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Learning to Practice : Practicing to Learn

By

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For Jimmy Bharney; stoic to the end...

...and Annie, who is always there.

Learning to Practice : Practicing to Learn

Abstract

There is clearly a lack of consensus regarding the terminology used to describe the exploitation of knowledge in an organisational context. The theory of knowledge exploitation is bound up in various concepts, the most familiar being Organisational Learning, Knowledge Management and the Learning Organisation. This report is an enquiry into the applicability of these concepts to the design led architectural practice.

Implicit within this study is a suggestion that the firm can be successfully (re)-designed. Chelsea Football Club provides a good example of a successfully redesigned 'organisation'. Their success is attributable to a combination of management (knowledge), talent (expertise) and investment (organisation). The results over one season have been impressive. This begs the question, is it possible to apply management theory to an architectural firm and achieve similar results?

The idea that a firm can achieve a competitive advantage by implementing a strategy based on the concept of the learning organisation is appealing, but is it realistic? The weakness of the proposition is an assumption that the concepts in question are good in principle and appropriate in practice. If the principles of the learning organisation can be successfully applied to an existing firm, then in theory it should be possible to design a new firm and achieve similar results.

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To the School of Architecture and Landscape at Kingston University I can only offer my apologies for the similarities between the title of this report and the name of their learning and teaching initiative. It was a subconscious sort of thing.

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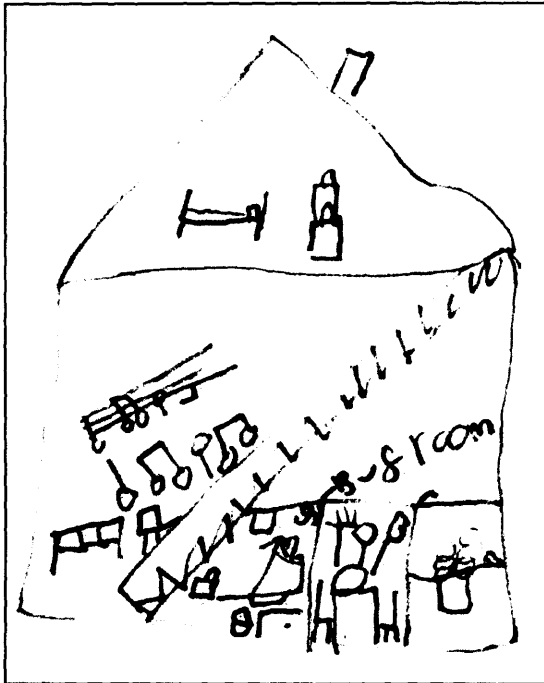
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INTRODUCTION



The Future of the Firm

Is it inevitable that the 'exit' of the principal, or figurehead, from the design led architectural practice will signify the end of the firm? The comparatively small number of design led firms that survive into the second generation and enjoy the same status implies that the death of the architectural firm is predictable. While this may sound sensational there is some anecdotal evidence to support the proposition.

In his studies into the nature of organisations Arie de Geus (1999) provides evidence to suggest that the average life of a company is forty years - the equivalent of a working career. He argues that most firms are commercial failures and adds those firms surviving into the second generation do so not by moving into different sectors of the same market but by moving into different markets. While there are numerous examples of long-lived firms they are distinguished by the fact they are, or were for a long time, family run firms under family control.

Senge (1999) argues, "In most companies that fail there is abundant evidence in advance that the firm is in trouble. This evidence goes unheeded, however, even when individual managers are aware of it. The organisation as a whole cannot recognise impending threats, understand the implications of those threats, or come up with alternatives." This he attributes to a firm's inability to learn.

Adopting a neo-classical interpretation de Geus argues that companies 'die' because management see it as an economic activity, a business and not a community of people. Based on this assumption de Geus advocates the 'living company', as an alternative model for the company; a sustainable community that exists for its own survival and improvement. One of the characteristics of the living company is an ability to learn, and unlearn, effectively. The idea of the 'living company' shares an ideological position similar to that of the learning organisation as defined by numerous management theorists and practitioners alike, including Argyris (1978), Senge (1999), and Ove Arup (1970).

A trend within the architectural profession provides some additional evidence. In the last few years the leading design led architectural practices have witnessed the departure of a number of their key personnel. Most have moved from senior management positions to take lead roles in either new or established firms. Although not significant in its self, what is notable is the similarities between the practices in

question. Firstly, the firms concerned are named after a principal who is also the founding partner. A second similarity is that the principals are recognised architectural 'stars' with national and/or international reputations. And thirdly the principals have either reached retirement age or are planning their exit strategy.

The most publicised of these 'departures' was that of Ken Shuttleworth's resignation from Foster & Partners in 2003 to set up his own practice. The approach adopted by Shuttleworth, in forming his new practice, Make, was to adopt a more egalitarian approach that recognised the need for the practice to extend beyond the influence or reputation of any one individual. So successful was Shuttleworth's strategy that a significant number of his colleagues also resigned from Foster & Partners to join the newly formed 'Make'. Other notable practices experiencing unexpected departures recently include Richard Rogers & Partners, Terry Farrell & Partners, MacCormac Jamieson Prichard, and Alsop & Partners.

It is no coincidence that the sudden death of James Stirling in 1992 precipitated the collapse of 'his' firm Stirling Wilford. Assuming that the firms in question had or were

implementing a succession strategy one might conclude from this evidence that the strategy adopted had failed.¹

The Problem

The assumption adopted in this report is the design led architectural firm will die, not because it is motivated by the desire to maximise profits over people, but because of the mindset of the organisation - principal(s), managers and employees - concede that the reputation and success of the firm is concentrated in the abilities of an individual, the principal partner. The death of the design based architectural practice is inevitable because it lacks a sustainable organisational strategy that provides for its continued success. Policy and strategy are, according to (Garratt, 2003) "...the worlds of the board and directors", which means the leader determines the future of

Figure 1

Building, 28.11.03
"Shuttleworth quits Foster to go it alone"

Building Design, 18.2.04
"Director Julian Tollast is the latest to leave Terry Farrell & Partners"

Building, 19.3.04
"Foster loses third man to Make"

Building, 2.7.04
"Marco Goldschmiedt quits as Rogers' managing director"

Building Design, 5.11.04
"Another partner quits Alsop's new practice"

Building Design, 10.12.04
"MJP loses three key directors"

¹ If however this was part of the firms exit strategy, that is to run the firm down, then it could be said that they will probably succeed.

the practice. On the exit, or retirement, of the founding partner the firm is faced with a limited number of options. They include:

- Reinvent the firm, (includes merge)
- Reposition the firm within the market (Coxe, 1987), (Winch & Schneider, 1993), (Smyth)
- Resign the firm to history

Hypothesis

The hypothesis of this report is based on an assumption that the inevitable exit or retirement of the leader and creative force of the design led architectural practice will have a detrimental impact on the continued success of the firm. The thesis is that in order to survive the principal's 'exit' the firm needs to design an organisational strategy that ensures the knowledge and abilities attributed to the principal are shown to belong to the firm as a whole. This new structure needs to be introduced prior to the exit of the principal to limit the damage resulting from the internal jockeying for position that will inevitably follow their departure. If management do not take steps to build structures to deal with this then the practice will either dissolve or be repositioned within the market.

Report Structure

This report is in four sections. Section One provides an overview of the concepts relating to the learning organisation and attempts to illustrate the interdependency of three aspects: organisation, knowledge, and learning. The section draws on management theory and attempts to set a context against which the architectural firm can be reviewed.

Section Two employs a similar structure and format to Section One, assessing the applicability of the learning organisation as a concept to the design led architectural practice. The 'practice' is considered under three headings - business, practice and project.

An email questionnaire was circulated to a select number of design led architectural firms. The purpose of the survey was to use the information gathered to confirm or refute certain assumptions relating to the behaviour of the design led firm. The

results of the survey are summarised in Section Three with copies of the questionnaire included in Appendix A.

The conclusions drawn from the study are summarised in Section Four.

SECTION ONE

*“Learning is
experience,
everything
else is
information”*

Albert Einstein.

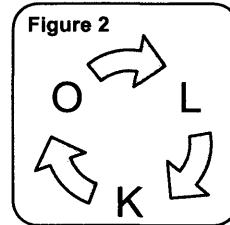
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It is pointless to describe theories of knowledge and learning in isolation because they don't exist in isolation.

They are interdependent concepts that define a strategic approach to the design of the organisation. This interdependency of the various 'concepts' is illustrated in

Figure 2. The organisation (O) provides the structure necessary for managing the project. The successful delivery of the project is dependent on the input of resources (K). The organisation, in providing access to projects becomes a catalyst for learning (L)

(Winch, 2004). The ability of an organisation to deliver a project is a function of the experience it holds in terms of resources. This experience translates as knowledge. Without knowledge, in the form of skilled resources, the organisation lacks a competitive advantage.

**Structure**

The following chapters will explore these concepts in more detail. Chapter one explores the nature of both the organisation and the firm and asks 'what is a firm that it can learn?' Chapter two will review the concept of learning, how we learn and why. The third chapter will review the concept of knowledge; how it is created, the knowledge worker, knowledge management, and the significance of information in a knowledge environment. The objective is to provide an overview of the various concepts and identify key components of the theories that might be applicable to the design led architectural firm. The scale and complexity of the subject coupled with the constraints of the report dictate the level of detail achievable. Therefore one of the objectives of the study is to identify areas of future enquiry.

Organisations

The term 'organisation' describes the means by which the roles and responsibilities of the various individuals are structured and co-ordinated to achieve more than the individuals could achieve alone (Douma, 2002). The organisation can be said to fulfil two sets of objectives; one is task focused – the delivery of the project, the other company focused – sustaining the firm.

According to Morgan (1996), organisations are, "...complex and paradoxical phenomena that can be understood in many different ways." Morgan's approach to defining organisations is to provide the reader with a metaphor that helps explain what the organisation is in terms of its structure; whether machine, political system, or instrument of domination. While valuable in describing the operational aspects of an organisation the use of metaphor reveals little about what constitutes an organisation. It provides us with a convenient way of reading the organisation, but does not provide an appreciation of what, as an ideology, the organisation represents.

Metaphor is also employed by Mintzberg (Douma, 2002) to define a range of organisational types. Mintzberg's work identifies not only a comprehensive range of organisational typologies but more importantly the mechanisms for internal co-ordination and information exchange within the various organisational types.

Most commentators agree that, in the project based environment of the professional services firm, the organisation exists to process information (Prusak, 1997; Doumas, 2002; Winch, 2004). Dawson (2000) develops this assumption and argues that the boundary between service, as intangible, and product has blurred to the extent that the transaction is a combination of both service and product. Information in a project context should therefore be regarded as the recorded instructions and directions (knowledge) necessary for product delivery. What we need to reconcile is the relationship between this information, its knowledge potential and the organisation.

