

# RESEARCH METHODS AND METHODOLOGIES FOR STUDYING ORGANISATIONAL LEARNING

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## **Abstract**

*The purpose of this paper is to compare and evaluate the main research methods and methodologies for studying organisational learning (OL), and propose a framework for their selection. It presents a comprehensive review of literature on OL, learning organisation (LO) and research methods and reports evidence on recent developments in research methods for studying OL. The paper highlighted on the purists and pragmatists' views of research methodologies as basis of the study. The results revealed that the research methods and methodologies for studying OL do not reflect on the differing views of the purists and pragmatists' debate but rather conform to the convergence ideologies of the two camps. Particularly, the outcomes augment the use of triangulation and suggest that the choice of method(s) should be consistent with research aims and epistemological philosophy of OL. Consequently, the study recommends OL Research Methods Framework as a useful guide for selecting a suitable approach in the area. The paper recommends ethnography for future research consideration.*

*Research methods; Organisational learning; OL Research Methods Framework; Ethnography*

## 1 INTRODUCTION

Research findings provide enormous contribution to academic knowledge, organisational practices and systems improvement. However, the reliability, relevance and quality of research results depend largely on methodological designs used to carry out the study (Myers, 2009). Arguments regarding what are the appropriate methods for investigating research issues continue to unravel in academic and professional publications (Howe, 1988; Onwuegbuzie and Leech, 2005). Opinion differs on whether to adopt a single line of methodology (Howe, 1988) or to combine techniques from the two main polarised research approaches (Onwuegbuzie and Leech, 2005).

The design and choice of appropriate method(s) becomes difficult in studies involving social behaviour as these agents are very dynamic (Onwuegbuzie and Leech, 2005). In this respect, Patel (2006, p. 6) argues that: "There is lack of design research in systems generally and lack of design research organisation and systems as a composite order of phenomenon". Even the issue becomes much more complex when the ontological investigation attempts to achieve systems rethinking, a change in social-cultural practices or to promote organisational learning (OL). Focusing on learning organisations (LO), the growing complexity of business environment, the increasing pace for change, the rising competitive pressures, the aging workforce, the increasing levels of workloads, the deteriorating quality of work-life balance and other social problems (Mullins, 2005; van Eijnatten and Putnik, 2004; Burnes et al, 2003) compound the methodological design and selection. As a consequence of this, Patel (2006) posits that design research should symbolise purpose and rich action for a successful outcome. Thus, the approach should include clear purpose, intention and meaning, social interaction and support, and ways for finding certainty and catering for change Patel (2006).

In this respect, our objective here is to compare and evaluate the main research methods and methodologies for studying OL, and propose a guideline for their selection. This paper employed a comprehensive review of literature covering OL, LO and research methods to investigate appropriate methods and methodologies relevant for studying the various aspects of OL. The paper is structured to include introduction (section 1), an overview of research methodologies (section 2), concept of LO (section 3), methodologies used in previous LO studies (section 4), evaluation of research methods suitable for LO (section 5) and conclusion and recommendation (section 6).

## 2 OVERVIEW OF RESEARCH METHODOLOGIES

Traditionally, research methodologies are broadly classified into qualitative and quantitative thereby creating a huge divide amongst researchers, especially in social sciences (Onwuegbuzie and Leech, 2005). The difference between these two methods has been prominent in many research methods publications (Howe, 1988; Neuman, 1997). For instance, Myers (2009, p. 8) distinguishes that qualitative research is an in-depth study of social and cultural phenomena and focuses on text whereas quantitative research investigates general trends across population and focuses on numbers. Likewise, Miles and Huberman (1994) maintain that qualitative research focuses on in-depth examination of research issues while Harrison (2001) argues that quantitative design provides broad understanding of issues under investigation.

Given this distinction, purists uphold that research questions are usually oriented towards quantitative or qualitative direction and as such these two methodologies should not go hand-in-hand (Howe, 1988; Smith and Heshusius, 1986). Consequently, Myers (2009) supports the purists' view of separating the two research philosophies by citing examples of research techniques under the two main categories in his recent publication on 'Qualitative Research in Business and Management'. Thus, qualitative

research methods include action research, case study, ethnography, grounded research, semiotics, discourse analysis, hermeneutics and narrative while quantitative research methods encompass surveys, simulation, mathematical modelling, laboratory experiments, statistical analysis, econometric and structured equations modelling (Myers, 2009, p.8).

