evidence of experience are those associated with performance based competency standards, including the Australian National Competency Standards for Project Management (AIPM 1996) and the United Kingdom National Vocational Qualifications (OSCEng 1997; MCI 1997; CISC 1997). These require assessment of portfolios of evidence of competence by a registered workplace assessor. The experience requirement of professional certification programmes, and in particular those associated with performance based competency standards, highlight the important role of the organization in competence development and recognition. Unless project personnel work within project competent organizations that use accepted project management practices and provide developmental opportunities for their staff, it will be difficult for them to provide the evidence of experience necessary to achieve professional certification.

Although, as indicated above, there are a number of widely accepted standards for aspects of the project management competence of individuals, there are no equivalent standards for the project management competence of organizations. This is currently being addressed by a global network, mobilised under PMI's Standards Program, to develop an Organizational Project Management Maturity Model (OPM3) to help organizations improve the management of their projects and deliver what they have committed (Schlichter and Duncan 1999). Meanwhile, there is considerable agreement amongst writers and practitioners that corporate

---

Turner, J.R., Keegan, A. and Crawford, L. (2000) Learning by experience in the project-based organisation. In: Project Management Research at the Turn of the Millenium: Proceedings of PMI Research Conference, 21 - 24 June, 2000, Paris, France, pp. 445-456. Sylva, NC: Project Management Institute

project management competence includes the following (Graham and Englund 1997; Hoffman 1997; Kerzner 1998; Frame 1999):

- Strategic alignment of projects
- Top management support
- An effective project management information system
- Clearly defined and well formulated project management procedures
- A plan for project management selection and development
- An effective internal project management community

The first four of these building blocks of organizational project management competence involve strategic direction, and provision of supporting structures and systems. The last two focus on people and on organizational learning which can be described as:

*the ways firms build, supplement and organize knowledge and routines around their activities and within their cultures, and adapt and develop organizational efficiency by improving the use of the broad skills of their workforces (Dodgson 1993).*

Kolb (1984) defines learning as:

*the process whereby knowledge is created through transformation of experience.*

Experience is therefore the raw material of learning and knowledge creation in organizations. The extent to which experience contributes to competence development is dependent upon the structures and strategies used by individuals and organizations to learn by experience. Learning is more than acquiring new knowledge or content. Transformative learning involves the questioning of prior experience and values in a way that enables modification of ideas and behaviours (Mezirow 1997). Kolb's experiential learning cycle (Knowles *et al* 1998) (Knowles, Holton III *et al.* 1998) has become well accepted as a way of explaining the role of experience in learning, Exhibit 2.

## **Exhibit 2: Kolb's Experiential Learning Model**

This model demonstrates that experience alone is not enough. Experience is socially constructed, specific to a particular firm or culture and is often both conservative and unreliable (Dodgson 1993). Experience therefore needs to be accompanied by structured reflection and observation from a number of perspectives, leading to abstract concepts and generalizations, enabling the learner to develop theories for performance improvement. The Kolb model highlights the importance of experiential learning in project-based organizations where the unique nature of projects means that the ability to test implications of concepts in new situations is an essential aspect of competence.

Learning from experience is complex and dependent upon the learner, the task and the context. Experiential learning and competence development, on the job, therefore requires an active partnership between the learner and the organization in which the experience takes place (Boud and Walker 1997). This includes the preparedness and skills of the individual in learning from experience, the work experiences, guidance, support, and encouragement provided by the organization and the project management competence and approach to transformative experiential learning of the organization in terms of its structures and systems.

Thus in this section we have seen that experiential learning is considered to be the main vehicle for competence development of individuals and organizations. The experiential learning of individuals should be structured within competent project-based organizations and relevant contexts. In order to aid this process, the organization needs to have a plan for project management selection and development, within a supportive project management community. To develop its own competence, the organization needs to develop competent individuals, and effective project management systems and procedures. We shall now see how the project-based organizations we have observed achieve these ends.