Walsh & Ungson (Prusak, 1997) suggest that the retention of information within an organisation is attributable to the collective organisational 'memory'. They argue that although the organisation exists independent of particular individuals, it is individuals who acquire information in problem solving and decision making activities. Their thesis is based on three assumptions:

- As stated, organisations resemble information processing systems. (Implicit within this is an assumption that the information pertains to a project.)
- If the first point holds then organisations must 'posses' interpretive systems with which to scan and diagnose both the information and the environment in which the information exists. (This ability to interpret and diagnose is important as it reduces the level of project uncertainty.)
- While organisations may not have memory in a cognitive sense it is argued that the organisational culture, language and social interaction create the conditions necessary for retaining information and, by extension, knowledge. Significantly this information is available to all members of the organisation regardless of whether the original author is still a member.

In this instance memory is used metaphorically to describe the potential of an organisation for retaining knowledge and information.

Those that challenge the idea that organisations have memories include Argyris and Schon (1978), who argue that "...organisations do not literally remember, think or learn". Argyris argues that learning is a function of the individual and the organisations capacity for learning is bound by individual learning. It does not follow however, that individual learning leads to organisational learning. Although information is generated and held by individuals, an organisations ability to retain information is dependent upon established processes and procedures for recording and exchanging information.

Organisational Criteria

Argyris & Schon (1978) provide a definition of the organisation based on an ability to fulfil a number of functional criteria. These are:

- **Governance** - this describes "...an identifiable vehicle for collective decision and action". Although it is individuals who decide to act the decisions taken by individuals are made for the collective and adhere to rules designed for "...decision, delegation, and membership". This agreeing of and to rules by the collective is a pre-condition for being an organisation.
- **Agency** - the second criterion describes a commitment by the collective to act on a continuous basis, as an "...instrument for continuing collective action", such as

in a firm. This commitment by the organisation to continue working together is, in part, recognition of the efficiencies obtained by exploiting the knowledge gained from the original collaboration.

- **Task** – this is the focus of the ‘agents’ and describes the purpose of the organisation, which is to undertake ‘complex’ projects on a continuous basis for as long as the organisation persists.

Essentially, the organisation provides a structure, through a division of labour, which enables the design, coordination and delivery of the various tasks, or projects. In summary we can conclude that organisations don’t exist without consensus, they are task or project-based and require agents or resources to deliver the projects.

The Firm

As described by economists the firm is “An economic organisation that coordinates the process of production and distribution.” (Sloman & Sutcliff, 2001). As an economic organisation the firm is assumed to be profit motivated, unlike the organisation, which need not be. According to Ive & Gruneberg (2000), and Winch (2004) the starting point for understanding the economic theory of the construction related design firm is that it is project or task based. In contrast to the manufacturer, whose output is a physical product, the output of the design firm is (production) information, that is, information used by others to produce a physical asset. (see Winch, 2004).

The perception that the service provided by the professional firm is intangible needs to be reconsidered. While Dawson (2000) argues that all organisations are becoming professional service firms it is also arguable that the design firm has become a ‘manufacturer’ of information. The CAD data produced by the design firm and used by clients to manage its facilities could be considered a ‘product’ albeit one that requires specialist knowledge to produce, structure, and manage.

Whereas the output of the manufacturer is a result of the input of the manual worker in physical labour, the output of the design firm requires the input of the designer in the application of knowledge. This is not to argue that knowledge is a factor of production (Nonaka, 1995) (deGeus, 1999). The factor of production deployed in the production of information is Drucker’s (1969) ‘knowledge worker’.

Labour, as a factor of production, is generally measured by quantity, both in input and output. The design led architectural firm distinguishes itself not by the *quantity* of output but by the *quality* of output. Among other things, quality, within the design led firm, is achieved by knowledge of design coupled with a predisposition for excellence. If the quality of output is dependent on the quality of input then one of the problems faced by the design firm is the acquisition and retention of suitably qualified resources.

Retaining a strong knowledge base however, is no guarantee of success. The success of the professional organisation is, in part, attributable to the knowledge it 'owns', which is a product of the knowledge worker. Encouraging the knowledge workers to share their 'assets' with peers (competitors) is problematic. Dawson (2000) argues that "Knowledge management is largely about getting people to *want* to share knowledge". In this respect knowledge management is the management of knowledge worker(s).

Theory of the Design Firm

While the design led firms may not be strictly profit seeking, in the neo-classical sense, profit is a necessary requirement for their continued existence or solvency. Although a design firm might distinguish itself by its capacity for design and innovation, without profit it is unable to rent premises, purchase equipment or to pay salaries. It could therefore be argued that the continued survival of the firm is its ability to generate profit - or income (Ive, 2000).

The profits of a firm come from selling its labour, or knowledge, "...at a value greater than that of the inputs used up in its production" (ibid). With a labour market limited by a scarcity of skilled knowledge workers, and high barriers to entry, the outputs of a design firm must also be limited. One proposal for addressing a shortfall in the supply of resources is, as Drucker (1969) suggests, increasing the yield of the available resources to compensate for the deficit. This, he proposes, is achieved through increasing the effectiveness of the available resources - its knowledge. The objective of the design led organisation is therefore to increase the effectiveness of a limited labour pool in order to generate additional income with which to continue to practice.

Paradoxically, the supply side of the labour market for architects is characterised by a reluctance to exploit the market. Ordinarily a skills shortage, coupled with the high barriers to entry associated with architecture (Foxell, 2003), would result in a sellers market where workers are "...able to exact relatively high wages and advantageous working conditions". (Ive & Gruneberg, 2000). On the contrary, architects who restrict themselves to working for design led practices typically offer their services at a discounted rate. This is offset against the experience (knowledge) and prestige to be gained from the association with such firms. In fact it is not uncommon for young graduate architects, particularly Asian students, to offer their services free to 'reputable' design led firms.²

Winch (2004), notes that the organisational structure of the design led firm needs to reconcile the conflicting demands imposed by two competing forces. This can be described as the practice / project dilemma. At a practice level the firm consists of a labour pool of architects all of whom conform to a particular design ideology and an established organisational culture. The directive of those employed by the firm is to maintain the design reputation of the firm whilst deployed on projects. At a project level the architects are assembled into project teams within the organisation. On large projects these teams are in turn 'seconded' to the wider project coalition. As part of the coalition the architects are coerced into adopting the requirements of the coalition leader - typically a project manager or a professional client. This often results in a conflict of ideology and a dilemma for the architectural design team.

Summary

Organisations don't learn, the people that make up the organisation learn. Learning is held by individuals within the firm as knowledge. The organisation becomes the repository of the codified knowledge of its constituent parts –a library. There is a dynamic quality to the organisation. As the resource base changes so to does the quality of the knowledge held by the organisation. Argyris & Schon (1978) also argue that in an organisational learning context it is the active process of organising that is important and not the static condition of the organisation. The act of organising has both the potential to create information loss, through the process of reinterpretation or information change through a process of refinement. Equally important to the learning process is the ability to un-learn in order to re-learn.

² Katrina Rudi, Head of Diploma at Kingston School of Architecture, mid 1990, often berated students for offering their services free. Not only did it reflect badly on the profession, who were complicit in the exploitation of free labour, but it also affected the position of new graduates who were unable to compete for scarce jobs.

Knowledge

In Mackintosh (1996) human capital is defined as, “The level of knowledge and skills embodied in the work force through education and training.” The theory is that effectiveness can be improved through learning. Human capital is, “...produced by investment, depreciates and requires replacement”. The assumption is that the higher the level of investment the higher the output of the resource and income to the firm. However, maintenance of this ‘asset’ also requires greater levels of investment.

Economists generally describe firms as being either labour-intensive or capital-intensive. Starbuck (Prusak, 1997) proposes a third type; the knowledge-intensive firm. This term defines the critical inputs of a firm. Starbuck argues that understanding the nature of the inputs, and outputs, of the firm enables us to understand the structure and operations of the firm, for instance, the dominant factor in a knowledge-intensive firm (KIF) is ‘human capital’, which has significantly different requirements from a firm dominated by physical or financial capital. Starbuck also advises against trying to define the term knowledge too widely as it has the effect of diluting the concept. His criterion for a knowledge-intensive firm is that at least one third of employees are experts with “...formal education and experience equivalent to a doctoral degree”. To remain innovative, the learning organisation requires changes in personnel – the introduction of new knowledge. The individual experts learn little from joining firms, the firm is interested only in the expertise the individual has to offer, which is rewarded by salary. This introduces the complexities of the theory of principal and agent (Douma, 2002).

Anecdote 1 - Fee proposal for consultancy services on an infrastructure project

Is there any incentive to the design team in implementing a learning policy on a project particularly as the benefit is to the client in the first instance?

As part of a call-off contract a multi-disciplinary consultant was asked to submit a fee proposal for additional work to a project they had previously been involved in. Points of interest:

- The proposal was submitted by a team new to the project.
- The team apparently lacked knowledge of the consultant’s bidding procedures.
- Even though the consultant had no competition the proposal included the time involved in assembling the bid.

With the consultants previous experience of the works the client had expected some economies based on previous knowledge. In fact the fee proposal exceeded expectations by 150%.

With the earlier commission the client effectively ‘funded’ the consultant in gaining knowledge of the design problem. With a re-design the client would expect the consultant to draw on that knowledge to develop designs proposals. What was proposed was another ‘funding’ exercise with the consultant’s new team re-learning both the project and the problems.

This raises practical concerns regarding learning and knowledge management within firms. If there is an assumption that clients will effectively fund the design regardless of the level of knowledge existing on the project then consultants are likely to act opportunistically.

Knowledge confers certain advantages on an organisation. As intellectual capital, knowledge is a commodity with an economic value and can be traded. It can also provide an organisation with a competitive advantage. Knowledge also has certain disadvantages. One of the paradoxes of knowledge is “the value of information can only be revealed to another party by disclosing that information, while such disclosure destroys its value” (Douma, 2002). Therefore in order to exploit the economic value of knowledge one has to reveal it thereby compromising the competitive advantage of the firm. In this sense knowledge can be said to depreciate.

It is possible to distinguish two types of resource in the construction industry; manual workers and knowledge workers. Manual workers are tasked with resolving the ‘manufacturing’ or, construction problem. Knowledge workers on the other hand, as defined by Drucker (1969) are the product of the “knowledge society” and rely on intellectual ability rather than physical ability as the means of production. In a service based economy the knowledge worker effectively replaces labour as the factor of production.

Prusak (1997) supports this view and goes further by suggesting that, due to the availability of capital, knowledge, or specifically intellectual capital, as a ‘scarce’ resource could replace capital as a factor of production. Penrose (1985) contends it isn’t ‘labour’ that is the factor of production but the *service* the labour provides. Penrose argues, “services are a function of the experience and knowledge accumulated within the firm, and thus firm specific”. In essence, the firm is a repository of knowledge. As many agree, knowledge is not autonomous, “...knowledge is essentially related to human action” (Nonaka, 1995). The management of knowledge could therefore be read as a metaphor for the management of knowledge workers.