From the purists' perspective, the disparity between the qualitative and quantitative paradigms emanates from the fact that epistemological, ontological and axiological hypotheses of research issues are usually qualitative or quantitative in nature (Tashakkori and Teddlie, 1998).

However, pragmatic researchers debunk the dichotomy between purists' belief of qualitative and quantitative methodologies but rather engage in arguments that reveal similarities between the two and promote triangulation (Onwuegbuzie and Leech, 2005; Tashakkori and Teddlie, 1998; Newman and Benz, 1998). In this respect, mixing qualitative with quantitative methods provides opportunity to corroborate results from diverse methods of studying a given phenomenon in a more rigorous manner (Neuman, 1997). Though the pragmatic researchers argue that mono-method research is a danger to the advancement of social sciences and wonder how stakeholders may develop confidence in findings from singular methods, they support the fact that the choice of research methods must reflect the research questions being addressed (Onwuegbuzie and Leech, 2005; Sechrest and Sadani, 1995). In the mist of this debate, researchers, particularly the inexperienced ones may find it difficult to select the appropriate methodologies for a given study.

### 3 LEARNING ORGANISATION

Organisational Learning (OL) is a new paradigm of management which aims to acquire new knowledge or approach of managing and transforming organisational operations in a continuous fashion for survival (van Eijnatten, 2004; Stacey, 2003; Pedler et al, 1991; Senge, 1990). The term OL is often used interchangeably in literature with LO though there is a slight difference between the two (Burnes et al, 2003), for the purposes of this paper, we have stuck to using the terms interchangeably.

LO is perceived as a place where members continuously develop their capacity to create desired outcomes, develop and nurture new patterns of thinking, transform ways of doing things and liberate the entity aspirations (Pedler et al, 1991; Senge, 1990).

There is a reasonable consensus amongst LO experts regarding the experimentation and practising of OL in an unstable and unpredictable environment (van Eijnatten and Putnik, 2004; Burnes et al, 2003; Stacey, 2003; Burgoyne, 1995). The proponents and followers of the LO concepts share a common view that learning goals will be achieved if everyone in an organisation is actively involved in a learning process (Stacey, 2003; Tsang, 1997; Kofman and Senge, 1995; Senge, 1990). As a concept of creating knowledge intensive organisations where old behaviour patterns could give way to new thinking (Stacey, 2003; Burgoyne, 1995; Argyris, 1990), there are new developments in linking OL to complexity theory (van Eijnatten and Putnik, 2004; Brodbeck, 2002). Thus, complexity theory is an emerging field of study in organisational management which explore system's multiple interactions and its spontaneous self-organisations (van Eijnatten and Putnik, 2004; Stacey, 2003; Fitzgerald and van Eijnatten, 2002; Waldrop, 1992).

However, opinions differ on the approaches for implementing LO (Mets and Torokoff 2007; Burnes et al, 2003). Senge (1990) put forward a five inter-related disciplines consisting personal mastery, mental models, team learning, shared vision and system thinking as a framework for the implementation. Huber (1991) suggested a four step approach involving knowledge acquisition, information distribution, information interpretation and organisational memory while Met (2002) also proposed a

three conceptual framework comprising mental systems, main/business processes, and individual and joint learning. Similarly, Probst and Buchel (1997) posited that LO could be developed through learning to implement a strategy, a culture, a structure or human capital of a particular organisation. Characteristically, Burgoyne (1995) outlines three levels of learning in LO and these are: Single loop learning, Double loop learning and Triple loop learning. Single loop learning offers individuals the opportunity to identify errors and correct them within the organisation while double loop learning views people as learning agents who examine environment, develop appropriate responses suitable for new requirements and provide room for organisations to adapt and manage change (Burgoyne, 1995). On the other hand, triple loop level offers possibility to challenge strongly interpretations of existing knowledge and traditional constructs including the understanding of management of people and work and this where LO can wholly emerge (Burnes et al, 2003; Burgoyne, 1995).

Given the complexity of LO, it is very obvious that the choice of methodologies in a research involving any branch of this epistemology is really difficult, especially for the young researchers. Hence, in the next section, we have provided a discussion on instances where some specific methodologies were used by LO experts to investigate varied research issues.