### **Observations on the Experiential Learning of Individuals**

We have observed different experiential learning practices in organizations from different industries. In this paper we will discuss two:

---

Turner, J.R., Keegan, A. and Crawford, L. (2000) Learning by experience in the project-based organisation. In: Project Management Research at the Turn of the Millenium: Proceedings of PMI Research Conference, 21 - 24 June, 2000, Paris, France, pp. 445-456. Sylva, NC: Project Management Institute

- The Engineering Construction Industry (ECI) with a long history of project-based management
- High Technology Industries, including computers and telecommunications, which are more recent entrants

## **Main Contractors from the Engineering Construction Industry**

In companies with a long history of project-based management, considerable effort is devoted to the training and development of project managers. We have spoken to several main contractors from the ECI with 50 years' history of undertaking contracts for clients. The ECI entails predominately mechanical construction of process plant in the oil, gas, petrochemical and power industries. The size of contracts ranges from \$US 100 million to \$US 2 billion, and the work is often undertaken for large companies, including oil companies and utilities. The contracts usually have tight margins, so companies that have been in business for 50 years can be considered successful. Several features typify project managers and their development in the ECI:

- (a) It can take fifteen years to develop a project manager capable of managing a \$US 100 million contract, and twenty-five years to develop a project director to manage a \$US 1 billion contract. Potential project managers and directors are often identified in their mid twenties and developed over these periods.
- (b) Project managers are viewed as a key, value-adding resource, providing firms with their main competitive edge. Several respondents mentioned the ability to add value for clients as a key competence for project managers. (There has been a shift in emphasis in the industry from reducing costs to enhancing value). For these reasons, project managers are highly valued and have the longest tenure with these firms.
- (c) Most of the senior executives and directors of these firms are former project managers or directors.

## **Identifying and recruiting potential project managers**

Potential project managers are usually drawn from the ranks of design engineers. The methods of selecting them are primarily ad-hoc, the managers of project managers acting intuitively when deciding who will make good project managers within the industry. A variety of criteria emerge as bases for identifying potential project managers. One respondent mentioned that a key criteria was:

*people who are vocal with their ambitions*

However, different skills are required of project managers for different types of project. Partington (1997) reports that one company from the industry used a highly regarded project manager who had managed many successful projects for clients to manage an internal change project. The abrasive manner successful on site was not successful for managing internal stakeholders whose working practices he was trying to change.

Another impact on the recruitment and selection of project managers is the cyclic nature of the industry, and the fact that design engineers come and go. Some are recruited directly from university, but many join the firms to work on specific contracts. They tend to be drawn for the firm's network of previous project workers and broader industry contacts. There are few formal selection and recruitment practices in evidence in the firms we have studied. However, experience derived from past projects is often used as a critical indicator to decide whether people fit with the culture of the organization.

People identified as potential project managers are often put onto both formal and informal development programmes. Formal programmes comprise structured training and education, some with certification. Informal programs comprise mentoring by senior project managers who observe the progress of high potential candidates. Another common, informal practice is the deliberate engineering of appropriate experiences. Considerable effort is made to retain these people as project management is viewed as the key skill within these organizations.

## **Development of Future Project Managers – The Spiral Staircase Career**

The role of project managers in the ECI is viewed as being very eclectic, requiring knowledge and experience of:

- management of the project process
- management of contractual relationships with clients, suppliers and sub-contractors
- management of the technology
- management of people in the project team
- management of the business

---

Turner, J.R., Keegan, A. and Crawford, L. (2000) Learning by experience in the project-based organisation. In: Project Management Research at the Turn of the Millenium: Proceedings of PMI Research Conference, 21 - 24 June, 2000, Paris, France, pp. 445-456. Sylva, NC: Project Management Institute

- management of different cultures for international projects

A broad range of experiences are required for future project managers. It is not possible to develop them by restricting their experiences to one function. Thus, rather than seeing project managers climbing the ladder up the functional silo, they have broad, sweeping careers, being exposed to a number of functions, perhaps moving back to functions they have fulfilled before in a more senior role. We have labeled this the *spiral staircase career*, (Keegan and Turner 2000). During their career, a future project manager may spend time as:

- a design engineer in the early stages
- a lead engineer of a design team, starting as a lead engineer on a small project and progressing to larger projects, perhaps after an interval elsewhere
- manager of the design function
- a project engineer or contract engineer on a project, progressing to larger projects at later stages
- an assistant project manager, then a project manager on small project, project manager on larger projects, and eventually project director

A future project manager can spend time as manager of the design function, whose role includes:

- maintaining the firm's design standards
- assigning design engineers and lead engineers to projects
- mentoring engineers within the function and assisting in identifying their development needs

In most of the companies we spoke to, the manager of the design function may not necessarily be the most senior person in the department. A highly experienced lead engineer may be on a higher grade than the departmental manager. However, it is accepted that they have different roles to fulfil, and they respect each other's position.

