

LEARNING TECHNIQUES EMPLOYED BY CONSTRUCTION CONTRACTORS' ORGANISATIONS

G.K. Kululanga¹, F.T. Edum-Fotwe², R. McCaffer³ and A.D.F. Price⁴.

Department of Civil and Building Engineering, Loughborough University, UK.

This paper describes current research within the Department of Civil and Building Engineering at Loughborough University into learning practices within UK Construction Companies. The need to understand how companies learn and accelerate the learning process is greater today than ever before. Companies that stop learning, also stop improving and may run the risk of eventually going out of business. As such, organisations are paying more attention to the concept of corporate learning in order to increase their competitive advantage, and ability to innovate so that they can sustain continuous improvement. The research forms part of a larger theme of improving strategic management practices of construction organisations. By focusing on the organic learning styles and learning mechanisms, the research addresses how construction organisations can employ these options to enhance the strategic process. The paper suggests that continuous improvement in construction companies requires a *learning culture*.

Keywords: Construction companies, learning mechanisms, organic learning styles

INTRODUCTION

Continuous improvement has become an ever-present reality to construction companies as they seek to adapt to the changing industrial environment. A key factor driving this continuous improvement agenda is the recognition of the role played by organic learning (Barnett, 1994). As such, organic learning is the most compelling reason for undertaking continuous improvement programmes in companies. To this end, Arie De Geus (1988) and Kolb (1996: 270-287) have argued that the highly successful companies are differentiated from others not so much by any single set of knowledge or skills of their employees, but equally by the ability to learn. Furthermore, there is growing recognition that the rate and effectiveness of organic learning employed by corporate establishments may soon become the key source of sustainable competitive advantage (Stata, 1989). The ability to innovate, for example, in working style, management practice, technology and products can be promoted through organic learning which in turn improves business performance (Drucker, 1988).

The concepts behind organic learning have their genesis in theories of organisational learning. Just as learning is essential for growth of individuals, it is equally important for business establishments. But organic learning is not the same as individual learning. There are too many cases where whole organisations know less than their

¹ E-mail: G.K.Kululanga@lboro.ac.uk

² E-mail: F.T.Edum-fotwe@lboro.ac.uk

³ E-mail: R.McCaffer@lboro.ac.uk

⁴ E-mail: A.D.F.Price@lboro.ac.uk

individual members *the whole can be less than the sum of its parts* (Strauss, 1995). Organic learning relates to how organic systems, such as corporate establishments imbibe information from their internal and external environments to ensure continued improvement in their performance. Garven (1993) outlining what organic learning involves, described it as a situation where there is a continuous expansion in the capacity of an establishment to create desirable outcomes for its activities. This involves acquisition of knowledge about relationships between organisational actions and environmental outcomes. This implies that management styles, operational tools, working methods do not remain static and there is a new expansive pattern of thinking nurtured where organic systems are continuously learning.

ORGANIC LEARNING STYLES

Learning styles for organic systems reflect a hierarchy and can be grouped into three styles, namely: single loop; double loop; and deuterio loop. Lower level or single loop occurs where organic establishments identify and correct first order errors (symptoms) and continue with their present policies. Argyris (1990) argued that whenever an error is detected and corrected without questioning or altering underlying values of the system be it an individual, an establishment or any other organisation, the learning style is single loop. It is *only* suitable as the nature of the market place remains relatively mature and static *as long as they do not need to learn something new* (McGill and Slocum, 1993). Equally, lower level learning style is appropriate for business processes that are easily programmable. However, many corporate establishments without realising it *predominantly* use lower level learning (Redding and Catalanello, 1994). The use of lower level learning becomes lethal to companies in a dynamic environment where business processes are in a state of change. It inhibits continuous improvement of the businesses processes of organic establishments (Villegas, 1995).

When organic systems, in addition to detection and correction of problems, question and modify existing norms, procedures, policies and objectives, double loop learning style is said to have occurred. Thus, double loop learning style is more relevant to non-programmable issues which is prominent for long survival of organic systems (Argyris, 1994). However, double loop learning is perceived much riskier by many organic systems, its benefits more remote (new ideas may have much longer time horizons, more uncertain outcomes) and more indirect results than exploiting of exiting ideas (Stein and Vandenbosh, 1996).