#### **4 METHODOLOGIES USED IN PREVIOUS LO STUDIES**

In the past decade, the growing interests in the LO studies have generated a number of empirical research that have employed methodologies ranging from techniques in a qualitative paradigm (Kira and Frieling, 2007; Kim and Kaplan, 2006; Pahl-Wostle and Hare, 2004; Brodbeck, 2002; Martin and Matlay, 2003; Harvey and Denton, 1999) through a quantitative design (Mets and Torokoff, 2007; Chang and Sun, 2007) to a mixed approach (Sharma, 2005; McDougall and Beattie, 1998). Please see Table 2 on page 7. In addition, there are interesting conceptual papers which synthesised ideas from literature and case studies to provide a wealth of knowledge to the field of organisational learning (van Eijnatten, 2004; van Eijnatten and Putnik, 2004; Giesecke and McNeil, 2004; Burnes et al, 2003).

In order to develop new management strategies for Swiss urban water management, Pahl-Wostle and Hare (2004) used a long term participatory agent-based social simulation involving role play and computer modelling, to build a unified system of mental model elicitation and model structure as a process of transforming management practices. As part of actors' interaction, Wostle and Hare (2004) employed brainstorming, individual interviews, group meetings, questioning, questionnaires and focus groups to provide suggestions for collective decisions. Other techniques used include: Hexagonal modelling and graphical modelling, card sorting, role play board game; use of cardboard arrows, sellotape, washable marker pens and wipeable table cloth. The results were collated in workbooks and further discussed and updated through the actors' platform. The research techniques used (Wostle and Hare, 2004) were closely linked with their proposed ingredients for social learning which included the awareness of each actor's goals and ideologies, shared problem identification, understanding of system management complexities, and ability to learn and work in a team. Notwithstanding this, the exercise took a longer time to complete and participants became frustrated at some stages (Wostle and Hare, 2004).

Similarly, Brodbeck (2002) combined Crawford Slip Method (CSM) with a focus group discussion method which involved managers responsible for working capital management in the company to provide responses to research propositions via the company's intranet as part of data collection. Focus group was used to analyse the findings under complexity perspective and they proposed procedural and process requirements for the organisational procedural design (Brodbeck, 2002). Application of Information and Communication Technology (ICT) in OL was reinforced by Martin and Matlay

(2003) who combined email questionnaires with interviews and documentations to investigate how ICT and internet could be embedded within a firm's marketing strategy and integrated with key business functions. Through the application of Johnson and Hignite's (2000) Model for Internet User Organisations, Martin and Matlay (2003) established that organisational culture could support the wider access and application of new knowledge through OL.

Mets and Torokoff (2007) used quantitative case study approach to investigate the patterns of LO and to evaluate the state of OL in six Estonian small and medium sized production companies. Mets and Torokoff (2007) formulated 47 statements of closed questionnaires covering every aspect of Senge's five model of learning (Senge, 1990) and Mets' three-dimension OLF (Mets, 2002). They administered 326 questionnaires to respondents consisting workers and managers of the six companies and used SPSS version 13.0 factor analysis program for the processing of the data. In conclusion, Mets and Torokoff (2007) established that both managers and workers' OL patterns of the Estonian companies did not completely reflect on all the Senge's disciplines of learning though OLF environment patterns were present.

In addition, Chang and Sun (2007) employed a Likert scale questionnaire approach to collect 31 responses from three types of clusters consisting of academic scholars, business management consultants and industry practitioners, in order to explore the correspondence between TQM and LO. They adopted Senge's Five Disciplines and Total Quality Management (TQM) framework and applied correspondence analysis and K-means cluster technique to analyse 13 (row) x 5 (column) contingency table covering 31 questionnaires generated (Chang and Sun, 2007). In this respect, a significant correspondence was revealed between TQM and LO, with elements of these two variables falling within each of the three main clusters. Their study also identified elements of TQM and LO managerial style differences between clusters and concluded with measurability and diffusibility recommendations for TQM and/or LO implementation (Chang and Sun, 2007).

In another instance, Sharma (2005) invoked both quantitative and qualitative methods involving interviews, surveys, descriptive statistics, correlation analysis and factor analysis to assess the status of various management practices/cultural attributes in local government and to examine their relationship with organisational performance. Theoretically, Sharma adopted the Denison Organisational Culture Survey (DOCS) model (Denison et al, 2005) as an underpinning survey design instrument for grouping organisational culture measures into four traits - adaptability, mission, involvement and consistency and 12 attributes of employees' perceptions (Sharma, 2005).