### **Managing the Process of Developing Individuals**

Although considerable effort is put into the development of project managers, like many things relating to their careers in this industry, the process tends to be fairly ad-hoc. The process is managed in two ways:

- through mentoring by the design department manager
- by an informal committee planning future requirements

While an individual is working as a design or lead engineer, they have an annual review with their departmental manager. Through that review they identify their future career aspirations, and development needs. That may include training or work experiences. Having identified work experiences required, then opportunities will be sought to satisfy those. The firms also tend to maintain an informal committee of senior project managers and project directors, who plan the future requirements for project managers, and track the development of people within the firm. They too will seek out opportunities to match the development needs of specific individuals.

The dilemma that many of these firms often face is between keeping somebody working on their current project or moving them to the appropriate career opportunity that has just arisen. The solution is not easy. Nobody is indispensable, and so often someone will be moved to the new project that provides them with the development opportunity that suits their current need. This may create an opportunity for another individual to replace them in the vacancy created. However, if a project is at a critical stage of its development, then the person may be retained on the project, and the opportunity will be lost.

### **The Role of Formal Tuition**

Courses for project managers are seen as an essential part of their development. But as Plato describes in *The Republic*, training tends to be post-experience. Project managers are first given experience on the job, and then sent on courses to enhance their understanding. As we shall see in the next section, new recruits, and new project engineers are expected to work closely with the company's project and quality procedures. Thus they are given formal guidance, on the job, about the correct ways of working within the context of the company's projects. Later they are given formal tuition into the knowledge behind those procedures. Early training will be provided in the company, and will relate to the firm's ways of working. Later training will be more specific to the individual. It may be provided by courses from an industry provider, such as the Construction Industry

---

Turner, J.R., Keegan, A. and Crawford, L. (2000) Learning by experience in the project-based organisation. In: Project Management Research at the Turn of the Millennium: Proceedings of PMI Research Conference, 21 - 24 June, 2000, Paris, France, pp. 445-456. Sylva, NC: Project Management Institute

Institute (in the US), the European Construction Institute (in Europe), or the Engineering Construction Industry Training Board, (in the UK), or it may be via a university masters course.

## High Technology Industries: Knowledge-based Firms

In high technology industries, the process of training and developing project managers tends to be more formal. Formal education and training, often linked to certification, plays a much more significant role. Many of these organizations view themselves as knowledge-based firms, and they often have a strong project focus, often with functions having been eliminated entirely. In these situations, experiential learning poses unique challenges.

### A project-focus and the absence of functions

Unisys in Vienna is a firm with a strong project focus, having eliminated functions entirely. Experiential learning takes place entirely within projects. The firm provides bespoke computer and information technology systems. They employ approximately 200 people in Vienna serving the needs of mainly Austrian clients. They have abandoned functional departments in the largest and most strategically important area, the Information Systems Group, ISG, and adopted a fully project based way of organizing. Employees within ISG are allocated to projects, which when completed are disbanded. The employee is immediately allocated to another project. There are no functional departments to which people belong and around which they form an identity.

The elimination of functions and the creation of the purely project-based firm have advantages, including the reduction of overheads associated with functional departments. Highly educated and skilled personnel are constantly moved between one project and another. To reinforce the 'movement', Unisys in Vienna has a policy of hot desking. Other companies in the Information Technology sector such as Baan in the Netherlands and CAP Gemini also utilize hot desking. One reason is that IT and other knowledge intensive firms work so closely with clients that workers spend much of their time on the client's premises and not their own.

Although the project orientation is a strong feature of these firms, there are disadvantages when functions are de-emphasized or eliminated. People may feel somewhat lost, lacking a 'place' to hang their hat, or constancy in terms of the people with whom to work. We call this 'no home syndrome' (Keegan and Turner 2000). This is a drawback of the temporary organization in general, and also of the much vaunted virtual organization.

### No home syndrome and the issue of learning

Apart from the personal discomfort that can arise due to a changing project environment, the *no home syndrome* has another serious drawback in that when functions are eliminated so too are repositories of organizational knowledge. A common practice adopted in this industry to overcome the leaking away of valuable knowledge and experience and to aid individual learning is the practice of 'pairing'. Where feasible, firms assign additional people on a project so two people are available to do the same job (two systems administrators, two programmers). The rationale is to allow people to work together on similar tasks, especially new ones, so each person can learn alongside another and the knowledge can be captured through their communication. In a supplier of business and financial data products, we have uncovered a pattern of innovation that relies heavily on the simultaneous and unplanned creativity of employees. This pattern of innovation and learning is shaped by the complex and unpredictable nature of the firm's markets for which there are few standards, and even fewer guidelines. Firms such as these use a variety of 'memory carriers' (Van der Bent *et al* 1998) such as the INTRANET, project review procedures and formal and informal meetings to capture learning independently of individuals, as we shall discuss in the next section.

