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Activity as a unit of analysis for knowledge management frameworks

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Abstract
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Keywords
management, frameworks, knowledge, activity, analysis, unit

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Activity as a Unit of Analysis for Knowledge Management Frameworks

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ABSTRACT

The authors of this paper take the view that knowledge management is a set of practices for systematically adding value to the knowledge of individuals, which is generated and shaped through interaction with others. It is therefore appropriate that knowledge management research be conducted in the context of particular organisations, focusing on local activities. To that end two of the authors have conducted a four-year research program investigating the factors in organizations that enhance and enable the assimilation, generation, sharing and building of knowledge that transforms an organization into a learning organization. Human activities in organisational contexts have been analysed through the lens of the cultural-historical Activity Theory where the pragmatic concept of "Activity" is simply what people do. It is argued that Activity Theory provides a framework suitable for the analysis of everyday human work where information and communications technologies make a strategic contribution.

Keywords: knowledge management, social learning, activity theory.

1. INTRODUCTION

Whilst there are a variety of attitudes to the popular field of knowledge management (KM), the authors of this paper have consistently expounded the assertion that knowledge exists in the minds of individuals and is generated and shaped through interaction with others. Their research [1-6] has found that knowledge management in an organizational setting must, *at the very least*, be about how knowledge is acquired, constructed, transferred, and otherwise shared with other members of the organization, in a way that seeks to achieve the organization's objectives. Knowledge management is a set of practices and processes for systematically adding value to intellectual and knowledge based resources. The introduction of computerization and digital telecommunications, the shift from domestic to global economies, and the increasing influence of user communities are signs of significant changes in the structure of markets and societies. Like finance, land, capital equipment and people, knowledge has become a critical resource for businesses, community organizations and government. Knowledge needs to be strategically managed by any organization or groups of organizations to maximize profits of businesses and boost the health of societies.

Informal, activity-based learning is inherent to all human activities. Workplaces are full of learning opportunities and in work life, socially based learning is occurring all the time. As interactions occur, learning takes place and it often happens in ways not normally recognised as learning. The social and intellectual capital of organizations is built through these interactions and interrelationships. It is therefore appropriate that KM research be conducted in the context of particular organisations, focusing on local activities using interpretive methods involving ethnographic or action research approaches. To this end the Enterprise Socio-Cultural and Learning Analysis (ESLA) team of the Defence Science and Technology Organisation (DSTO) conducted a four-year research program investigating social learning and knowledge management within a number of different settings in the Australian Defence Organization (ADO).

In this paper, the authors reflect the research team's own learning and evolving understanding of social learning during the long-term research program. The program investigates the factors in organizations that enhance and enable the assimilation, generation, sharing and building of knowledge that transforms an organization into a learning organization. Human activities in the DSTO and ADO contexts are analysed through the lens of the cultural-historical activity theory of the Russian psychologist Vygotsky during the first half of the 20th century [7] and his student Leontiev who developed a conceptual framework for a complete theory of human activity [8]. In Activity Theory the pragmatic concept of "Activity" is simply what people do, so that Activity Theory provides a framework suitable for the analysis of everyday human work where information and communications technologies make a strategic contribution.

2. BACKGROUND TO THE STUDY

The ESLA research team conducted a four-year study investigating the procedures that facilitate social, generative learning – learning that enhances the enterprise's ability to adjust to dynamic and unexpected situations and to react creatively to them. The term 'social' learning has been used to reflect that organizations, organizational units, and work groups are social clusters, and that learning therefore occurs in a social context.

Lave and Wenger [9] refer to the interactions between people and the environment as situated experience or situated learning. It is through learning that we see ourselves in a different context and this transformation of oneself through learning is particularly important if one is to contribute to the dynamic changes in the organizational landscape. For the purpose of this study, social learning is defined as learning that occurs within or

by a group, an organization, or any cultural cluster and it includes:

?? the procedures by which knowledge and practice are transmitted across different work situations and across time;

?? the procedures that facilitate generative learning that enhances the enterprise's ability to adjust to dynamic and unexpected situations and to react creatively to them.