Kogut and Zander (Prusak, 1997) distinguish between two categories of knowledge; information and know-how. Knowledge as information is knowledge that can be exchanged without losing its ‘integrity’. Knowledge as know-how is “the accumulated practical skill or expertise that allows one to do something smoothly and efficiently”. This is essentially a re-stating of Polanyi (Prusak, 1997) and Nonaka (1995).

Managing Knowledge

One of the characteristics (and frustrations) of Knowledge Management (KM) is the absence of an unambiguous definition. As a concept the term must obey certain rules. Without agreeing the parameters of the concept there can be no meaningful enquiry into its applicability. If everything relating to knowledge and learning can be classed as knowledge management, then there is no need for the distinction – the term loses its significance. Clearly this is not the case.

The lack of consensus on a generic definition for the term knowledge management can be attributed to the following:

- The debate over application and theory.
- The appropriation of the term by various authors.
- The number of associations of the term.

Application - The confusion caused between the practical (applied) and the theoretical (academic) interpretations of KM are highlighted by Chris Argyris (1999) who suggests that the problem is the product of the conflicting views of two protagonists: practitioners and academics. Argyris suggests that the 'learning organisation' reflects the practice-orientated prescriptive approach of practitioners and consultants, while the term 'organisational learning' represents the more sceptical views of academics. He concludes, however, that the 'schools' agree on two points; that the concepts are desirable and that there are threats to the principle of productive organisational learning.

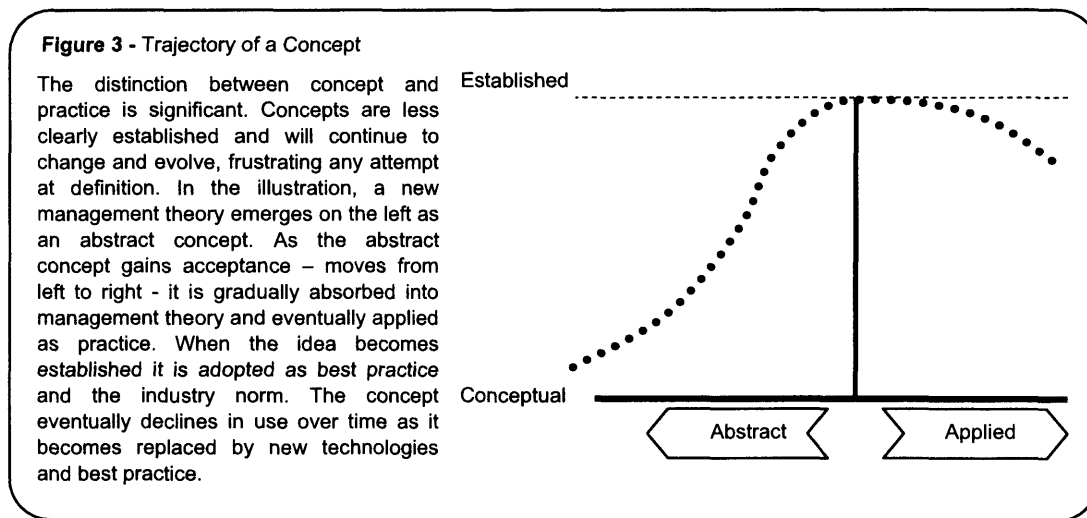
Appropriation – This consists of an undoing, or deconstruction³, of the concept and might be seen as an extension of the previous point. By undoing (analysing) the meaning or significance of the concept the author can redefine it to conform to his/her particular terms of reference thus facilitating the migration of the concept to the respective industry or sector of the author.

³ Deconstruction: The term denotes a particular kind of practice in reading and, thereby, a method of criticism and mode of analytical inquiry. In her book *The Critical Difference* (1981), Barbara Johnson clarifies the term:

"Deconstruction is not synonymous with "destruction", however. It is in fact much closer to the original meaning of the word 'analysis' itself, which etymologically means "to undo" -- a virtual synonym for "to deconstruct." ... If anything is destroyed in a deconstructive reading, it is not the text, but the claim to unequivocal domination of one mode of signifying over another. A deconstructive reading is a reading which analyses the specificity of a text's critical difference from itself."

[First paragraph of a four-page definition of the term deconstruction in J.A. Cuddon, *A Dictionary of Literary Terms and Literary Theory*, third ed. (London: Blackwell, 1991)].

As with any hypothesis, the concept gains credibility by testing it against industry norms. Over time a body of evidence is established confirming the value of the concept within the newly defined terms of reference. Eventually the concept acquires the status of best practice. The migration is complete as the term transfers from being a concept to established practice, Figure 3. The adaptation of a concept applying in one industry to satisfy the requirements of another industry is in itself knowledge creation.

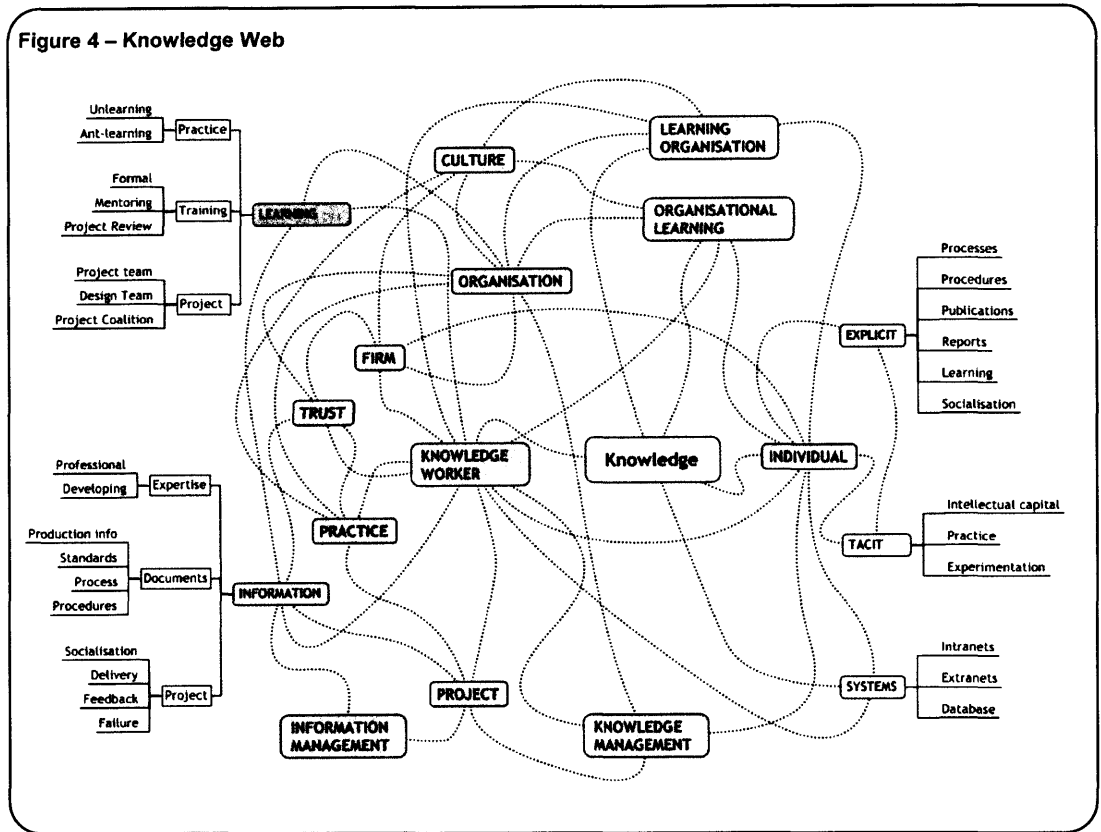


Association - Providing a definition of the learning organisation as a concept is complicated by the variety of complimentary concepts the term is associated with. This is illustrated in Figure 4, which highlights the inter-relationships between the various concepts. The following is a summary of the principle issues.

“Organisations are, in essence, **information processing** systems” (Winch, 2004) or “arise as solutions to **information problems**”, (Doumas, 2002). The information problem is resolved by the application of knowledge. Knowledge is a product of the individual, who is distinguished by his/her level of expertise. Within the organisation these knowledge producers are known as **knowledge workers**.

For knowledge to be to be effective it needs to be applied. In a project environment it is the management of this knowledge that determines the success of the project – that is utilizing the appropriate skill sets at the appropriate stage of the project. At a simplistic level knowledge is what individuals know. This ‘knowing’ is acquired through a combination of **learning** and/or experience, and has been accepted as comprising two distinct aspects, tacit knowledge and explicit knowledge.

Tacit knowledge as defined by Nonaka (1995) consists of that knowledge which is gained by experience and is not readily transferable, for example riding a bike. **Explicit** knowledge is knowledge that can be recorded or codified with the minimum loss of integrity. Explicit knowledge is generally held in the firm's procedures, standards and processes.



Knowledge resides with the individual, information with the organisation or firm. A reciprocal contract is established whereby the individual is bound to exchange knowledge with the organisation (others within the firm) as part of the production, or problem solving, process. This is, in part, recognition of the fact that the organisation provides the knowledge worker with access to larger projects and a source of learning with which to supplement their knowledge.

Nonaka (1995) argues that although the terms knowledge and information are used interchangeably there is a clear distinction to be made between them. Knowledge, he suggests is about beliefs and commitments, action and meaning. **Information** on the other hand provides a new perspective, which in turn generates new knowledge. Information “affects knowledge by adding something to it or restructuring it”.

Information has a number of connotations. At a **project** level it describes what is required in terms of project delivery, that is, “the reduction of uncertainty through time” (Winch, 2004). At a **practice** level information is concerned with the exchange of knowledge as learning within the organisation. The objective being to ensure that all knowledge generated by the organisation is retained by the organisation.

Knowledge is generally discussed in terms of the management of codified knowledge, that is knowledge recorded and stored in a format accessible by others, in other words information. If knowledge is embodied in the individual then the knowledge worker assumes far greater significance in the production process. Some commentators argue that the basis of knowledge management is in the capturing, storing and retrieval of information. If knowledge is a resource and management is a practice (Drucker, 1969) then by acknowledging the central role of the knowledge worker in the production of knowledge it is arguable that the management of knowledge becomes the management of experts and specialists, which requires a completely different set of skills. According to Drucker the knowledge worker is self motivated and requires the minimum of management intervention.

If we can argue that knowledge management is the management of the organisations expertise with the aim of ensuring the knowledge possessed by the organisations ‘experts’ is retained by the organisation for the benefit of all then we might conclude that knowledge management is the management of organisational learning.

Anecdote 2 – “We could be the team that builds Crossrail”

During the recession of the early 1990's, a large multi-disciplinary engineering firm was forced, through a downturn in the market, to make redundancies. The first casualties were the long-term, experienced, agency staff, whose contracts were abruptly terminated. The methods employed by the company in making redundancies were, it was said, not the most tactful and caused a good deal of resentment among employees generally.