### In the absence of 'Nellies'

The practice of pairing people on projects reflects another feature of the industry. While "sitting next to Nellie" has been a classic training and learning practice for decades, there are very few Nellies in High Technology companies. So rapidly changing are the technologies and solutions that these firms offer to clients, there are few people experienced enough in the organization with whom newcomers can be paired to provide mentoring and coaching opportunities. 'Nellies' are created by pairing people who learn from one another through experimentation, rather than transfer of learning from an experienced individual to an apprentice. Although there may be some redundancy, there is a greater chance that knowledge will be captured more effectively than if a person works alone. This system also ensures that knowledge is developed and learning captured continuously

over the timescale of the project instead of simply at the end. The widespread use of mentoring as a form of training in recent years reflects the importance of ongoing learning and development in a changing environment.

## Experiential Learning of Organizations

In the absence of functions, individual learning is useless without practices to ensure the organization owns and retains knowledge. The firm can engage in formal learning, with the maintenance of company libraries, for instance. But the organization must also adopt experiential learning practices to learn how to manage the unique features posed by its projects, and gain performance improvement. Not only do many of the organizations we have interviewed put significant effort into the development of project managers, they also put effort into their development as organizations. Capturing, recording and disseminating experience are key to developing organizational competence, and feeding that back into the development of project managers and other project management professionals. Practices we have observed which organizations use to capture experience include:

- the use of internal project management procedures
- end of project reviews
- project management self-support groups or conferences
- the use of the INTRANET
- moving people around the organization

### The use of Internal Project Management Procedures

Internal project management procedures are a key way organizations capture knowledge and experience. Many of the companies in our sample use them to capture best practice within the firm. They are the collective representation of the firm's experiences. Most Project Management Maturity Models map increasing maturity through the use of procedures and their consolidation within the organization, (Ibbs and Kwak 1997).

One firm from the ECI told us that new recruits and new project personnel are told to strictly follow the internal procedures on their first project. On the second and subsequent projects, they can gradually reduce the amount they refer to the documentation, as they internalize the firm's good practice. They are also allowed to adapt the procedures to the needs of the individual projects as their experience of the correct ways of working grows.

Ericsson have a procedure called PROPS, which should be used on all projects, although it is not mandatory. PROPS is designed to be tailored to the needs of individual projects, particularly to the size of project, (see Payne and Turner 1999). PROPS represents good practice within Ericsson, but that good practice is flexible enough to be adapted to the size and type of project. PROPS is being continually updated to reflect new experiences, and the changing technology and nature of projects. It was first published in 1987, and is now in its third edition. There is a product development manager for PROPS in Ericsson's project management headquarters within Stockholm.

The United Kingdom's government has developed its internal project management procedure, PRINCE 2, (CCTA 1996). This was originally designed for information systems projects, but the second edition was designed with a greater business focus. There are now extensive courses in the UK and the Netherlands around the PRINCE 2 procedures, and a certification process. PRINCE 2 certification is becoming mandatory to bid for many projects in both the public and private sector in the UK. In this way the government is contributing to not only the increasing competence of public sector projects through the capturing of best practice, but also to the increasing project management competence of the society, (Gareis and Huemann 1999).

Organizations which have not captured their own experience in project procedures are able to use industry standard procedures, such as PRINCE 2 and ISO 10,006, (ISO 1998). ISO 10,006 is largely based on the PMI Guide to the Body of Knowledge, (Duncan 1996). Both PRINCE 2 and ISO 10,006 share several features:

- a strong focus on both the quality of the end product and on the quality of the project management process
- a recommendation that the procedure should be tailored to the needs of the individual project
- a recommendation that the company's internal procedures, (or tailored version of PRINCE 2 or ISO 10,006) should be continuously updated to reflect new experiences and new knowledge

The focus on the quality of the end product in PRINCE 2 is partially through the business case. At the transition from one life-cycle stage to the next the product must be checked against the business case, and so a series of toll-gates, or go/no-go decisions are built in. Ericsson's PROPS process has a similar set of "tollgates".



There are apocryphal stories of people applying PMI's Guide to the PMBoK® to the letter on every project, and their project performance falls. This is not a fault with PMI's PMBoK®, but with the way it is being applied. Every project is different, and so every project requires a unique procedure (Payne and Turner 1999). The standard procedures represent captured experience and best practice, but they do need to be tailored project by project. Hopefully that tailoring is marginal, but it needs to be consciously done. It is part of a project manager's tacit knowledge built up through their own experiences that enables them to know how and where the procedures need to be tailored to the needs of individual projects. People who have the lack of maturity that makes them want to follow procedures to the letter should not be allowed to practice as project managers.