The deuterio learning style represents the pinnacle of organic learning style with considerable potential for continuous improvement. This style of learning bears considerable resemblance to double loop learning. However, while the double loop style focuses on the process under investigation, the deuterio option seeks to also evaluate and improve the learning process by which organic systems learn (Redding and Catalanello, 1994). Organic establishments practising this style of learning inquire not only into causes and outcomes of their business processes, but also explore the relevance of the learning mechanisms employed to learn in order to invent more effective systems of learning.

It has been noted that management systems, business process working practices, and technologies used in organic establishments are in a state of change and eventually become obsolete (Hazegawa and Fumizu Group, 1988). In order to sustain improvement and recognise when to abandon old ideas and seek new ones, deuterio

learning style plays a significant role, and is thus not an occasional or one-off activity for organic systems. Furthermore, business processes of companies are sometimes performed efficiently but may well be inappropriate. While it is recognised that efficiency is important, without effectiveness there is room for potential failure (Grantham and Nicholass, 1993). Deutero learning style has been coined as an enabler for corporate effectiveness which ensures business process efficiency and effectiveness for corporate growth (Argyris, 1994). Companies are more interested in questioning critically the underlying reasons of their business functions than cranking the engine to get results.

NEED FOR LEARNING CULTURE IN CONSTRUCTION

It is generally argued that the rate of improvement in the manufacturing and service companies far outstrips that of construction in improving processes, services, products and management styles as well as adding value to the end user (Hazegawa and Fumizu Group, 1988 and Royal Academy of Engineering, 1996). An important reason often put forward by managers of corporate establishments in the construction industry for its lack of achievements in comparison to the others, has been the one-off nature of its business (O'Brien, 1996; European Construction Institute, 1996 and Lai, 1996). While this may be true, the one-off nature of business is not uncommon in other industries (IFIP, 1992) as in shipbuilding (Lehne and Wollert, 1992) and aerospace (Levoid and Rinne, 1992) industries; yet their rate of improvement is often better planned and more systematic.

Many construction organisations are currently re-engineering their establishments by adapting to the demands of their environment in order to remain competitive (Edum-Fotwe, Price, Thorpe and McCaffer, 1996). However, many crucial questions endure regarding the kind of learning styles, processes and learning mechanisms that are engaged in pursuit for continuous improvement in the delivery of their services. If construction managers had an understanding about how their organic establishments learn, the processes that are engaged and the success factors underpinning the learning mechanisms, a better learning outcome may be assured for improving continuously.

Continuous improvement in management styles, working methods and technologies used in construction organisations in a changing environment demands an understanding of the root driving cause. This requires recognising the organic learning processes which encompass organic learning styles, organic learning mechanisms and their success factors that when employed should generate favourable outcomes. The ideas are neither new nor particularly controversial, yet it is surprising that this ability to learn, which is so widely regarded as important, receives so little explicit attention particularly in construction organic establishments (CIRIA, 1997).

If continuous improvement is to be sustained in construction companies, there is the need to move forward into a learning culture. This required culture will have to reflect a deutero learning style. Companies that arrive at solutions by merely addressing the symptoms of the problems without attending to the root causes are characterised by the single loop learning and the learning style provides little insight for continuous improvement in business processes. The benefits are short term and the problem recurs in the same form or is manifested in a different form. Notwithstanding this obvious disadvantage of single loop learning, it has to be pointed out that its significance relates to the awareness which it establishes regarding the need to address the status quo, albeit by a lower level learning style. This awareness

is a necessary precursor to effectiveness in order to achieve sustainable outcomes for organic systems.