The company director responsible for transport, keen to retain his 'core' team, invited the contract staff to a meeting. His objective was to convince them, as a team, to remain with the company. He explained that as a 'core' team they had amassed sufficient transport related knowledge to allow them to become a major competitor in the transport market. He maintained that the firm could ride the recession by winning key contracts. However, in order to succeed and keep the 'team' together while bidding for contracts the director argued that the contract staff would have to agree to a reduced rate of pay in line with that of full-time employees. By agreeing to this condition, he said, “We could be the team that builds Crossrail”.

While the gathered assembly were considering this a voice from the back of the meeting shouted, “We will build Crossrail, it just won't be with you”.

This example provides an illustration of a type of knowledge worker that has no commitment to any organisation. As self-employed agents their loyalties remain to themselves. There is little incentive to them in part-funding the marketing drive of another organisation. If they choose to work on a particular project they merely apply to the successful bidder and take their knowledge with them – their future prospect isn't necessarily tied to the success of their current employer.

The problem for the employer is that, unless managed, the knowledge gained by the knowledge worker through working on various projects will leave the organisation when they leave. The new employer will have won not only the project but gained an instant knowledge base. The knowledge worker improves his/her appeal by moving around and gaining a broad knowledge base. This option is not available to the full time employee as they are tied to the systems and culture of the parent organisation. They are career driven, which demands a long-term commitment to the organisation.

Learning

There is a generally held view (Argyris, 1978, Senge, 1999, Prusak, 1997) that organisations know less than the individuals that make up the organisations. It is the resolution of this paradox that frames most of the debate on learning within the context of the organisation. The consensus is that continuous learning is an activity that all organisations need to engage with if they are to remain competitive. This section summarises the theory of some of the principle commentators on learning.

All organisations are constantly engaged in learning. However to be effective the learning process needs to be structured or strategic. Most learning in firms consists of survival or adaptive learning that is learning in response to the forces of the market. Although this form of learning is important the organisation must include what Senge (1999) calls 'generative learning'; that is, "learning which enhances our capacity to create."

In their studies into learning Argyris & Schon (1978) identified a number of traits, which they named espoused theory and theory-in-use. Espoused theory is how individuals (and organisations) think they will act under certain conditions. This is based on a theory of action by which they are guided, their norms, how they wish to be seen by others. Conversely, theory-in-use, is used to explain how individuals (and organisations) actually behave under those conditions. They conclude that a discrepancy exists between the values expressed publicly and the reality when confronted with a problem.

The espoused theory of the organisation is recorded in policy statements, vision statements and job descriptions. These documents serve a useful purpose in selling the organisation to clients and employees. Unfortunately they often conflict with the theory-in-use. The challenge for the learning organisation is to reconcile the contradictions between the espoused theory and the theory-in-use.

The concept of agency is used by Argyris & Schon (1978) to describe the relationship between the individual and the organisation. The assumption is that as agents of the organisation, individuals will work towards maintaining the organisations theory-in-use. By managing their environment the agent seeks to ensure outcomes correspond to expectations. Any errors identified are corrected. This corrective action involves a

process of evaluation leading to new assumptions requiring new strategies. “Error correction” is, they argue “...shorthand for a complete learning cycle.” Organisational learning can be said to occur when the new strategy (learning) becomes the revised theory-in-use.

Learning Cycles are used to identify and modify internal and external changes within the organisation through detection and correction. Argyris & Schon (1978) identify three types:

- Single-loop learning, is concerned with effectiveness, that is, how to achieve existing objectives and resolve problems within the range specified by the organisational norm.
- Double-loop learning requires that the norms themselves be modified, that is at a strategic level.
- Deutero-Learning, describes the process of learning to learn. This assumes that organisations need to develop the capability to completely restructure at regular periods in order to remain competitive.

Senge (1999) argues “organisations learn only through individuals who learn. Individual learning does not guarantee organisational learning. But without it no organisational learning occurs”. He goes on to state that learning organisations are not possible unless there are people at every level who practice it. He proposes five disciplines as a means to achieve organisational learning. They are:

- *Personal Mastery* – clarifying what’s important particularly with respect to personal learning.
- *Mental Models* – prejudices and assumptions that shape how we see things.
- Shared Vision – the ability to galvanise people as a single unit with a common goal.
- *Team Learning* –learning how to work, bond and excel as a team.
- *Systems Thinking* – the fifth discipline and one which “...integrates the disciplines, fusing them into a coherent body of theory and practice.”

Systems Thinking, as advocated by Senge (1999) is a “...discipline for seeing wholes”. He argues, “...organisations break down because they are unable to pull their diverse functions and talents into a productive whole”. The system is based on feedback loops, not dissimilar to Argyris & Schon’s, and illustrates how actions can

reinforce or balance each other. The feedback process is a learning process, which overturns deeply ingrained ideas and beliefs. How and what we learn is specific to the organisation and the role of the individual within the organisation.

De Geus (1999) proposes the following types of learning:

Assimilation – deals with assessing information “...for which the learner already has structures in place to recognise and give meaning to the signal.” This is effectively the traditional way of learning.

Accommodation - requires a fundamental change in beliefs, ideas and attitudes.

The focus of Nonaka's (1995) theory is in knowledge creation, that is, learning as it pertains to the delivery of the project. He offers the knowledge creating company as a more refined version of the learning organisation. This describes a culture of continuous renewal and re-creation and where everyone is a knowledge worker.

While there is evidence to suggest that everyone in an organisation can contribute to the well-being of the company, to categorise everyone as a knowledge worker dilutes the concept. For the purposes of this report knowledge workers will conform to Starbucks definition (Prusak 1997), that is an 'expert'.

De Geus sees decision making as a learning process. Information is provided, evaluated, assessed and decided upon. The process is one of being informed and informing others. His analysis adopts a format similar to Senge's circle diagrams. The stages of evaluation are, *perceiving, embedding, concluding* and *acting*. Implicit in this is a view that organisations are constantly learning, particularly through the exposure of individuals within teams on projects.

The paradox of learning, as it applies to project related learning, is that the knowledge gained will by necessity become redundant relatively quickly. The drive for competitive advantage ensures that the previous paradigm becomes redundant. Advantage is gained through devising innovative means of improving delivery; innovation, by definition, implies change.

Although there is no consensus regarding a strategy for implementing theories of knowledge and learning the concept remains attractive. Rather than assuming a global theory we need to recognise that the theory is peculiar to the individual organisation, that is, the theory is developed specifically to suit the requirements of

each organisation. The task of management is to record how the organisation currently works and develop a concept that supports these methods. Once described and implemented by management the concept will become a self-fulfilling prophecy. Knowledge will continually be added to and adjusted through a learning cycle – (Senge, 1999), or spiral - Nonaka (1995). In theory learning and, by extension, change will become a constant – a means of maintaining competitive advantage.

SECTION TWO

*“There is hope
in honest error,
non in the icy
perfection of the
mere stylist”*

Charles Rennie Macintosh

B(O)PP

The idea of the professional practice, as explained by Davis & Knell (Foxell, 2003) was developed in the 19th century to

“persuade society that their services were of such public significance that they should not be left to the vagaries of the market, but should be safeguarded in publicly accountable monopolies.” There were two advantages to the protection of the title ‘architect’. Firstly, it ensured that society, and not just the client, was provided with high standards of performance, behaviour and conduct. The other benefit was that the competition for services was restricted to the profession resulting in high barriers to entry and a code of conduct to govern behaviour and performance. As Foxell (2003) argues, this adherence to a code of conduct inspired trust in the conduct of the profession.

Figure 5

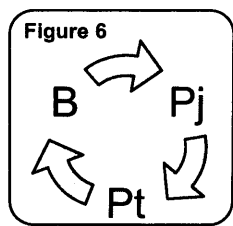
“..an Institution for the general advancement of Civil Architecture, and for promoting and facilitating the acquirement of the knowledge of the various arts and sciences connected therewith; it being an art esteemed and encouraged in all enlightened nations, as tending greatly to promote the domestic convenience of citizens, and the public improvement and embellishment of towns and cities”.

Extract of RIBA Charter 1837

During the Thatcher era, the profession was deemed to be self-serving and the protection it enjoyed was brought into question. While de-regulation and commercialisation (that is the promotion of the client’s agenda over society) has begun to undermine the status of the architectural profession, the design led firm still retains the principle of professionalism as an ideal and practices accordingly.

Section One of this report provided an overview of the elements that constitute the learning organisation. In an effort to report a complex subject concisely the various aspects of organisation, knowledge and learning were discussed separately. This section adopts a similar approach with its analysis of the architectural firm. The review comprises three parts, Business, Practice and Project, which correspond to those in Section One. These categories provide a convenient means of summarising the structure and operation of the architectural firm, see Figure 6.

Business (B) refers to the organisation of the firm, its strategy, how it is managed, the culture that it fosters and the sectors it operates in. The direction of the firm is ratified at business level but established at practice (Pt). Practice (Pt) refers to the knowledge base of the organisation, which determines the ethos, size and type of project that it is prepared to undertake. The final part, project (Pj),



deals with production. This is how the expertise and knowledge of the practice is used to produce the information necessary for project delivery. The project also provides opportunities for interrogating new ideas and for testing new techniques and technologies which all feed back into the practice as part of the learning cycle.

Business (Organisation)

The architectural practice is defined by the type and quality of knowledge it possesses (Duffy, 1998). Knowledge of design is a prerequisite for the architectural firm; this is the service they provide. Exceptional design ability however distinguishes the design led firm and uniquely positions it within the market. This 'exceptional' design is achieved through a process of continual experimentation and innovation; normally explored through competitions or on projects. The architectural firm can distinguish itself by one of two ways in the market, by negotiating on price or by creating a competitive advantage based on differentiation. The design led architectural firm adopts differentiation, as opposed to price, as a business strategy (Porter, 1985).

As Winch & Schneider (1993) conclude, the strategic management of the design led architectural practice is not easily defined. The practice must reconcile a number of competing forces, including the demands of the client, peer pressure and architectural integrity. Market positioning assumes that the values of the practice are either business centred or practice centred (Coxe et al, 1987), (Winch & Schneider, 1993), (Smyth) Such simplification is convenient for managing matrices but it fails to consider more complex influences such as a social agenda or an environmental agenda.

In its professional capacity the practice is in a position to decide which set of values to adopt – assuming they understand that the choice is limited to two, business or practice. The design led firm chooses its market position by default; it is driven by the desire to produce architecture or improve society. The economic firm chooses its position by design; it uses architecture as a business proposition. In this scenario the market positioning matrix as proposed by Coxe (1987) and Smyth is a record of positioning, not a strategic tool for planning.

As an organisational type the architectural firm conforms to the definition of the innovative organisation as proposed by Mintzberg (Douma, 2002). Coordination within this organisational type is managed by a process of mutual adjustment or informal communication. However it is likely the different functions of the firm will apply different organisational typologies.

The Future of the Firm

Design ability falls into the category of tacit knowledge. This is considered to be an innate skill and not easily transferable, which sustains the impression of the principal as artistic genius. If the reputation of the firm is built on a presumption of knowledge then the objective of the firm is the transfer of this knowledge or reputation from the individual to the firm. If the firm is personified in the individual then it will literally 'die' on the exit or departure of that person.