## **End of Project Reviews**

End of project reviews play a vital part in capturing experience within organizations. PRINCE 2 and ISO 10,006 suggest a review be conducted at the end of every project, and company standard procedures updated to reflect that learning. Ericsson's PROPS procedure also requires this, as does ABB's internal procedure. Most Project Management Maturity models show at the higher levels of maturity that organizations continually benchmark their procedures and processes, gathering data about project performance, storing that as historical data to help plan future projects, and thereby improving overall project performance.

However, our data reveals less than satisfactory use of end project reviews. When asked how and whether these reviews are used to capture individual learning and enhance organizational learning, the answer is "Not a lot!" Many organizations find the practice very difficult to enforce, and where it is enforced, it becomes a meaningless box-ticking exercise. EDS in New Zealand told us that the post-completion reviews were an essential part of their quality assurance procedures, but that there was no check on the quality of the outputs from that step.

Further, where reviews are conducted, it can be very difficult to transmit the learning to the rest of the organization. There are two problems:

1. A project may last for several years. Valuable learning experiences take place at the beginning of the project, but are not captured until the post-project review at the end, if at all. This problem has been observed in most of the companies taking part in our study.
2. When learning is successfully captured in post-project reviews, it needs to be transmitted to the rest of the organization (Nonaka & Takeuchi 1995). Updating internal procedures may achieve that. However, it may be several years between issues of the procedures, delaying distribution of the learning. A more subtle problem is how to ensure people are working to the current version. People become less reliant on the procedures as their experience grows, so they may not quickly assimilate the new issues. . We discuss below practices adopted by organizations to distribute learning in other ways.

## **Benchmarking**

Another way of learning is by benchmarking project performance. It is usually not effective to benchmark projects internally, because in doing so the firm will be comparing like performance with like performance. It is essential to benchmark against projects undertaken by other firms within the industry. Gareis and Huemann (1998) describe benchmarking of high technology companies and projects, and in (1999) how they plan to benchmark the project oriented society. The European Construction Institute and the Construction Industry Institute of the United States are conducting a benchmarking exercise for the ECI in the two continents, and have about 4000 projects in their database. None of our sample firms have specifically mentioned benchmarking. However, we know that Unisys in Vienna are part of Gareis and Huemann's programme, and Raytheon Engineers and Constructors, ABB Lummus Global and Fluor Daniel are part of the ECI/CII programme.

## **Practices adopted by Project-based Organizations to distribute Experiential Learning**

We saw that there can be a delay between learning experiences being gained on projects and being captured in post completion reviews or project benchmarks. Further delays occur between the experiential learning being captured and recorded in the internal project procedures and the dissemination and adoption of the new

---

Turner, J.R., Keegan, A. and Crawford, L. (2000) Learning by experience in the project-based organisation. In: Project Management Research at the Turn of the Millenium: Proceedings of PMI Research Conference, 21 - 24 June, 2000, Paris, France, pp. 445-456. Sylva, NC: Project Management Institute

procedures. Successful project-based organizations adopt many practices to ensure the learning experiences are gained by the organization at large before they are eventually reflected in the procedures.

## **Centers of Excellence and International Programmes**

Many of the companies we studied are international companies with operating arms in many countries. These organizations all institute international mechanisms for retaining learning and disseminating that learning throughout the company. There are two main practices. Firstly, there are international centers of excellence in specific project processes (such as bid management). Secondly, there are international programmes on issues of specific importance to companies at a given time (such as Y2K programmes). These international centers offer advice to operating companies and record changes in 'company ways of doing things'. For example, within Ericsson, the Project Management Institute in Stockholm is responsible for maintaining their PROPS procedure and running their quarterly conference discussed next. A similar group also exists within ABB, also based in Sweden. Where local deviations are examined and determined to be successful, the Centers of Excellence will codify these, provide training, and retain the learning within the company. The programmes operate in a similar manner. They determine what operating companies affected should be doing in terms of best practices.

## **Project Management Self-support Groups or Conferences**

Many organizations run project management self-support or mentoring groups. Ericsson has a quarterly conference attended by project managers from around the world. As well as general papers describing current developments both within Ericsson and outside, they give delegates opportunities to make smaller paper presentations to describe their own experiences. ABB run a similar conference twice a year. The Dutch Bank, ABN-AMRO, run a quarterly afternoon meeting in Amsterdam for their Dutch staff. An internal or external speaker makes a presentation, followed by questions and answers. There is then a buffet supper to give staff members an opportunity to network and exchange experiences. The Benelux Region of the Engineering Construction Institute provides similar opportunities for the ECI as a whole within the Benelux Countries, contributing to the development of the Project Oriented Society, (Gareis and Huemann 1999).