Specifically, quantitative techniques were used to assess status of management practices and employees' perceptions of organisational performance whereas interviews were carried out to discuss survey results and validity (Sharma, 2005). The outcomes of the study proved that employees' empowerment had not received enough support from the management though there was correlation between various performance measures. In addition, team orientation followed by diffusion of the core values and OL were present in the various management practices. In this example, Sharma (2005) provided strong justification for the various stages of her research methodologies to achieve credible outcomes.

In relation to conceptual papers, Burnes et al (2003) recognised that the growing complexity of business environment necessitates the need for OL and acquisition of knowledge as an alternative approach to managing organisations through a review of one hundred and twelve publications. The authors aimed to test the four propositions which underline OL. Please see Table 1 below.



Proposition No	Underpinning Assumptions for OL
1	An organisation needs to learn as fast as its environment changes if it will like to survive
2	The degree of moving from traditional learning to organisational learning depends on the degree of instability in an organisation's environment
3	Small number of elite managers cannot solely maintain the alignment of an organisation with its environment in a fast changing business environment
4	The whole workforce has to identify the need for change and implementation of change through collective learning

**Table 1: Propositions for Underling Organisational Learning (Adopted from Burnes et al, 2003)**

In conclusion, Burnes et al (2003) claimed that OL might be appropriate for organisations operating in an unstable environment but who do not want to or cannot change their environment.

Similarly, drawing on fifty-one academic publications, van Eijnatten and Putnik (2004) aimed to provide working definitions for chaos, complexity, learning, LO and chaordic enterprise. They proposed two main theses statements regarding chaordic enterprise and its operations in a complex, non-linear dynamical environment:

- *“The chaordic enterprise might be the end state towards which an actual company – seen as a learning organisation – might evolve, and*
- *Chaordic System Thinking (CST) might be used as a meta-model to inform a learning organisation capable of self-organisation and transformative change under hyper-turbulent conditions”*

From the literature review, it was established that for a dynamically reconfigured networked enterprise to become a LO, it must have ‘communities of commitment’ which is deeply-rooted in the ‘organisational mind’ with enough capacity to survive most reconfigurations (van Eijnatten and Putnik, 2004).

Our discussions here reveal that research methodologies for studying OL range from quantitative-qualitative arguments to conceptual papers involving a comprehensive review of literature. The findings support the convergence views of the purists and pragmatists’ debate in relations to epistemological and ontological propositions of research issues (Onwuegbuzie and Leech, 2005; Tashakkori and Teddlie, 1998). This argument is clearly demonstrated on Table 2 below, where the choice of methods was influenced by research aim/purpose and theoretical/conceptual model(s) (Myers 2009). Another striking revelation emerged from the review shows that almost all the empirical research summarised on Table 2 invoked a triangulation technique to obtain credible results, and this supports the argument for mixed or diverse methods (Onwuegbuzie and Leech, 2005; Neuman, 1997). One conspicuous point here is that though two or more research study might have similar methodologies, their aims and theoretical models are not exactly the same. Following on from this, we have developed a framework (Organisational Learning Research Methods Framework) for guiding a selection of appropriate research method for studying OL. Please see Figure 1 in the appendix. The framework attempts to fasten problem statements, theoretical assumptions and techniques of study together in a more coherent way (Myers 2009). In addition to these discussions, some research methods for studying OL are evaluated in the subsequent section.