Social learning represents important processes that contribute to individuals' ability to understand information, create knowledge from that information and share their understanding. Social learning is therefore intrinsic to knowledge management.

The immediate aim of this research was to understand the issues inherent in building learning, adaptive and sustainable organizations. A long-term objective, however, was to develop architectures that will support the development of information systems which guide and enhance organizational learning and facilitate knowledge management. An overview showing the main elements of the research task is shown in Figure 1.

While the results of much of this research have been comprehensively reported elsewhere [3-6], in this paper, the set of architectures derived from the results of the diverse quantitative and qualitative studies conducted are presented, and the role of activity as a unit of analysis is discussed.

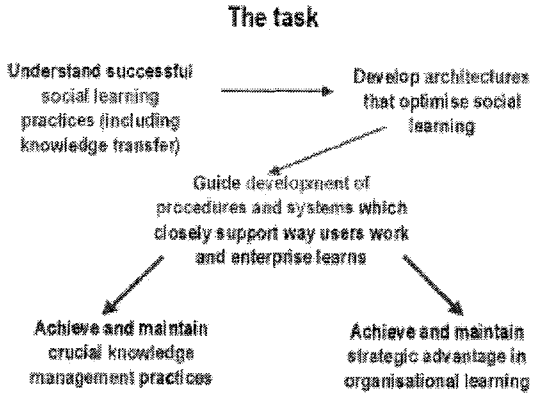

Figure 1 An overview of the ESLA research

3. BACKGROUND TO THE ACTIVITY PERSPECTIVE

The significant difference that Activity Theory brings to the study is that it places the focus on the activities that are carried out by people in support of their interpretations of their role, the opportunities available, and the purpose for which the activity exists. This is both subjective, in the sense that it is a matter for individual interpretation, and objective, in the sense that the motives, purpose and context are a vital part of the reality of human work. In contrast to Western cognitive science, thinking, feeling and acting are considered as integrated parts of the one object in Activity Theory.

The theory recognizes an objective reality, i.e. the object, or purpose, of all human activity is what defines that activity and that object is real, whether physical or ideal. What is objective is not the rational analysis of what *should* be done but what really *is* done, affected by messy contexts and driven by conflicting motives. Indeed, activities are often poly-motivated as, for example, employees may be good corporate citizens, and therefore be motivated to cooperate with fellow employees, but also compete with them when they have their own careers to consider. A failure by management to take these different motives into account can have disastrous consequences.

In Activity Theory an *activity*, as commonly depicted in Figure 2, is the only complete meaningful unit of analysis of work and includes purpose, motive and context. *Activity*, defined by the dialectic relationship between subject-object, both mediates, and is mediated by, the tools used and the social context of the work activity. This two-way concept of mediation implies that the capability and availability of tools mediates what can be done and the tool, in turn, evolves to hold the historical knowledge of how the communities work and can be organized.

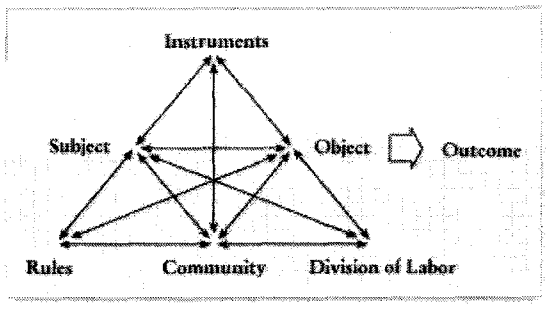

Figure 2 The Representation of an Activity by Engeström

Using Activity Theory, a research approach where activity is the unit of analysis has both a solid theoretical foundation while at the same time is eminently practical in a way that make sense in the context of organizational initiatives such as those implementing principles of KM. The theory has identified a structure whereby human activity driven by purpose and motive is implemented at a lower level by a choice of actions, towards specific goals, and operations, necessitated by specific conditions. It is however the highest level of activity that matters and actions and operations have no meaning in themselves unless they contribute to purposeful activities. This implies that identification and recognition of activities is paramount in any particular circumstance.