Henry Mintzberg (1999) notes the danger of placing too much reliance on an individual. "This approach", he quotes, "encourages cultures of dependency and conformity that actually obstruct the questioning and complex learning which encourages innovative action". Mintzbergs' key question is "what good is the great leader if everything collapses when he or she leaves?". His thesis is that the principal is **not** the organisation. This issue is complicated by the fact that the principal must set the agenda.

There is a suggestion that the transfer of 'reputation' may not be a realistic proposition. In response to statement 01.4 of the survey, which states:

"It is generally recognised that the success of the firm is based on the reputation of the principal partner(s)."

One respondent replied, "The principal partner does not want to credit others and ensures that they are not credited in writing if possible".

Figure 7 RIBA Journal editorial

"You might like to think an architect would like nothing better than to have their name survive after their death or retirement. Not Richard Rogers, though. He has a clause written into the constitution of Richard Rogers Partnership obliging the firm to change its name two years after he leaves or retires."

From the quote provided in Figure 7 it would appear that other prominent architects are equally reluctant to share the credit.

The survey (Section Three) supports the notion that the reputation of the design firm is based on the reputation of the principal (statement 01.4). 63% agreed with the statement and 25% disagreed (see Section Three). Of the total number of firms targeted 60% have a 'named' principal, that is, a recognisable figurehead. In reviewing the responses of those who disagreed with the statement 10% were from a 'named' firm. We can conclude therefore that the majority of the 25% who disagreed with the statement, belong to firms with no readily identifiable principal(s). In these firms the association of reputation with individual is not well established and

consequently the future of the firm is not (yet) bound up with the continued involvement of any one of the principal(s).

The fact that the majority of those respondents from firms with 'named' principals consider the reputation of the firm to be bound up with the reputation of the principal is recognition of the fact that the continued survival of the practice, and their position within it is dependent on one person. Hypothetically, if this is common knowledge then there should at some stage be a noticeable deterioration in the quality of the work produced as experienced staff seek secure positions elsewhere. This will be reflected in peer review and will ultimately re-position the firm in the market. The super-positioning of the practice in the market will obviously influence the quality of architects willing to join, see Figure 1. A weaker knowledge base is likely to result in weaker design, which will impact on the firm's reputation triggering a further cycle of staff churn and re-positioning. This cycle will persist until the firm is either re-positioned or folds.

The assets of the knowledge-based company are in its intellectual capital or knowledge base. As the firm grows the complexity of the information problem (Winch, 2004) grows, demanding greater levels of coordination and involvement from the team. No one individual will be capable of resolving the information problem. Failure to design an organisation that retains the knowledge worker will inevitably result in the failure of the organisation.

Practice

In 1970 at the age of 75 Ove Arup (1970) delivered what has become known as 'The Key Speech', this was his vision statement. In it Arup stressed the importance of the individual within the organisation. He recognised that the success of the firm is dependent on the quality of the employee and highlighted the need for expertise in all project related undertakings. Of the few design led firms (although not architectural) that have survived beyond the first generation, Arups is the most successful and impressive model. Ove Arup recognised the importance of the knowledge worker in creating a world class firm and established the cultural condition necessary within his firm for what has now become known as the learning organisation.

As observed by Winch & Schneider (1993) the architectural practice is a knowledge-based organisation with only "...the expertise of their staff as assets with which to trade". They are distinguished by being a "...service organisation, a professional organisation, and a creative organisation" – aspects which correspond to our subdivisions of business (professional), practice (creative) and project (service). The distinctive competence of the design led firm is creative innovation. This requires **talent**, which provides ability and knowledge, and a **project**, which provides the outlet for practicing or exercising knowledge. The term 'practice' describes the work of the professional firm and quite literally refers to the process of continuous improvement, or learning.

Given that staff are the key assets of the architectural practice then maximising their effectiveness should be a priority. This could be managed by structured or strategic learning initiatives. Surprisingly, or perhaps not, the results of the survey suggest that firms generally lack a culture of organisational learning. 62% of respondents acknowledged that learning occurs on the project. Given the project is primarily concerned with the production of information for construction purposes this suggests that the design ability of the firm is concentrated in a select core group.

Learning within the firm occurs in a variety of ways. Architects often hold part-time teaching positions in the schools of architecture. This has a number of benefits. For the newly established firms it provides supplementary income. For the established firms it provides the architect with a forum for testing and exploring a wide range of architectural ideas and enables them to address complex theoretical design issues.

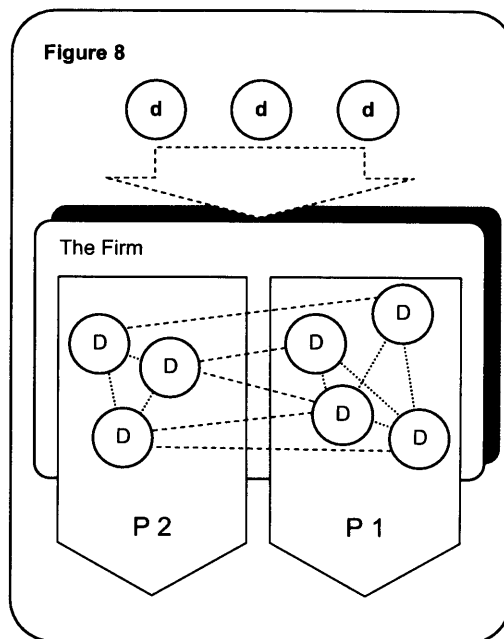
This ensures that the practice is familiar with current architectural theory and may also influence the design direction of the practice.

The internal design review provides another vehicle for learning. Ideally the review will be open to the office, which encourages experience gained on a range of projects to be fed into the project under review. The review encourages knowledge exchange through socialisation. By addressing design issues in this manner tacit knowledge can be drawn out and shared for the benefit of all.

Projects are defined by the client's requirements, which impose constraints to innovation both directly, through the detail of the brief, or indirectly through the need to maintain the client's trust. The design competition, also constrained by a brief, allows greater freedom of expression – precisely because the risk lies with the practice. The design competition is the equivalent of research and development. It is popular among design practices because it provides the means of testing theoretical propositions and developing new knowledge.

Practice as Organisation

The organisation of the firm can be considered under three separate headings. The **business** aspect deals with governance, strategy and leadership; **practice** deals with the ideology of the firm; and **project** deals with the firm's ability to deliver a fully coordinated and compliant set of production documentation. The role of the knowledge worker within the practice is illustrated in Figure 8. **The Firm**, as shown in Figure 8, is a repository of knowledge workers, (**D**), drawn from the market for labour, (**d**). The knowledge workers are assigned to project teams, (**P1**), (**P2**). The complexity of large building projects requires that projects are broken down into manageable work packages, for instance, cores, external walls, finishes. Applying the principles of the division of labour, the architects, (**D**), or knowledge workers, are each assigned a package of work. The division of labour, by forcing the architect to resolve detail problems, imposes constraints on the architect's ability to design resulting in a

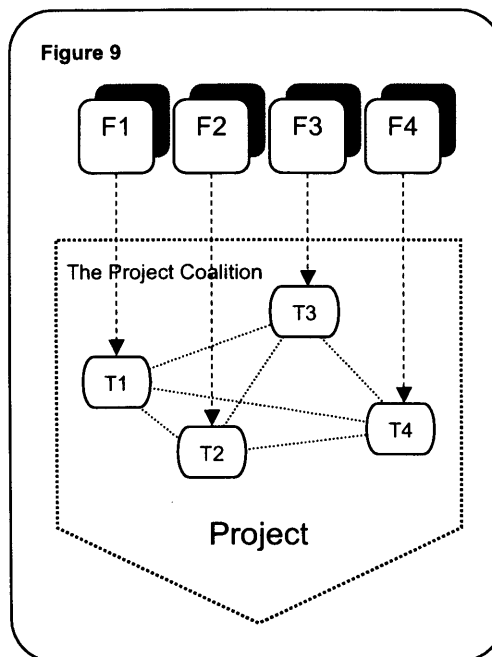


frustration expressed as anti-learning. Anti-learning describes the resistance of architects to comply with practice procedures preferring instead to re-invent or apply procedures and processes learned at their previous employer. 43% of those surveyed confirmed that architects reinvent systems while engaged on the project. A further 62% stated that architects have a tendency to revert to systems learned in their previous job.

The management of the project relies on establishing a series of internal networks as shown in Figure 8; this is to ensure the project is properly coordinated. Information exchange on the project is, referencing Mintzberg (Douma, 2002), by mutual adjustment or informal communication. Additional informal networks are also established *between* projects to exploit the collective knowledge of the practice. With complex projects no one agent can possess all the expertise (knowledge) necessary to successfully deliver the project. The weakness of the knowledge worker as sole practitioner is that they don't know what they don't know. The organisation as a collective of knowledge workers addresses this by creating networks where the information can be reviewed and resolved by consensus.

Project

As an information-processing industry (Ive & Gruneberg, 2000), (Winch, 2004), effectiveness within construction is an ability to generate and exchange information efficiently within the project. This is represented by the network linking the various teams on the project **T1**, **T2**, **T3** and **T4** in Figure 9. This exchange of information extends beyond the dictates of the project. Projects are temporary by definition and delivered by temporary organisations (Ive & Gruneberg, 2000). These temporary organisations, **T1** - **T4** or temporary coalitions (Winch, 2004), comprise disciplines drawn from various permanent organisations, **F1** to **F4**. On completion of the project the temporary coalition disbands and its members are absorbed back into their respective firms, **F1** to **F4**, taking the project knowledge with them.



The purpose of the architectural firm is the resolution of the information problem associated with delivery of the project. This is achieved by utilising the knowledge of its resources, whose expertise is acquired on projects. The capacity for an organisation to learn is therefore limited by the quality, type, and duration of the project.

The construction industry is a project based industry (Winch 2000). It comprises teams drawn from numerous consultancies tasked with collaborating on the design and coordination of a one-off site-based project. Winch (ibid) in his analysis argues that on larger projects the project coalition tends to bond as a unit and develop *project* allegiances as distinct from their individual *practice* allegiances. From a knowledge and learning perspective the weakness of the coalition is an inability to fully exploit the knowledge gained on subsequent projects. The knowledge gained on the project is lost when the project ends and the individual team members return to their respective organisations.

There are parallels within the architectural firm. In practice, projects are executed by dedicated teams with a mix of skills and abilities (disciplines) ranging from design to

contract administration and CAD/visualisation. These teams conform in many respects to the temporary project coalition described by Winch (2004).

Within the design led firm teams are assembled from a pool of resources, the knowledge capacity of the firm, which provides the requisite skills and expertise necessary for delivering the project – the knowledge workers. Teams are assembled for the duration of the project, they form as a unit, establish norms, or coordinating conventions, perform as a team in delivering the project and eventually disband. The knowledge accumulated in this process is often lost as the various ‘disciplines’ are reassigned individually on a needs basis. The ‘stormin’ associated with establishing new teams is partly the frustration of individuals attempting to introduce procedures developed while working on the previous project. This could be partially compensated for by codifying experience in the form of procedures. Making knowledge explicit enables architects to move between projects without the need to reinvent systems each time thus reducing both the learning curve and the transaction costs associated with forming teams.