Continuous quality improvement focuses on advancing performance to meet customer's needs and desires. The heart of continuous improvement is upgrading standards. This is achieved through small, gradual ceaseless changes that feed into a set of quality goals which are essentially moving targets reset at higher and higher levels. Perfection is the serving motivating force for further, ongoing and endless re-standardisation. The approach involves incremental innovations that targets changes in management style, technology, working methods and other business processes. Thus, companies wishing to progress towards total quality management must first address the issue of organic learning without which no continuous improvement can be sustained. The argument underpinning this, is that organic learning and total quality management are inextricably linked (Barnett, 1994). As such, organic learning (also described as a passport for continuous improvement) should be the most compelling reason for understanding a total quality management (Hill, 1996).

ORGANIC LEARNING TYPES AND MECHANISMS

The number of learning types are quite extensive, their names and definitions depends on perspective of analysis (Villegas, 1996). The process and content involved in learning vs. learning for improvement may not be the same. Barnett (1994) argues that the first is a cognitive process of initial learning while the second requires particular mechanisms and techniques which might help organic systems to improve. To this end, four dimensions of organic learning types for improving have been identified from contributors of theory development on organisational learning. The interaction of these four dimensions are depicted in figure 1.

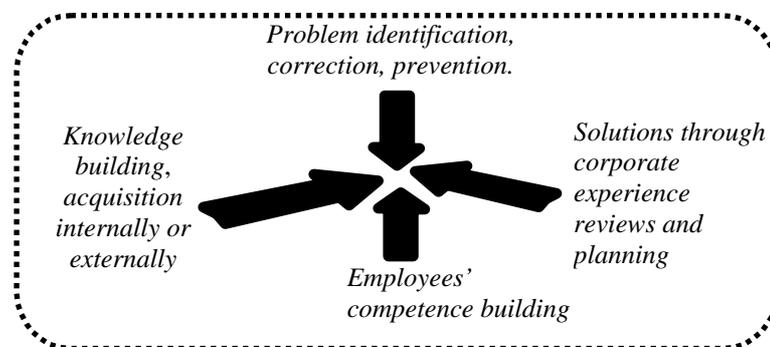


Figure 1: Organic learning dimensions

Experiential learning, is probably the most common style of learning by organic establishments through knowledge about action-outcome relationships which are encoded in their routines and organic memories (Inkpen, 1995). Three types of learning techniques are reflected in organic experiential learning: learning from experience of others known as (vicarious learning) which has extensive application in internal and external benchmarking; learning from direct organic experiences; and learning from interpretation of acquired experiences which finds application in reviews and planning performed by corporate establishments. However, the speed, depth and breadth from experience learning influences the degree of learning outcome (Redding and Catelanello, 1994).

VALUE CREATING COLLABORATIVE MECHANISMS

The traditional notion of competitive advantage which only focuses on product or market positioning, gives little insight to organic learning. It overlooks knowledge accumulation and value creating disciplines in corporate establishments and only aims at *a few hundred yards* of knowledge and skill building. According to Hamel (1991) competitive advantages, arise not just through product-market positioning but also through the ability of a firm to develop new organisational skills. For example, companies in automotive industries are turning collaborative working mechanisms into value creating arrangements by integrating work and learning. Collaborative arrangements such as joint ventures, partnering, alliancing and consortium are being turned into value creating arrangements to allow organic establishments to graft competencies and value-creating disciplines of their partners. The following factors dictate the type of learning outcome associated with collaborative organic learning type: learning intent; learning transparency; learning receptivity; and learning sustainability (Hamel, 1991).

LEARNING NETWORKS

Learning networks are flourishing particularly in the manufacturing sector (CIRIA, 1997). They are used to bring people together from different background to exchange practical ideas which may eventually result in innovative practices in companies. Different types and structures of learning network exist for specific issues. However, the point is that they are mechanisms through which organic establishments capture ideas.

COMPETENCIES

Company competencies may come about as a result of their employees who accumulate extensive experience. This may enable the organisation to continuously improve as a result of creativity from the workforce. Tools are being employed to enhance creativity of employees to enable knowledge building in companies.

CORPORATE MENTORING

Mentoring, which has for centuries focused on tutoring of individuals is now being used for tutoring organic establishments. For example, car manufacturer who may have better total quality tools, may wish to extend the knowledge to its suppliers through this programme. This enables the supplier to acquire the innovative practices through this type of arrangement. Figure 2 shows the structure of organic learning management as reflected by the literature view.