Author and Year	Methodology	Research Aim/Purpose	Theoretical/Conceptual Models
<b>Qualitative</b>			
Kira and Frieling (2007)	Standardised observations and interviews	Explore individual and collective workplace learning and the link between them in industry	Workplace Learning Theory and Chaordic Systems Thinking
Kim and Kaplan (2006)	Interpretive case study involving ethnographic methods and semi-structured interviews	Examine how software systems and organisations co-evolve in an Australian university	Complex Adaptive Systems
Pahl-Wostle and Hare (2004)	Participatory agent-based social simulation involving focus group, interviews, questionnaires, role play, etc.	Develop new management strategies for Swiss urban water management	Conceptual Framework of Social Learning adopted by HarmoniCOP Harmonizing Collaborative Planning
Martin and Matlay (2003)	Email questionnaires, face-to-face interviews and documentations	Investigate how ICT and internet could be embedded within a firm's marketing strategy and integrated with key business functions	Johnson and Hignite's Model for Internet User Organisations. Johnson and Hignite (2000)
Brodbeck (2002)	Focus group including computer based questionnaires and Crawford Slip Method of Ideas Unlimited	Apply complex theory to the design of business procedures	Complexity Theory
Harvey and Denton (1999)	Interviews and documentations analysed through cluster matrix technique	Investigate how and why OL has gain currency in management studies	Iterative Approach to Complex Issues adopted from Laughlin (1995) and Broadbent & Laughlin (1997), which also reflect on Habermas Model
<b>Quantitative</b>			
Mets and Torokoff (2007)	Closed questionnaire and application of SPSS version 13.0 factor analysis for processing the data	Investigate the patterns of LO and evaluate the state of OL in Estonian companies	Senge's Five Model and Organisational Learning Framework
Chang and Sun (2007)	Likert scale questionnaires analysed through correspondence analysis and K-means cluster technique	Explore the correspondence between TQM and LO	Senge's Five Disciplines and Total Quality Management (TQM)
Roden (2005)	Simulation involving real world organisational features	Examine various individual-and organisational level processes that affect variation and selection/retention of beliefs	March's Model of Mutual Learning (March, 1991)
<b>Mixed Method</b>			
Sharma (2005)	Interviews, surveys, descriptive statistics, correlation analysis and factor analysis	Assess the status of management practices/cultural attributes in local government and examine their relationship with organisational performance	The Denison Organisational Culture Survey (DOCS) model Denison, et al (2005)
McDougall and Beattie (1998)	Likert scale questionnaire survey, semi-structured interviews, critical incident techniques, documentation	Explore the issues in training and development in relation to individual and organisational learning	Analytical Framework from Literature Review

**Table 2: Examples of Methodologies and Theoretical Models in LO Research**

## 5 EVALUATION OF RESEARCH METHODS SUITABLE FOR LO

Drawing on the above findings, we evaluate the available research methods for studying LO with particular emphasis on their epistemological hypotheses as well as strengths and weaknesses. Due to lack of space, we have only considered action research, ethnography and interview from a qualitative side and simulations, factor analysis and descriptive statistics from a quantitative side. A case study approach is neutrally discussed as previous studies show that it can be swayed to either side of a qualitative-quantitative continuum (Mets and Torokoff, 2007; Kira and Frieling, 2007; Neuman, 1997).

### 5.1 ACTION RESEARCH

Action research which is often called participatory action research involves investigating how an organisation could develop systems to improve the quality of its work practices. Burns (1990, p. 252) defines it as: “The application of fact-finding to problem solving in a social situation with a view to improving the quality of action within it, involving the collaboration and co-operation of researchers, practitioners and laymen”. In other words, it creates clearer understanding of organisational dynamics and a collaborative platform for self organisation in which a researcher plays a vital role. In this regard, action research underpins both single and double loops learning and provides room for organisations to adapt and manage change (Burgoyne, 1995; Argyris and Schon, 1991). It also provides clear set of social values in a democratic, equitable and liberating learning environment (Savin-Baden and Wimpenny, 2007), an epistemology underlying Senge’s view of LO (Senge, 1990).

However, Myers (2009) maintains that it is difficult to conduct action research as an attempt to solving practical business problems while at same time writing up the results which contribute to theory for journal publications. In addition, action researchers need excellent skills and good personal qualities including good team building skills, good working relationships, ability to facilitate learning and provide advice, excellent problem solving skills, openness and trustworthiness (McAdam, 1995). Similarly, there are ethical issues relating to action research, particularly when there is a conflict of interest between the action researcher and the organisation being studied (Rapaport, 1970).

### 5.2 ETHNOGRAPHY

Ethnography is a qualitative research approach which reveals the worldview of people and demonstrates their daily cultural meanings, and brings researchers closer to where action takes place (Myers, 2009; Spradley, 1980). It offers opportunity to obtain vital information over a longer period of time to challenge conventional practices and assumptions (Myers, 2009). Thus, ethnography complements the triple loop learning concept which seeks to question existing knowledge and traditional constructs of management practices (Burgoyne, 1995) and is recommended appropriate methodology for studying OL. Comparatively, ethnography is different from case study, as it involves participant observation where case study is usually conducted through in-depth interviews within a shorter period of time (Yin, 1989).

Despite the advantages, there are no many publications on the use of ethnography in OL though Nyame-Asiamah (2009) proposed it for the study of: ‘Assessing the Role of Knowledge Management Technologies in Learning Organisations’. While Kim and Kaplan (2006) used it as one of the research methods to examine how software systems and organisations co-evolve in an Australian university. Generally, it takes a researcher a longer period of time to collect data, analyse them and write the final report through ethnography, hence people find it daunting to use.