It should be noted from the outset that architects don’t make buildings, constructors do. Architects ‘make’ drawings. As knowledge workers, architects generate new (original) knowledge in the form of ideas. This knowledge is codified as a drawing and exchanged as information. The information is recycled by various parties, diluted by ‘value engineers’ and eventually used as the blueprint for the ‘product’, the building. The potential for information loss and information corruption in the exchange of information in this manner is high. As Quintas notes “...the assumption that knowledge created in one context can be understood and relevant in another context without a great deal of work, may be misleading”.

Architects develop propositions that combine both tacit knowledge on design and explicit knowledge on codes and regulations. As information passes (knowledge transfers) between the various project disciplines - Client, Designer, PM, Consultants, Contractor, Sub-contractor - information becomes lost or corrupted.

The implications of implementing changes to the project without an appreciation of the tacit base on which the information was produced may not become apparent until a later, and more critical stage in the project, resulting ultimately in additional cost.

SECTION THREE



Survey

A survey in the form of a questionnaire was produced and issued to architects in fifteen design-based practices in London. A total of seventeen responses were received from ten practices. Of the responses received one provided written evidence only and has been excluded from the count leaving a total of sixteen responses. The survey is qualitative in scope and designed on an ordinal scale eliciting responses to statements of opinion. Allowance was made for the provision of additional information as evidence in support of answers. To ensure an acceptable return the survey was restricted to those firms with established contacts. Consequently there are a number of notable omissions from the list of firms.

The questionnaire is in three parts, each with eight questions. Each part mirrors the sections of the main report; Business, Practice and Project. The totals from the survey are shown on the Results sheets on the following pages. Results are in percentages to one decimal point. For the purposes of the review results will be described as positive (agree, strongly agree), negative (disagree, strongly disagree) or neutral (unsure, don't know).

The survey was issued and returned by email. Of the original enquiry eight responses were received from five firms within four days of emailing. A follow up email resulted in a further nine responses within two days of the reminder.

Of the original seventeen responses received seven, or 41%, provided evidence, or partial evidence to support their answers.

General details of the practices surveyed are listed in Figure 10.

Figure 10

Name		Response	Respondents	Spoiled Counts
1	AHMM	yes	1	
2	Allies & Morrison			
3	Bennetts Associates	yes	1	
4	Cartwright Pickard	yes	3	
5	Dixon Jones	yes	2	1
6	Haworth Tomkins	yes	1	
7	Hertzog & DeMeuron			
8	John McAslan & Partners			
9	MacCormac Jamieson Prichard	yes	3	
10	Make	yes	1	
11	Marks Barfield			
12	Nicholas Grimshaw & Partners	yes	1	
13	Richard Rogers & Partners	yes	1	
14	Terry Farrell & Partners			
15	Wilkinson Eyre	yes	3	
			17	1
15	TOTAL	10		16

Key Findings

Although the use of averages is not normal with an ordinal scale of measure it is worth noting one set of figures. The average 'neutral' response for the questionnaire is 27%, split as follows; Business 22% , Practice 38%, Project 20%. This suggests that either the questions were not properly understood; that there is a lack of communication within the firm; or that employees are not engaged with issues affecting the firm. Either of the last two suggest a lack of engagement with practice matters.

Business

- There are inconsistencies between responses to questions 01.1 and 01.8. Although 69% of respondents agree the practice conducts regular appraisal of its performance to improve the level of service 50% state that the views of those leaving the firm are not included in such reviews. Improvement generally implies a lacking that requires change. Given that people are reluctant to change, see question 02.1, 03.7 and 03.8, it is unlikely that the information gathered from a self-assessment would be as informative, or possibly beneficial, as that of an exit interview.
- 75% of respondents believe that people will share knowledge if credited for it. Whether this implies that people currently hoard knowledge is unclear. What it suggests is that firms can fully exploit the information held within the organisation through the introduction of simple procedures. It is worth noting the response to question 02.3, which suggests only 38% of respondents believe that the practice will review procedures against feedback from employees. This highlights a need to distinguish between feedback and knowledge/information.
- Question 01.4 is surprising in the range of responses provided. 63% of respondents believe the reputation of the firm is based on the reputation of the principal partners, while 25% disagreed with the statement. This might be related to the fact that a number of the firms interviewed are 'younger' with a more egalitarian structure. Although no one personality dominates, the practice's reputation is still likely to be attributable to the 'names' of the practice. Therefore, as response 01.7 suggests it is unlikely that the departure of a principal will seriously damage the reputation of the practice.

Practice

- Learning within a practice environment takes place on the project. 63% of firms agree that the pressures of the project make it difficult to implement new procedures (02.1). However 63% also agree that the practice provides sufficient support for on-the-job training (02.7). This is contradicted to an extent by response 02.2, with an overall 50% stating the firm provides structured training.
- For the 38% of firms who review procedures against project feedback (02.3), there are 63% who believe that the pressures of work make it difficult to implement new procedures (02.1). This suggests that firms are incurring losses through transaction costs, with no return on the investment made.
- 38% of firms review procedures against project related experience (02.3) with 57% of firms sharing this across the practice as a whole (02.5). This coupled with the 63% of firms providing support for on-the-job learning (02.7) suggests that elements of a learning organisation are established.
- The value of contract staff is perhaps undervalued in architecture in comparison with the construction industry generally. Contract employees are potentially the ultimate knowledge worker absorbing knowledge as they move between firms. If knowledge provides competitive advantage and the contract employee has experience of this knowledge then the firm should seek to mine this knowledge. Architecture might view this differently particular as contract staff tend to be employed as CAD technicians – although this ignores the gain to be made from understanding how competitors are developing CAD systems. 38% disagree that contract staff add value to the practice (02.4). This is perhaps related to the perception of 44% of firms that contract staff are less committed to the project than permanent staff. It is worth noting that 50% of firms were neutral on the value added by contract employees (02.4).

Project

- Only 6% of firms disagree with the statement that communication at a project level is good (03.1).
- Although 56% of firms agree that CAD standards are generally adhered to (03.6), 44% agree that architects tend to reinvent systems at a project level (03.8) and a further 63% state that architects will revert to systems learned on their previous job (03.7). At a practice level this contradicts the statements relating to the sharing and implementing of procedures from section 02. Furthermore it suggests that the level of communication may not be as good as suggested in 03.1.

- According to 50% of firms, procedures are an effective means of capturing and sharing knowledge (03.5). However if architects revert to previous procedures (03.7), or reinvent procedures, then the benefit of developing procedures is being undermined. There is likely to be a lack of consistency across the firm. Again this illustrates a lack of structure, or communication. The objective of the firm should be capture the knowledge gained from projects and translate that into procedures which can be used for the benefit of the practice as a whole. One of the main benefits of procedures is that it eliminates the time involved in reinventing systems. It also allows workers to move easily between projects as the systems and procedures used on all projects will be similar, if not the same.

Evidence

The following are quotes from the statements of evidence provided in support of responses to the questionnaires, see Appendix A. These provide an insight into the behaviour and attitudes of the knowledge workers in the design led architectural practice.

01.4 It is generally recognised that the success of the firm is based on the reputation of the principal partner(s)

- “The principal partner does not want to credit others and ensures that they are not credited in writing if possible”
- “In design led practices this is almost always the case”.
- “Project success and recognition breeds more success”.

01.8 The practice uses the information gained from those leaving to improve its performance.

- “There is very little acknowledgement that anyone leaving is a loss to the firm, so no desire to learn from their going”.

02.4 Contract employees add value to the practice because of the new knowledge they bring with them.

- “The practice has not had good experience with contract employees (in terms of quality and commitment).”
- “Disagree, they are normally short-term and come with their own individual methods of working and short-term view of the situation.”
- “Sometimes yes, sometimes no. We’ve had a few spectacular disasters, as well as success, and there is a cultural resistance to contract staff.”
- “Contract employees are typically used to fill short term resource shortfalls although that is not the case here. Contract staff are not allowed to participate in practice procedures.”

02.6 Architects associate more closely with the project and project team than the practice.

- “As projects tend to last for several years, architects (and certainly those on their first project) do tend to ‘disappear’ into them and lose sight of the whole.”
- “Busy projects may not allow enough time for staff to engage with practice issues.”

03.7 Architects on projects tend to revert to the systems and procedures learned in their previous job.

- “Only when the ones they have don’t work.”
- “People are creatures of habit. They must see that the new system is beneficial to them before taking it on. Relies on (new) procedures being conveyed with enthusiasm.”

03.8 Architects have a tendency to reinvent procedures/systems at a project level.

- “Only if they are unaware that procedures/systems already exist.”

Results

Practice Knowledge

Business.01

Totals expressed as a percentage %

	Strongly disagree	Disagree	Unsure	Agree	Strongly agree	Don't know
01.1 The practice conducts regular appraisals of its performance to improve the quality of service it provides to clients.		12.5	12.5	68.8		6.2
01.2 People will happily share knowledge/information if they are credited as the originator of it.			12.5	56.3	18.7	12.5
01.3 The departure of a senior figure provides the only opportunity for career advancement in the practice.	6.2	68.8		25		
01.4 It is generally recognised that the success of the firm is based on the reputation of the principal partner(s).	6.2	18.7	12.5	37.5	18.7	6.2
01.5 There is consistency between what the practice says it does and what it actually does.	6.2	31.3	6.2	37.5	18.8	
01.6 Only those people in a management position have a long-term future in the practice.	12.5	37.5	31.3	18.7		
01.7 The practice is unlikely to suffer greatly as a result of the departure of key personnel.	6.2	31.3	25	37.5		
01.8 The practice uses the information gained from those leaving to improve its performance.	6.2	43.8	18.7	18.7		12.5

Practice Knowledge

Practice.02

Totals expressed as a percentage %

	Strongly disagree	Disagree	Unsure	Agree	Strongly agree	Don't know
02.1 The pressures of the project make it difficult to implement new practice procedures.	6.2	31.3		62.5		
02.2 The practice provides structured training to ensure that architects develop an appropriate range of skills.	6.2	18.7	18.7	43.8	6.2	6.2
02.3 The practice regularly reviews its procedures against feedback received from those working on projects.		25	31.3	37.5		6.2
02.4 Contract employees add value to the practice because of the new knowledge they bring with them.		37.5	31.3	12.5		18.7
02.5 The practice organises regular 'sessions' to ensure the experience gained on projects is shared with the practice as a whole.		43.7		56.3		
02.6 Architects associate more closely with the project and project team than the practice.		25	50	25		
02.7 The practice provides sufficient support for learning through on the job training.		12.5	18.7	62.5		6.2
02.8 Contract staff don't have the same commitment to the project as full time staff.	6.2	12.5	18.7	31.3	12.5	18.7

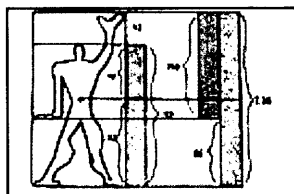
Practice Knowledge

Totals expressed as a percentage %

Project.03

	Strongly disagree	Disagree	Unsure	Agree	Strongly agree	Don't know
03.1 There is a good level of communication at a project level, which ensures that decisions are made on an informed basis.	6.2		25	56.3	12.5	
03.2 The uptake of new management initiatives succeeds because managers lead by example.		12.5	25	50	6.2	6.2
03.3 The pressures of work leave little time for training.		31.3	12.5	50	6.2	
03.4 The level of competence among architects across the practice in relation to ICT and CAD is high.			12.5	68.8	18.7	
03.5 Procedures are an effective means of ensuring that the knowledge gained on previous projects is applied to all new projects.	6.2	12.5	25	37.5	12.5	6.2
03.6 CAD standards relating to project execution and delivery are generally adhered to.		37.5	6.2	50	6.2	
03.7 Architects on projects tend to revert to the systems and procedures learned in their previous job.		25	12.5	56.3	6.2	
03.8 Architects have a tendency to reinvent procedures/systems at a project level.		31.3	25	43.7		

SECTION FOUR



Conclusion

This study has attempted to illustrate the applicability of theories on learning and knowledge to the design led architectural firm. The tacit nature of the design process coupled with the naked ambition of the design architect should conspire against the successful implementation of such concepts. However a study by David Bartholomew (2005), entitled 'Sharing Knowledge' records how consideration of knowledge sharing tools provided demonstrable benefits to the design practices involved in the study.