Many organizations provide more formal mentoring. One company with an extensive array of mentoring practices is the Dutch Consultancy Pink Elephant. Mentoring is an integral aspect of their career development and knowledge management.

## **The use of the INTRANET**

Many organizations are now experimenting with the use of the INTRANET. Java based project-management software is now becoming common-place, as is the use of e-rooms. Ericsson have developed the concept of e-rooms. Many projects have a virtual project office on a central server. Project plans, progress reports, issues registers, etc are posted in the e-project office. The system is supported by a powerful search engine. If someone has a similar project, or problem, they can search and interrogate existing or completed projects. It is up to the person with the problem to search. This is different to what Digital did in the early 1990s. Then a person with a problem would e-mail everybody else in the organization, and it was up to the person with the solution to respond. This often did not work because the people with the solutions were too busy. In Ericsson, it takes project managers no longer to develop and maintain plans and issues register in the e-room than elsewhere.

## **Moving People around the Organization**

Finally, a technique used for spreading experience is to move people around the organization. By posting people in another town or country, experience is transferred by people making contacts with new colleagues. This is a slow method of transferring experience, but it is effective. One of the people we interviewed in Ericsson had recently been transferred from the central project management department in Stockholm to the Malaysian Office to take current best practice to Malaysia. Similar expatriate secondments are very common in the ECI.

## **Examples from the Literature of Learning or Lack of It**

There are examples from the literature of project-based organizations learning by adopting some or all of these practices, (Gibson and Pfautz 1999), or failing to learn by adopting none of them, or an insufficient amount, (Pinto 1999). First we discuss the bad news, then the good.

---

Turner, J.R., Keegan, A. and Crawford, L. (2000) Learning by experience in the project-based organisation. In: Project Management Research at the Turn of the Millennium: Proceedings of PMI Research Conference, 21 - 24 June, 2000, Paris, France, pp. 445-456. Sylva, NC: Project Management Institute



## **Failure of Institutional Learning**

Pinto (1999) describes the poor record of failure that dogs Information Technology projects. He lists several studies which report project failure rates on IT projects of between 50% and 95%. In particular he says in the case of IT projects in the US military only 5% of projects are used as envisaged. He lists several causes of this culture of failure, but two include:

- a failure to train project managers properly
- a lack of systematic institutional learning in most organizations

### **A failure to train project managers properly**

According to Pinto many organizations fail to give their project management professional even formal training. Further, many people are labeled project managers with no real experience of project working. He argues that many organizations rather than investing in the training of their project managers, invest instead in powerful project management information systems. Pinto likens the use of these powerful systems without adequate training or experience of project professionals using them as akin to “putting an afterburner on a mule”. It is an interesting reflection on modern organizations that hundreds of thousands of dollars are invested in the systems, but the investment in people is often significantly less impressive.

### **A lack of systematic institutional learning in most organizations**

Pinto says that organizations repeatedly make the same mistakes. There is often a sense of déjà-vu, as they find themselves on the same track to previous failures. There can be a sense of helplessness as projects drift to inevitable failure. Pinto mainly blames this lack of institutional learning on a failure to conduct post implementation reviews. However, there is an implication in his discussion on the use of project management software that many of these organizations have no internal procedures for the management of projects. They have neither the mechanism for learning nor the tools (memory carriers) to capture that learning.

## **Success of Institutional Learning**

On the other hand Gibson and Pfautz (1999) describe a success of turning around the management of IT projects within the R&D Department of SmithKline Beecham. Key elements of their improvement project were to standardize the project management process within the organization, and then to implement continuous improvement processes. Practices that have been adopted as part of this process include the following:

### **Formalization of the project management process**

Previously, the project management procedures had been a maze of complexity, with experienced project managers being able to manipulate the system, whereas inexperienced project managers were lost in the maze of requirements. That meant the projects that won resources and were completed were not necessarily those that brought the organization the best returns, but were those with experienced project managers. Under the improvement project, processes were standardized and simplified, leading to overall better performance for the organization. They did find at a strategic level there was very little difference between the old processes and the new. The main difference was a consistency in application.

### **Adoption of post-completion reviews**

Similarly the review process on projects has been standardized and formalized. Previously reviews had been avoided, not because of the time involved, but because they were unstructured and seemed to have little point. Under the new approach, objective reviews were instituted. The reviews focused on the technical processes and the business outcomes of the project. Further they focused only on significant problems from which immediate significant improvements could be gained. The technical reviews were also conducted in electronic format to reduce the time input required, and improve the turnaround time of the reviews.