### 5.3 INTERVIEWS

An interview technique is used to gather primary data for almost all kinds of qualitative research and they are typically classified into structured, semi-structured and unstructured interviews (Myers, 2009). This technique, mostly the unstructured type allows interviewees enough room to provide detailed responses (Myers, 2009). The interviewees can be individuals or focus group and the method is commonly used to extract first hand data for LO research (Kira and Frieling, 2007; Kim and Kaplan, 2006). Focus group is particularly useful when researching into collective learning as it allows participants to interact in a stimulating atmosphere while a researcher elicit opinions, mental models and attitudes held by the interviewees (Pahl-Wostle and Hare, 2004; Brodbeck, 2002). Consequently, interviews are appropriate for studying LO because they echo some principles behind complexity and OL theories.

Despite the advantages, an interview technique has a number of problems including: Lack of time to conduct interviews may often lead to incomplete data gathering; lack of trust in the interviewer may discourage interviewees from divulging sensitive information; elite bias where the researcher tend to focus on high profile informants and difficulty in getting access to a wide and varied range of interviewees in an organisation (Myers and Newman, 2007).

### 5.4 SIMULATION

In social sciences, the term simulation is described as: “The methodology of creating an artificial representation of a real world system in order to manipulate and explore the properties of the system” (Pepinsky, 2005, p. 369). Pepinsky (2005) and Wu and Sun (2005) shared a common philosophy underlying simulation construction though they described their assumptions differently. The common line of argument is that they all focus on rules, time, environment and agents. These similar views are outlined in Table 3 below:

Key Features of the Two Models	Wu and Sun (2005)	Pepinsky (2005)
Environment and reality	the <i>environment</i> which defines as the locus of interaction for all agents	a <i>reality</i> which is independent of belief about it
Agents and Socialisation	the <i>agent</i> which is any inhabiting entity in the environment to which behavioural characteristic are ascribed	the continuous modification of individuals' beliefs resulting from organisational <i>socialisation</i>
Rules and Code	the <i>rules</i> and the <i>parameters</i> which regulate the behaviour and responses of the agents	adaptation of organisational <i>code</i> to the beliefs of individuals
Time	<i>period</i> within which the specified rules and parameters may lead to emergent changes in the system	<i>period</i> within which the beliefs about reality are held

**Table 4: Key Conditions for Building Simulation [Adopted from Wu and Sun (2005) & Pepinsky (2005)]**

While Wu and Sun (2005) adopted the Model of Mutual Learning propounded by March (1991) to examine how individuals and organisations learn to increase and utilise knowledge, Pepinsky (2005) developed his idea from Complex Adaptive System (CAS) theory. Wu and Sun (2005) supported the claim that researchers ought to develop analytical framework for running social simulation and their

suggested steps include model creation, model execution and model verification, with each involving a number of activities. Consequently, simulations are recommended suitable for studying more complex systems which involve repeated interactions between multiple actors and are usually too problematic to carry out equilibrium analysis (Marney and Tarbert, 2000). In light of this, the choice of simulation is often influenced by complexity theory, a concept which shares common epistemology with LO and provides impetus for self-organisation (van Eijnatten and Putnik, 2004; Stacey, 2003; Brodbeck, 2002).

In the above instance, the writers conceived the use of mathematical and statistical notations to simplify their models, and the availability of agent-based computer applications (Brent, 1999) and distributed artificial intelligence (Wu and Sun, 2005) make it less laborious and practically reliable to run social simulation. One potential disadvantage associated with a simulation technique is that incorrect specification of the model's conditional variables will eventually result incorrect conclusions (Pepinsky, 2005). From an epistemological point of view, simulation creates an abstract model of a complex world and tries to make predictions on it but empiricist epistemology prohibits data which are not observable (Pepinsky, 2005).

### **5.5 FACTOR ANALYSIS AND DISCRIPTIVE STATISTICS**

Factor analysis is a statistical method used to classify a greater number of variables into a more manageable chunk of factors where researchers can calculate the correlation between various individual questions and group them into matrix. The highly correlated cluster of questions called factors is identified, and the correlation between an individual question and these factors is calculated by factor loading, which lies between 0 and 1. The next stage of the process involves ranking each question within the factor as per their factor loadings and calculating the factor-score coefficients for the various factors. Factor analysis is usually a good method if a researcher wants to explore patterns and relationships within a large set of variables, and quite recently, Sharma (2005) and Mets and Torokoff (2007) adopted it in their research (Please see Table 2 above). Availability of advanced statistical packages like SPSS makes it easier to use factor analysis, however it requires tenacity of mathematical interest to model data for the analysis, and a mistake in one calculation will have multiple effects thereby distorting the accuracy of the results.