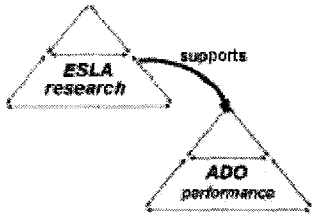

Figure 3 The research activity of the ESLA supporting the activities of the ADO

Identifying the Principal Activities of Interest An analysis of a situation using Activity Theory necessitates the identification and representation of the activities of interest to the problem at hand. The work of Bødker and Grønbœk [10] concluded that there could be several activities in each project. They were particularly interested in the creation of computer-

based application and identified two activities, those of design and use, that interacted in all their work. In the situation described in the section on the ESLA Study there also appear to be two main sets of activities, namely those of the researchers and then the activities of the organization they are studying. These two are related and shown in Figure 3.

As an activity is defined by its object it is evident that Figure 3 is an over simplification and that each of the two main activities can be considered as activity systems and decomposed into a number of activities each with their own objects. Based on the overview of the ESLA research shown in Figure 1 its activity system can be depicted as a set of five activities as shown in Figure 4. The core of this activity system is the activity of developing architectures to optimize social learning and this activity, and its outcomes, will be presented in detail in the following section.

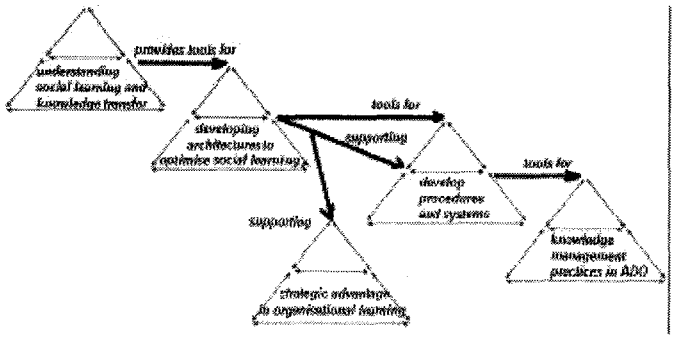

Figure 4 The activities of the ESLA Research Team as an Activity System

4. ARCHITECTURES DERIVED FROM THE ESLA RESEARCH ACTIVITY

The architectures presented in this paper are a statement of the historical development of the research program and the development of its findings as frameworks or architectures. In this way, it is also a story of the research team's own social learning journey. Activity is applied as a unit of analysis to the research teams own activities as well as to the findings of the research study.

The conceptualisation of the ESLA study's results as architectural models provides a set of constructs that can be used to evaluate current social learning within an organizational unit, diagnose the existing processes and develop strategies to enhance social learning. These constructs may be useful to other organizations seeking to overtly support social learning within a knowledge management context. Although this research was conducted within the ADO, it is clear from reports of similar studies, that many of the findings are equally relevant to any large, multi-functioned organisation engaged in innovation or knowledge work [4].

The Concept of Architectures There are numerous definitions of enterprise architecture and the scope of this study did not necessitate a rigorous definition of architecture. This is consistent with Zachman [11] who points out that 'Enterprise Architecture' is defined imprecisely. To some people, 'architecture' is simply a high level description (or model) of the system to be built. To others, it is conceptual, or logical, understanding as opposed to a physical construct. To others still, 'architecture' is 'requirements' while to others, it is simply a set of 'principles' [11].