---

Turner, J.R., Keegan, A. and Crawford, L. (2000) Learning by experience in the project-based organisation. In: Project Management Research at the Turn of the Millennium: Proceedings of PMI Research Conference, 21 - 24 June, 2000, Paris, France, pp. 445-456. Sylva, NC: Project Management Institute



## Implementation of project management support and mentoring networks

The implementation of project coaching, and the immediate benefits it gave, were key to gaining the commitment of senior management to the overall improvement process. Project coaches are assigned to novice project managers, depending on the type of projects they are working on, and their strengths and weaknesses. The coaches help the novices monitor their improvement, and work with them to develop improvement programmes to enhance their strengths. The improvement programmes involved both formal training, and the gaining of on the job experiences, thus emphasizing both explicit and implicit knowledge.

## Conclusions

Explicit and tacit knowledge are both essential to the performance of individuals and of organizations. Both can be gained by the individual from on the job experience, and by the organization by capturing, recording and disseminating experiences from projects. Tacit knowledge can only be gained in this way, whereas explicit knowledge can also be gained by formal tuition. (Turner and Huemann (2000) report on current practices in formal tuition, and how the use of simulations and case studies can help develop tacit knowledge).

Practices adopted for structuring on the job experiences for individuals include:

- the spiral staircase career
- mentoring and career review committees and procedures
- on the job pairing
- pre- or post-experience tuition

Practices used by organizations to capture, record and disseminate project experience include:

- the adoption of standard project management procedures, (tailored for individual projects)
- post-project reviews
- benchmarking
- centres of excellence
- project support groups
- the use of virtual project offices
- moving people around the organizations

Firms that adopt these practices report superior project performance. Firms reporting poor project performance appear not to be using these practices.

## References

- AIPM. 1996. *National Competency Standards for Project Management*. Spit Junction, NSW: Australian Institute of Project Management.
- Boud, David and Walker, David. 1997. *Experience and Learning in the Workplace: Reflection at Work*. Geelong, Victoria: Deakin University.
- Boyatzis, Richard E. 1982. *The Competent Manager: a model for effective performance*. New York: Wiley.
- BSI. 1996 *BS6079: Guide to project management*. London: British Standards Institute.
- Caupin, Gilles, Knöpfel, Hans, Morris, Peter W. G., Motzel, Ernst, and Pannenbäker, Olaf. 1999. *IPMA Competence Baseline, Version 2.0*. Zurich: International Project Management Association.
- CCTA. 1996. *PRINCE 2: Project Management for Business*. London: The Stationery Office.
- CISC. 1997. *Raising standards: Construction Project Management: NVQ/SVQ Level 5*. London: The Construction Industry Standing Conference.
- Crawford, Lynn and Gaynor, Fran. 1999. Assessing and developing project management competence. *Learning, Knowledge, Wisdom, Proceedings of the 30th Annual PMI Seminars and Symposium, Philadelphia*. Sylva, NC: Project Management Institute.
- 
- Turner, J.R., Keegan, A. and Crawford, L. (2000) Learning by experience in the project-based organisation. In: *Project Management Research at the Turn of the Millenium: Proceedings of PMI Research Conference, 21 - 24 June, 2000, Paris, France, pp. 445-456*. Sylva, NC: Project Management Institute