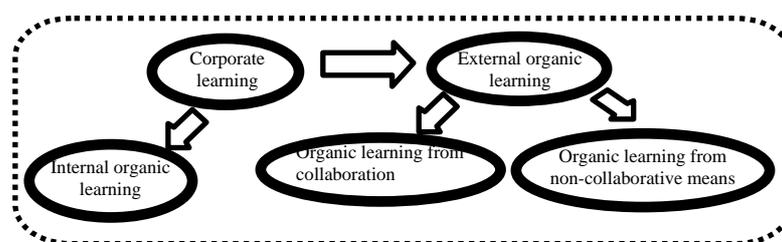


Figure 2: General structure for organic learning management

PROJECT OBJECTIVES

The main objective of this research work is to develop a framework for enhancing construction organisations' ability to learn to learn. In order to address this broad objective, the research has focused on the following specific sub-objectives.

- Review of organic learning styles, processes of companies that drive continuous improvement.
- Examination of learning mechanisms employed by construction organisations.
- Identification of the factors underpinning a better learning outcome in construction companies.
- Examination of the successful learning mechanisms employed by other business organisations.
- Examination of the factors that inhibit construction companies from learning.

RESEARCH INTO ORGANIC LEARNING IN CONSTRUCTION COMPANIES

The introduction underscored the need for construction contractors to pay attention to: organic learning styles; learning processes and learning mechanisms that can be employed in order to continuously improve products; processes and management styles. Thus, in order for construction organisations to realise the full benefits of organic learning, there is a need for academic research in the learning styles and processes of construction companies. This view is also supported by Hillebrandt (1991), the Technology Foresight Panel on Construction (1995) and the Royal Academy of Engineers (1996).

While a lot of benefits may be accrued from learning as suggested by literature, research into organic learning both theoretically and empirically is still in its infancy and the little that exist has focused on corporate establishments in manufacturing and service industries. Aspects of learning in the construction industry have normally focused on training and learning of individual members in corporate establishments (CIRIA, 1997). Thus, the learning process of construction companies may be unknown and not well developed. Lack of research in this area would also cause difficulty in comparison of results with other researchers in the development of organic learning management for construction companies.

METHODOLOGY

A literature review covering organic learning has been conducted. The review has provided a theoretical background on the concepts of organic learning styles and learning mechanisms that are employed by corporate establishments. This was required to establish an overview of organic learning styles, processes and learning mechanisms, and serve as a basis for examining how construction companies learn in the second phase of the research work.

The second stage of this study will be followed by a preliminary questionnaire survey of selected construction organisations to validate the concepts and terminology associated with learning at an organisational level obtained from literature review. In addition, the preliminary questionnaire is aimed at identifying construction contractors that may have in place a formal mechanism for learning. The identification of

contractors with a formal approach to corporate learning will be followed by a multi-case study of the techniques employed in company learning strategies. A learning framework will then be synthesised from contributions obtained from construction organisations and literature review. This will be tested for the extent to which it reflects the industry-wide practice. This will be achieved by the consensus of the executive notions with the method of intuitive scales. The results will provide a learning framework with summary factor for construction organic establishments.

The substance of the research also requires the application of a case study approach. Parthe (1993) and Inkpen (1995) have both noted that most research, (although in manufacturing and electronics industries) have employed the basic questionnaire. They argued that this simple approach on its own is unlikely to yield advances in theory development. An advantage of case studies is the ability to collect various types of data (Brewer and Hunter, 1993). However, in conducting field-based research with an interview component, cost and logistics factor limit the sample size. According to Parthe (1993), it is unlikely that the more process oriented aspects of corporate learning can be satisfactorily studied using currently emphasised *hard* methods. Thus, it is concluded that a combination of questionnaire and interview methods would allow an efficient and systematic approach to this research problem and provide a foundation of descriptive realism in line with the observations noted by Lee (1991). Using a sample from a single industry with a homogenous set of organisations imposes certain constraints. In particular, theory development is restricted to limited domain (Pinder and Moore 1980) and generalisability is confined to other industries sharing similar structural characteristics. However, a single industry offers greater control over environmental peculiarities.