On the contrary, descriptive statistical operations enable researchers to identify data patterns by measuring the central tendencies such as median, mean and mode; calculating the degree of dispersion such as variances and standard deviations; and observing relationships such as correlation of variables (Sharma, 2005). In this respect, descriptive statistics can be used to test research hypotheses and again, a wide range of computer packages are available to perform complex data. Descriptive statistics is one of the main methods used by Sharma (2005) in her study of the local government journey to learning organisation. However, it is difficult to establish the causes of associations in dynamic variables and as a result, it is important to support descriptive statistics with other qualitative approaches such as interviews and observations.

It is important to emphasise that all socio-technical systems have huge numbers of heterogeneous elements and relationships, hence, the use of mathematical and statistical tools is recommended for studying issues involving dynamic changes and self-organisation (Johnson, 2008).

### **5.6 CASE STUDY**

A case study approach which involves the use of multiple sources of evidence to investigate a contemporary phenomenon within its real-life context, particularly when the confines between phenomenon and context are not clearly apparent (Yin, 1989, p. 23), has been used in many OL

studies (Kira and Frieling, 2007). In some instances, a case study approach is categorised under qualitative (Myers, 2009) and was combined with ethnography, a qualitative technique (Pahl-Wostle and Hare, 2004). In another instance, Mets and Torokoff (2007) adopted quantitative case study approach to investigate the patterns of LO and to assess the state of OL in the six Estonian production companies. This raises an argument about where to place a case study in a qualitative-quantitative continuum as Myers (2009, p. 76-77) admitted that case study is not completely suitable for all qualitative researchers and it does not by and large involve participant observation. In this regard, it is clear that we can use a case study for both qualitative and quantitative studies so long as it is epistemologically unbiased and adopts interpretive or positivist's view in the analysis (Neuman, 1997).

In general, case study allows opportunity for empirical research which represents a true story in an organisation as researchers can explore, test and make valid interpretation of theories within the context of real-life environments (Myers, 2009). However, it takes a longer period of time to get permission to conduct interviews and investigate issues in an organisation (Nyame-Asiamah, 2007). In most situations, changes in organisational activities hamper a case study research, especially if the key person in an organisation liaising with the researcher gets transferred, redeployed or stop working (Myers, 2009).

## **6 CONCLUSION AND RECOMMENDATION**

We have established that issues involving OL can be studied through either qualitative designs or quantitative approaches, or a combination of the two. Thus, our findings do not tow a particular line with the differing methodological views witnessed in purists and pragmatists' arguments though the outcomes complement the convergence views of the two camps. A common point of noting is that OL research methodologies and methods are chosen on the basis of research aims and theoretical underpins of the study as proposed in 'OL Research Methods Framework' (Please see Figure 1 in Appendix). Quantitative research methods are recommended for studies intended to establish patterns, relationships and variations in organisational processes. It is also appropriate for studies aimed at investigating state of learning processes. In these instances, the common theoretical framework include: March's Model of Mutual Learning, CAS, Senge's Five Discipline and Organisational Learning Framework. On the other hand, qualitative methods are more applicable for OL research intended to develop strategies, plan changes, improve performance, manage knowledge and ICT, and examine learning issues. However, the selection of particular qualitative techniques is influenced by the philosophical assumptions of the study. The predominant models identified for consideration include: Complexity Theory, Social Learning Theory, Workplace Learning, CAS, Chaordic System Thinking and Model for Internet User. The choice of mixed methods is also determined in a similar way of selecting quantitative and qualitative methods. Specific models of consideration here include Analytical Framework from Literature and the Denison Cultural Survey. No matter what kind of methodological approach adopted, it is imperative to include triangulation in the process, so as to achieve quality results (Onwuegbuzie and Leech, 2005; Neuman, 1997).

In addition to the proposed OL Research Methods Framework, we also established that each of the methods has its own merits and limitations; and it is here that researchers, particularly the novice have to assess their own skills against alternative techniques outlined in our framework. As a hint for future research considerations, we identified that that not many LO studies have used ethnography in the past though it has potential to discover how people learn including their mental models and attitudes particularly in business organisations. Hence, this needs to be investigated within the OL Research Methods Framework.