- Dodgson, Mark. 1993. Organizational learning: a review of some literatures. *Organisation Studies*. **14**(3): 375-394.
- Duncan, William R. 1996. *A Guide to the Project Management Body of Knowledge*. Sylva, NC: Project Management Institute.
- Frame, J. Davidson. 1999. *Project Management Competence: Building Skills for Individuals, Teams and Organizations*. San Francisco: Jossey-Bass Publishers
- Gareis, Roland and Huemann, Martina. 1998. International research project PM-benchmarking: benchmarking of the PM-process. *Project Management: Professional Magazine of the Project Management Association Finland*. **5**(1): 34-35.
- Gareis, Roland and Huemann, Martina. 1999. IPMA Research: PM-competence of the project oriented society. *Project Management: Professional Magazine of the Project Management Association Finland*. **4**(1): 34-35.
- Gareis, Roland, and Huemann, Martina. 2000. Project management competences in the project-based organization. *The Gower Handbook of Project Management, 3<sup>rd</sup> edition*. Ed Turner, J. Rodney, Simister, Stephen J. and Lock, Dennis. Aldershot: Gower.
- Gibson, Lesley R. and Pfautz, Susan. 1999. Re-engineering IT project management in an R&D organization – a case study. *Managing Business by Projects, Proceedings of the NORDNET Symposium, Helsinki*. Ed. Arrto, Karlos A., Kähkönen, Kalle, and Koskinnen, Kai. University of Technology Helsinki.
- Graham, Robert J. and Englund, Randall L. 1997. *Creating an Environment for Successful Projects: the Quest to Manage Project Management*. San Francisco: Jossey-Bass Publishers.
- Heywood, L, Gonczi, A and Hager, P. 1992. *A Guide to Development of Competency Standards for Professions*. Canberra: Australian Government Publishing Service.
- Hoffman, Edward J. 1997. NASA project management: modern strategies for maximizing project performance. *Project Management Journal*. **27**(3): 4-5.
- Huczynski, Andrzej A. 1996, *Management Gurus: what makes them and how to become one*, International Thomson Business Press, London.
- Ibbs, C William and Kwak, Young-Hoon. 1997. *The Benefits of Project Management: financial and organisational rewards to corporation*. Sylva, NC: Project Management Institute.
- ISO. 1998. *ISO10,006: Quality Management – Guidelines to Quality in Project Management*. Geneva: International Standards Organization.
- Jowett, Benjamin. 1999. *The Essential Plato*. Book-of-the-Month Club.
- Keegan, Anne and Turner, J Rodney. 2000. Managing human resources in the project-based organization. *The Gower Handbook of Project Management, 3<sup>rd</sup> edition*. Ed Turner, J. Rodney, Simister, Stephen J. and Lock, Dennis. Aldershot: Gower.
- Kerzner, Harold. 1998. *In search of excellence in project management: successful practices in high performance organizations*. New York: Van Nostrand Reinhold.
- Knowles, Malcolm S., Holton, Elwood F. III and Swanson, Richard A. 1998. *The Adult Learner, 5<sup>th</sup> ed*, Houston, TX: Gulf Publishing Company.
- Kolb, David A. 1984. *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, NJ: Prentice-Hall.
- MCI. 1997. *Manage Projects: Management Standards - Key Role G*. London: Management Charter Initiative.
- Mezirow, Jack . 1997. *Transformative Learning: Theory to Practice*. San Francisco: Jossey-Bass Publishers.
- Nonaka, Ikujiro, and Takeuchi, Hirotaka. 1995. *The knowledge-creating company*. New York: Oxford University Press.
- OSCEng. 1997. *OSCEng Levels 4 and 5: NVQ/SVQ in (generic) project management*. London: Occupational Standards Council for Engineering.
- Partington, David A. 1997. *PhD Thesis*. Cranfield University.

- Payne John H and Turner, J Rodney. 1999. Company-wide project management: the planning and control of programmes of projects of different types, *International Journal of Project Management*, **17**(1): 55-60.
- Pettersen, N. 1991. Selecting project managers: an integrated list of predictors. *Project Management Journal* **22**(2): 21-25.
- Pinto, Jeffrey K. 1999. Managing information systems projects: regaining control of a runaway train. *Managing Business by Projects, Proceedings of the NORDNET Symposium, Helsinki*. Ed. Arrto, Karlos A., Kähkönen, Kalle, and Koskinnen, Kai. University of Technology Helsinki.
- PMI. 1999. *The PMI project management fact book*. Sylva, NC: Project Management Institute.
- Polanyi, Michael. 1967. *The Tacit Dimension*. New York: Doubleday Anchor.
- Schlichter, John and Duncan, William R. 1999. Excellence through standards: an organizational PM maturity model. *PM Network*. **1999** (February): 18.
- Slevin, Dennis P. and Pinto, Jeffrey K. 1991. Project leadership: understanding and consciously changing your style. *Project Management Journal* **22**(1):
- Thamhain, Hans J. 1991. Developing project management skills. *Project Management Journal*. **22**(3): 39-44.
- Turner, J Rodney and Huemann, Martina. 2000. Formal education in project management: current and future trends. *Connections 2000, Proceedings of the 31st Annual PMI Seminars and Symposium, Philadelphia*. Sylva, NC: Project Management Institute.
- Turner, J Rodney and Keegan, Anne. 1999. The versatile project-based organization: governance and operational control. *The European Management Journal*. **17**(3): 296-309.
- Van der Bent, Jan, Paauwe, Jaap. and Williams, A. Roger T. 1998. Organizational Learning: An exploration of organizational memory and its role in organizational change processes. *RIBES Paper 9855*. Rotterdam Institute of Business Economic Studies, Erasmus University Rotterdam.