Adopting the principles of organisational learning requires a cultural shift in practice. This shift represents change; it needs to be part of the organisations strategy for growth and it needs to be implemented from the top. If the theory of the learning organisation requires a culture of continuous learning as a prerequisite to competitive advantage, does this suggest that firms not implementing the concept are under-performing in some way? Does it suggest successful firms are applying the principles? Applicability is relative. Without a benchmark, with which to measure performance there is no objective means of establishing whether or not the concept is applicable.

The key objective of the practice is to maintain the design reputation of the firm. This could be achieved in a number of ways. One is the introduction of a culture that encourages the sharing and exchange of knowledge. This approach conforms to De Geus' (1999) living company and involves investing in people. An alternative strategy is to introduce new 'talent' regularly, although this would require regular staff clear-outs or purges similar to those previously used by David Chipperfield. New young talent has a number of advantages. They are cheap, compliant and willing to work extended hours to attain the principals approval. The danger with this is a lack of experience. The former approach promotes stability, the latter constant change. Regardless of the route adopted the decision is strategic and will influence the type of organisation the practice becomes.

Future Areas of Enquiry

This study began with the ambition of providing a critical review of architectural practice within the context of management theory, specifically organisational learning. The complexity of the subject has resulted in an overview which has served to highlight a number of areas of further enquiry.

The first is an enquiry into whether the established 'named' design led practice conforms to a recognisable organisational type. This would require interviews with the principals at offices such as Fosters, Rogers and Hopkins, to understand the strategy employed by them in setting up and managing the growth of their practice. These views would need to be balanced to confirm that their espoused theory matches the theory-in-action (Argyris, 1978).

The second area of enquiry develops from the first and adopts the approach taken by the board at Chelsea football club. Essentially the Chelsea board recognised that in order to achieve results, they needed to invest. The parallels are not dissimilar. Investment must happen at board (organisation) level, this involves strategy and direction. Talent (professionals/'knowledge' workers) ensure the quality of the output (project) is maintained. Experienced management (knowledge management) is required to ensure resources are deployed effectively. Lastly clearly defined roles and responsibilities must be defined to ensure that the firm works as a team.

A further area of interest is the various connotations of information within a design environment. Information as it relates to the production documentation requires a unique system of management. Information as the codification of knowledge in practice procedures has the potential to provide efficiencies, but is it likely to compromise the culture of the design-based firm.

There would appear to be significant benefits to the design led firm in implementing a culture based on the concept of the learning organisation. It is likely that the biggest obstacle to this is, ironically, with the person who is credited with creating the company, and its reputation in the first instance. As with all businesses, change needs to be driven from the top.

APPENDIX A

Practice Knowledge

General.00

00.1 The Subject

You have been specifically selected to receive this questionnaire and your response would be greatly appreciated.

The survey forms part of a MSc. research paper into the applicability of knowledge / learning as an organisational strategy. The study is qualitative in nature and is aimed specifically at the behaviour and performance of the *design led* architectural practice.

00.2 The Survey

The survey consists of a questionnaire in three sections. Each section consists of eight multiple choice questions and should take no more than ten minutes to complete.

Responses should be based on personal observations reflecting how the practice actually operates as opposed to how, in an ideal situation, it would operate.

00.3 Completing the Survey

To complete the questions please tick the appropriate box by double clicking the box and clicking the 'Checked' box in the dialogue window.

The 'Evidence' box is optional but if you can provide any examples to support your answer please type them in the space provided. Answers should be confined to the space available.

Anonymity will be maintained and all responses will remain strictly confidential.

Could you please return all completed forms to: FreddyMcBride@crossrail.co.uk by **02.09.05**.

00.4 General Information

Practice Name:

Approximate size of practice:

Qualification: (e.g. Part 3)

Title: (e.g. Senior Architect)

Approximate No. of years at the practice:

Approximate No. of years at previous practice:

I would you like details of the findings: (include email address)

I would be willing to participate in further research: Yes / No

Thank you for taking the time to complete this questionnaire.

Practice Knowledge

Business.01

Strongly disagree Disagree Unsure Agree Strongly agree Don't know

01.1 The practice conducts regular appraisals of its performance to improve the quality of service it provides to clients.

Evidence:

01.2 People will happily share knowledge/information if they are credited as the originator of it.

Evidence:

01.3 The departure of a senior figure provides the only opportunity for career advancement in the practice.

Evidence:

01.4 It is generally recognised that the success of the firm is based on the reputation of the principal partner(s).

Evidence:

01.5 There is consistency between what the practice says it does and what it actually does.

Evidence:

01.6 Only those people in a management position have a long-term future in the practice.

Evidence:

01.7 The practice is unlikely to suffer greatly as a result of the departure of key personnel.

Evidence:

01.8 The practice uses the information gained from those leaving to improve its performance.

Evidence:

Practice Knowledge

Practice.02

Strongly disagree Disagree Unsure Agree Strongly agree Don't know

02.1 The pressures of the project make it difficult to implement new practice procedures.

Evidence:

02.2 The practice provides structured training to ensure that architects develop an appropriate range of skills.

Evidence:

02.3 The practice regularly reviews its procedures against feedback received from those working on projects.

Evidence:

02.4 Contract employees add value to the practice because of the new knowledge they bring with them.

Evidence:

02.5 The practice organises regular 'sessions' to ensure the experience gained on projects is shared with the practice as a whole.

Evidence:

02.6 Architects associate more closely with the project and project team than the practice.

Evidence:

02.7 The practice provides sufficient support for learning through on the job training.

Evidence:

02.8 Contract staff don't have the same commitment to the project as full time staff.

Evidence:

Practice Knowledge

Project.03

	Strongly disagree		Disagree		Unsure		Agree		Strongly agree		Don't know
	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

03.1 There is a good level of communication at a project level, which ensures that decisions are made on an informed basis.

Evidence:

03.2 The uptake of new management initiatives succeeds because managers lead by example.

Evidence:

03.3 The pressures of work leave little time for training.

Evidence:

03.4 The level of competence among architects across the practice in relation to ICT and CAD is high.

Evidence:

03.5 Procedures are an effective means of ensuring that the knowledge gained on previous projects is applied to all new projects.

Evidence:

03.6 CAD standards relating to project execution and delivery are generally adhered to.

Evidence:

03.7 Architects on projects tend to revert to the systems and procedures learned in their previous job.

Evidence:

03.8 Architects have a tendency to reinvent procedures/systems at a project level.

Evidence:

BIBLIOGRAPHY

Books

A

- Arden, P. [2003] It's Not How Good You Are, It's How Good You Want To Be London: Phaidon Press Ltd
- Argyris, C. and Schol, DA. [1978] Organisational Learning: A Theory of Action Perspective Addison-Wesley Publishing Company
- Argyris, C.[1999 Second Edition] On Organizational Learning Oxford: Blackwell Publishers Ltd
- Asakura, R. [2000] Revolutionaries at Sony: The Making of the Sony PlayStation and Visionaries Who Conquered the World of Video Games USA: McGraw-Hill Inc.

B

- Barthes, R. [1973] Mythologies London: Paladin Grafton Books
- Beckford, J. [2002] Quality London: Routledge.
- Belbin, R. M. [1981] Management Teams: Why they succeed or fail. Butterworth-Heinemann.
- Bolchover, D. & Brady, C. [1992] The 90 Minute Manager: Business Lessons from the Dugout Great Britain: Pearson Education Ltd.
- Bowles, S. & Edwards, R. [1985] Understanding Capitalism: Competition, Command, & Change In The U.S. Economy New York: Harper & Row Publishers Inc.

C

- Chappell, D. & Willis, C. J.** [1992 7th Edition] The Architect in Practice. Oxford: Blackwell Scientific Publications.
- Cox, A. & Townsend, M.** [1998] Strategic Procurement in Construction. London: Thomas Telford.
- Coxe, W. et al [1987] Success Strategies for Design Professionals: SuperPositioning for Architecture & Engineering Firms. USA: McGraw-Hill Book Company.

D

- Davenport, T. H. and Prusak, L. [1998] Working Knowledge: How Organizations Manage What They Know Boston, Massachusetts: Harvard Business School Press
- Davis, H. & Pun-Lee, L. [2001] England, Department of Trade and Industry Essex: Pearson Education Ltd.
- Dawson, R. [2000] Developing Knowledge-Based Client Relationships: The Future of Professional Services USA: Butterworth-Heinemann.