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APPENDIX

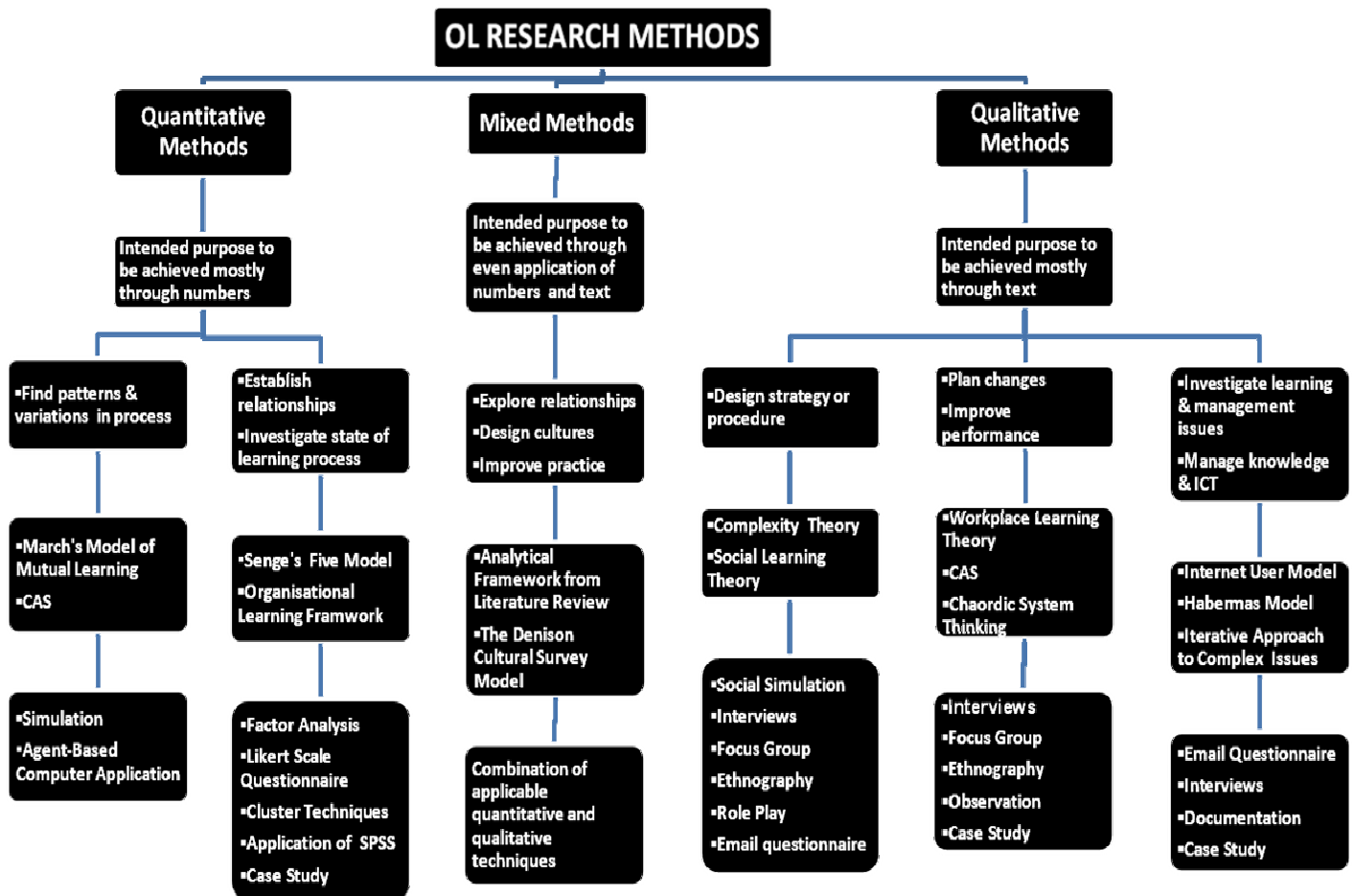


Figure1: Organisational Learning Research Methods Framework

Notes:

- Tier 1 – General view
- Tier 2 – Three main research methodologies
- Tier 3 – Corresponded meanings of the three main research methodologies
- Tier 4 – Possible research aims and objectives
- Tier 5 – Common theoretical models to be tied to the research aims and objectives
- Tier 6 – Research methods/techniques to match relevant preceding tiers