The development of the research sample will involve several steps. Figure 3 shows the format of the research structure. First several organisational attributes will be considered important in the sample. For geographical reasons, the companies will be restricted to United Kingdom. Managers in construction corporations will be contacted via a letter and telephone. The key informants for the interview and questionnaire will be the executives in construction organisations. These executives, are chosen for several reasons. First, the sensitivity of information, executives are expected to be more co-operative than senior managers (Inkpen, 1995). Second, executives would probably be knowledgeable about the importance of learning process from a strategic perspective.

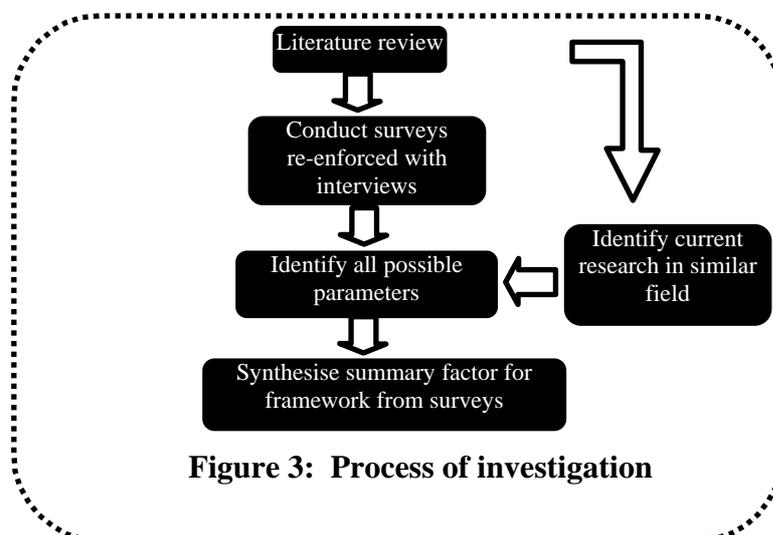


Figure 3: Process of investigation

Interviews will be based on a semi-structured format. There will be both open ended sequence of questions and a focused set of questions designed to identify specific attributes. The open ended questions will be used to allow the theory development to be grounded in the experience and terminology of corporate participants as recommended by Beyer and Trice (1982).

CONCLUSION

An understanding and appreciation of the learning process in construction companies will enable further development of learning practices of construction organisations to enhance their continuous improvement programmes. The identification of the success factors that underpin a successful learning outcome for construction companies will provide the means with which companies can use to drive continuous improvement programmes. The results of this work will also provide a basis for comparison with other research work for theory development of learning practices in construction companies in pursuit of continuous improvement.

REFERENCES

- Argyris, C. (1990) *Overcoming organisational defences: facilitating organisational learning*. London: Allyn and Bacon.
- Argyris, C. (1994) *On organisational learning*. Oxford: Backwell.
- Arie De Geus, A.P. (1988) Planning as learning. *Harvard Business Review*. **66**(2), 70-74.
- Barnett, C.K. (1994) *Organisational learning and continuous quality improvement in automotive manufacturing organisations*, PhD Dissertation, University of Michigan.
- Beyer, J.M. and Trice, H.M. (1982) The utilisation process, a conceptual framework and synthesis of empirical literature. *Administrative Science Quarterly*, **27**, 591-622.
- Brewer, J. and Hunter, A. (1989) *Multi-method research: a synthesis of styles*. Newbury, Park, CA: Sage.
- CIRIA (1997) Effective learning networks. *CIRIA News*. **1**, 6.
- Drucker. P.F. (1988) Management and the world's work. *Harvard Business Review*, Sept.-Oct., 65-76.
- Edum-Fotwe, F.T., Price, A.D.F., Thorpe, A. and McCaffer, R. (1996) Conceptualising the efficiency and effectiveness relationship in construction performance. Productivity in construction international experience, *2nd International Congress on Construction*. Singapore. Singapore Institute of Building.
- Garvin, D.A. (1993) Building a learning organisation. *Harvard Business Review*, Jul.-Aug., 78-91.
- Grantham, C.E. and Nicholas, L.D. (1993) *The digital workplace designing groupware platforms*. New York: Van Nostrand Reinhold.
- Hamel, G. (1991) Competition for competence and inter-partner learning with strategic alliances. *Strategic Management Journal*, **12**, 83-103.
- Hasegawa, F. and The Fumizu Group (1988) *Built in japan: competitive strategies of the japanese construction industry*. New York: Wiley.
- Hill, F.M. (1996) Organisational learning for total quality magazine through quality circles. *Total Quality Magazine*, **8**(6), 53-57.
- Hillebrandt, P.M. and Cannon, J. (1991) *The management of construction firms, aspects of theory*. London: Antony Rowe.