- | | | |
|--|---|--|
| Douma, S. and H. Schreuder 1991 [third edition 2002] | Economic Approaches to Organizations | Edinburgh, Pearson Education Ltd |
| Drucker, P. F. [1994] | The Practice of Management. | Oxford: Butterworth-Heinemann Ltd. |
| Drucker, P. F. [1969] | The Effective Executive | London: William Heinemann Ltd. |
| Drucker, P. F. with Maciariello, J. A. [2005] | The Daily Drucker: 366 Days of Insight & Motivation For Getting The Right Things Done | Oxford: Elsevier Butterworth-Heinemann |
| Duffy, F. with Hutton, L. [1998] | Architectural Knowledge: The Idea of a Profession | London: E & FN Spon |
| F | | |
| Frappaolo, C [2002] | Knowledge Management | Oxford: Capstone Publishing Ltd. |
| G | | |
| Garratt, B. [1996, revised and updated 2003] | The Fish Rots From The Head | London: Profile Books Ltd |
| Garratt, B. ed. [1995, second edition 2003] | Developing Strategic Thought: A collection of the best thinking on business strategy | London: Profile Books Ltd |
| Gerstner, L. V. [2002] | Who Says Elephants Can't Dance? | London: Harper Collins |
| Geus, de A [1999] | The Living Company: Growth, Learning and Longevity in Business. | 1999: Nicholas Brealey Publishing Ltd. |
| Goleman, D. | Emotional Intelligence | London: Bloomsbury Publishing plc. |
| Goleman, D., Boyatzis, R. & Mckee, A. [2002] | The New Leaders: Transforming The Art of Leadership Into The Science Of Results | London: Little, Brown. |
| Grieve Smith, J. [1990 Second Edition] | Business Strategy. | England: Basil Blackwell. |
| Gutman, R. [1988] | Architectural Practice: A Critical View. | New York, NY, USA: Princetown Architectural Press. |
| H | | |
| Handy, C. [1999 Fourth Edition] | Understanding Organisations. | England: Penguin Books Ltd. |
| Handy, C. [2002] | The Age of Unreason: New Thinking for A New World | London: Arrow |
| Heller, R. [2000] | Bill Gates: Genius of the Software Revolution and Master of the Information Age | London: Dorling Kindersley Ltd |

- Heller, R. [2000] Peter Drucker: The Great Pioneer of Management Theory and Practice London: Dorling Kindersley Ltd
- Hofstede, G. [1991] Culture and Organization: Software of the Mind. New York: McGraw Hill.
- Huseman, R. C. & Goodman, J. P. [1999] Leading with Knowledge: The Nature of Competition in the 21st Century USA: Sage Publication Inc.
- I**
- Ive, G. J. and Gruneberg, S. L. [2000] The Economics of the Modern Construction Sector. London: Macmillan Press Ltd.
- J**
- Johnson, G. and Scholes K. [1999 Fifth Edition] Exploring Corporate Strategy. England: Pearson Education Ltd.
- K**
- Krogh, G. von, Roos, J. & Kleine [1998] Knowing in Firms: Understanding, Managing and Measuring Knowledge Great Britain: Sage Publication Inc.
- L**
- Lawson, B. [2004] What Designers Know. Oxford: Architectural Press
- Little, S. & Ray, T. Managing Knowledge: An Essential Reader The Open University Business School.
- M**
- Mackintosh M., Brown, V., Costello, N., Dawson, G., Thompson, G. & Trigg, A. [1996] Economics and Changing Economies. London: International Thomson Business Press.
- McDonald, M. and Dunbar I. [1995] Market Segmentation: A step-by-step approach to creating profitable market segments. London: Macmillan Press Ltd.
- Morgan, G. [1996] Images of Organization London: Sage Publications.
- N**
- Nonaka. I. & Takeuchi H. [1995] The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation Oxford: Oxford University Press.
- O**
- Ohmae, K. [1982] The Mind of the Stategist: The art of Japanese Business USA: McGraw-Hill Inc.
- P**
- Paton, R., Brown, S., Spear, R., Chapman, J., Floyd, M. and Hamwee, J. Ed [1987] Organizations: Cases, Issues, Concepts London: Paul Chapman Publishing Ltd.
- Penrose, E. [1995 third edition] The Theory of The Growth of The Firm Oxford: Oxford University Press

- Peters, T. [1994] The Tom Peters Seminar: Crazy Times Call for Crazy Organizations New York: Vintage Books
- Pettinger, R. [1998] Construction Marketing: Strategies for success. London: Macmillan Press Ltd.
- Porter, M. E. [1985] Competitive Advantage: Creating and Sustaining Superior Performance New York: The Free Press.
- Prusak, L.[1997] Knowledge in Organizations USA: Butterworth-Heinemann
- Pugh, D. S. ed [1990] Organization Theory England: Penguin Books.
- R**
- Reingold, E. M. [1999] Toyota: People, Ideas and the Challenge of the New London: Penguin Books.
- Richardson, R. [1996] Marketing for Architects and Engineers: A New Approach. London: E & FN Spon.
- Ridderstrale, J. & Nordstrom, K. [2002] Funky Business: Talent Makes Capital Dance Great Britain: Pearson Education Ltd.
- Roberts, J. [2004] The Modern Firm: Organizational Design for Performance and Growth Oxford: Oxford University Press.
- Royal Institute of British Architects [May 1992] Strategic Study of the Profession, Phase 1: Strategic Overview, London: RIBA Publications.
- Ruggles, R. & Holthouse, D. [1999] The Knowledge Advantage Oxford: Capstone Publishing Ltd.
- S**
- Schmitt, G. [1999] Information Architecture: Basis and Future CAD Switzerland: Birkhauser.
- Senge, P. M. [1990] The Fifth Discipline: The Art & Practice of The Learning Organization. London: Random House Business Books.
- Senge. P. M. [1999] The Fifth Discipline: The Art of the Learning Organization. London: Random House.
- Sloman, J. & Sutcliffe, M. [2001] Economics for Business. England: Pearson Education Ltd.
- Smyth, H. [2000] Marketing and Selling Construction Services. England: Blackwell Science.
- Starkey, K. [1996] How Organizations Learn London: Thomson Learning
- T**
- Teece, D. J. [2000] Managing Intellectual Capital New York: Oxford University Press.
- W**
- Winch, M. G. [2004] Managing Construction Projects: An Information Processing Approach. Oxford: Balckwell Science Ltd.

Reports and Periodicals

- A**
- Abell, D. F. [Spring 1999] Competing Today While Preparing for Tomorrow Sloan Management Review, pp 73-81.
- Aouad, S. G [17-20 July] Integration Technologies to Support Organizational Changes in the Construction Industry Lyon, International Conference on Concurrent Engineering, pp596-604
- Arup, O. [1970] The Key Speech London, Ove Arup Partnership Ltd. www.arup.com
- B**
- Bartholomew, D. [2005] Sharing Knowledge England, Department of Trade and Industry
- Beer, M. and Eisenstat, R. A. [Summer 2000] The Silent Killers of Strategy Implementation and Learning The Sloan Review, pp29-37.
- C**
- Christensen, M. C. [Winter 2001] The Past and Future of Competitive Advantage MIT Sloan Management Review, pp 105-109.
- Constructing Excellence [March 2004] Demystifying Knowledge Management: a best practice guide for the construction industry England, Department of Trade and Industry
- D**
- David Langdon Consultancy [Feb 2003] Techniques & Technologies for Knowledge Management, Work Package – Interim Report Knowledge Management for Sustainable Construction Competitiveness
- David Langdon Consultancy [Feb 2003] Knowledge Production, Resources & Capabilities in the Construction Industry, Work Package 1 - Final Report Knowledge Management for Sustainable Construction Competitiveness
- David Langdon Consultancy [April 2004] Built Environment Professional Services Skills Survey London, CITB
- Drucker, P. F. [Summer 1996] The Shape of Things to Come: An Interview with Peter F. Drucker www.pfdf.org/leaderbooks/121/summer96/drucker.html
- E**
- Edkins, A. [1998] A Cognitive Approach to Exploring the Management of the Design Process RICS, Cobra 1998 Conference Papers
- Egbu, C. and Botterill, K [2001] Knowledge Management and Intellectual Capital: benefits for project based industries RICS, Cobra 2001 Conference Papers
- Egbu, C. and Easton, J. Knowledge Management: post project reviews No.16, pp 283-293

- Eisenhardt, K. M. [Spring 1999] Strategy as Strategic Decision Making Sloan Management Review, pp 65-72.
- F**
- Fairs, M. [17 November 2001] The Outsider Building Magazine.
- Fong, P. S. W. and Cao Y. [November 2004] Knowledge Management in General Practice Surveying Firms: awareness and practices RICS Foundation, Volume 4, Number 26, pp6-42
- Foxell, S. Ed. [2003] The Professionals' Choice: The Future of the built environment professions Building Futures, a joint initiative between CABE and the RIBA
- H**
- Haan, J. D. and Voordijk, H. and Joosten, G. J. [2002] Market Strategies and Core Capabilities in the Building Industry Construction Management and Economics, Volume 20, pp 109-118.
- Hillebrandt, P. M. [March 2004] A Business Model for UK Construction NCRISP Comission, 'Think Piece'
- K**
- Koch, C. [2003] Knowledge Management in Consulting Engineering – joining IT and human resources to support the production of knowledge Emerald, Vol 10 No 6, pp391-400
- L**
- Learning from Experience Lipton, M. [Summer 1996] The Experimental Learning cycle Demystifying the Development of and Organizational Vision www.dmu.ac.uk Sloan Management Review, pp 83-92.
- Loch, I and Morris, P. W. G. Organizational Learning and Knowledge Creation in Project-Based Organizations Bartlett School of Construction Project Management Research Papers
- Loe, E. [2000] The Value of Architecture: Context and Current Thinking London, RIBA Future Studies
- M**
- Maister, D. H. [Fall 1982] Balancing the Professional Service Firm Sloan Management Review, pp15-29.
- Malhotra, Y. [2004] Why Knowledge Management Systems Fail? Enablers and Constraints of Knowledge Management in Human Enterprises American Society for Information Science and Technology Monograph Series, pp87-112
- Marshall, R. and Yorks, L. [Summer 1994] Planning for a Restructured, Revitalized Organization Sloan Management Review, pp 81-91.
- Mintzberg, H. [Spring 1999] Managing Quietly Leader to Leader, No 12 www.pdf.org/leaderbooks/121/Spring99/mintzberg.html

- Morris, P. W. G. Managing Project Management Knowledge for Organizational Effectiveness pp1-14
- Morris, P. W. G. The Validity of Knowledge in Project Management and the Challenge of Learning and Competency Development Website: Centre for Research in the Management of Projects
- P**
Parasuraman, A. and Zeithaml, V. A. and Berry, L. L. [Fall 1985] A Conceptual Model of Service Quality and its Implications for Future Research, Journal of Marketing Vol. 49, pp 41-50.
- Q**
Quintas, P ITCBP Newsletter 10
- R**
Robinson, H. S, Carrillo, P. M., Anumba, C. J. and Al-Ghassani, A. M. [2001] Perceptions and Barriers in Implementing Knowledge Management Strategies in Large Construction Organizations RICS, Cobra 2001 Conference Papers
- S**
Smyth, H. Review of Market Positioning Models for Architectural Practices Website: Centre for Research in the Management of Projects
- Smyth, H. [1996] Design and Building Marketing: Issues and criteria for Architect Selection, Construction Marketing Conference 4 July 1996 Oxford Brookes University, Proceedings, pp 48-58.
- T**
Thompson, N. J. [3 July 1997] Proceedings of the 2nd National Construction Marketing Conference: Evidence on Conditions of Trust School of Construction & Earth Sciences, Oxford Brookes University
- V**
Vaitilinga, R., et al [27 January 1999] The Economics of the Knowledge Driven Economy Conference jointly organized by the Department of Trade and Industry and the Centre for Economic Policy Research
- W**
Winch, G. and Schneider, E. [1993] The Strategic Management of Architectural Practice Construction Management and Economics, Volume 11, pp 467-473.