- IFIP. (1992) One of a kind production new approach. In: Hirsch, B.E. and Thoben, K.D., (Eds), *IFIP Working Conference on New Approaches Towards One of a Kind Production*, North-Holland: IFIP TC 5/WG.5.7.
- Inkpen, A. (1995) *The management of international joint ventures, organisational learning perspective*. London: Routledge.
- Kolb, D.A. (1996) Management and learning process. In: Starkey, K. (Eds.) *How Organisations Learn*. London: International Thomson.
- Lee, A.S. (1991) Integrating positivist and interpretative approach to organisational research. *Organisational Science*, **4**, 342-365.
- Lehne, M.G. and Wollert, J. (1992) Integrated process and product modelling in shipping industry why and wow?. In: Hirsch, B.E. and Thoben, K.D. (Eds.) *IFIP Working Conference on New Approaches Towards One of a Kind Production*. North-Holland: IFIP TC 5/WG.5.7.
- Levold, J. and Rinne, D. (1992) Spacecraft experience in one of a kind products. In: Hirsch, B.E. and Thoben, K.D. (Eds.) *IFIP Working Conference on New Approaches Towards One of a Kind Production*. North-Holland: IFIP TC 5/WG.5.7.
- McGill, M. and Slocum, J.W. (1993) Unlearning the organisation. *Organisational Dynamics*, **22**(2), 67-79.
- Parthe, A. (1993) Inter-firm diversity, organisational business and longevity in global strategic alliances. *Journal of International Studies*, **22**, 579-602.
- Pinder, C.C. and Moore, L.F. (1980). The inevitability of multiple paradigms and the resultant need for middle-range analysis in organisational theory. In: Pinder, C.C. and Moore, L.F. (Eds.) *Middle-Range Theory and Study of Organisations*. Boston: Martinus Nijhof.
- Redding, J.C. and Catalanello, R. F. (1994) *Strategic readiness: the making of learning organisations*. San Francisco: Jossey-Brass.
- Stata, R. (1989) Organisational learning-the key to management innovation. *Sloan Management Review*, Spring, 36-76.
- Stein, E. W. and Vandenbosh, B. (1996) Organisational learning during advanced system development: opportunities and obstacles. *Journal of Management Information Systems*, **13**(2), 115-136.
- Strauss, R. E. (1995) Organisational learning as a cycle between microscopic and macroscopic levels - aspects on a theoretical concept and empirical validation. In: Ebrahimpour, M. and Mangiameli, P.M. (Eds.) *Northeast Decision Science Institute Proceedings*. USA: Rhode Island, **22**, 380-382.
- Technology Foresight Panel on Construction (1995) *Progress through partnership*, **2**, Office of Science and Technology, London: HMSO.
- The European Construction Institute (1996) *Implementing total quality in construction industry*. London: Thomas Telford.
- The Royal Academy of Engineering (1996) *A statement of the construction industry*. London: Royal Academy of Engineering.
- Villegas, J. (1996) *Simulation supported industrial training form an organisational learning perspective*. Linkoping Studies in Science and Technology. Department of Computer and Information. Linkoping University.
- Yin, R.K. (1984) *Research design and methods*. Berverly-Hill: Sage, 29.