According to the Meta Group [12], enterprise architecture provides organisations with the methods, processes, discipline, and organisational structure to create, manage, organize, and use models for managing the impact of change. It thus provides collective knowledge about that system. Chen, El-Sakka and Clothier's paper [13], based on context analysis for architecture practice, proposes that the definition of architecture should derive from three critical roles of architecture: providing a picture of existing systems, a blueprint of future systems, and a roadmap of how to get from one to the other.

The ESLA team's objective in developing the social learning architectures presented in this paper includes:

- helping to enhance understanding of social learning concepts and aspects
- helping to detect problems and inhibitors to social learning
- helping to avoid risk by providing a disciplined approach
- helping to clarify and prioritise requirements for effective social learning
- providing guidance on how to implement social learning
- facilitating the promotion of social learning concepts to stakeholders
- identifying inputs into future planning

The research evolved a set of representations in response to these objectives as follows.

The Conceptual Architecture The initial social learning architecture was a high level abstraction. The model of social learning, in the first instance, was thought of in terms of a map that identified the major elements and effects of social learning and the knowledge management issues that support it. The conceptual architecture of social learning, as shown in Figure 5, identifies the variety of factors that denote social learning. These factors include:

?? the set of organizational values that underpins social learning
?? the environmental context in which processes and strategies operate
?? the enabling and inhibiting processes and strategies.

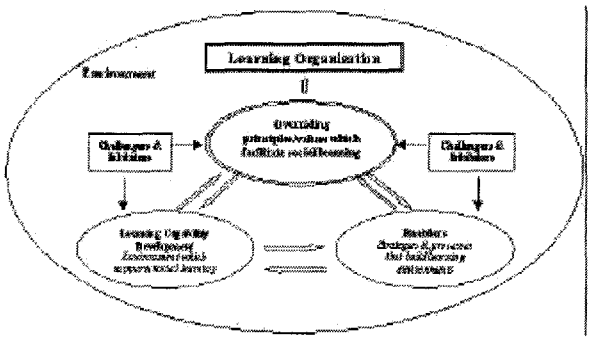

Figure 5 The Conceptual Architecture of Social Learning

Organizational Values The research findings highlight the importance of organizational and/or cultural values for effective social learning and knowledge management practices. In some cases, it was the absence of such values that made their importance clearer. Effective social learning was facilitated by the presence of a set of overarching values:

- *empowerment* - autonomy to make them accountable and increase their sense of ownership of their role in the organization
- *cultural cohesiveness* - common identity, shared goals and a shared understanding
- *trust* - entails mutual respect
- *forgiveness* - forgiving mistakes and creating knowledge from lessons learnt
- *commitment* - loyalty to the organization reciprocated by loyalty from the organization
- *openness of decision making* - transparent processes and information availability to employees at all levels of the organization
- *sharing of information* – information as an organizational asset not a source of an individual's power base

Apart from the overriding set of values, the research team identified additional sets of factors that support and enable effective social learning. These factors fall into two categories. The first, *Learning Capability Development*, refers to *characteristics in the environment* and provides a context in which the second category operates. This second category is referred to as *Enablers* and represents *processes and strategies* that, if present and effectively applied in an enterprise, can facilitate social learning.

However, the same processes and strategies that enable social learning were found to also act as *Inhibitors* or *Challengers* of social learning when they were not thoughtfully applied. Examples of the negative aspect of such processes might include an organization characterized by destructive work practices, a highly politicized environment, organizational change (and the resultant change fatigue), and changing organizational cultural values.

Overall, the learning capability is dependent on the priorities and objectives of the organization itself and the relative dominance, or perceived importance, of each of the *Values* in different research settings. However, the research also shows that the contribution of *Values* and *Enablers* to social learning is dependent on receptive and supportive organizational structures and processes. Thus learning capability is nurtured by, and itself nurtures, organizational values that foster effective social learning.

The Emergence of Structure The complexity and effects of the *Enablers* led to the development of a number of descriptive architectures that were believed to be more generally applicable to most organizations. A structure began to emerge from these descriptive models.

People are the essential core of any organization's capability. This potential is dependent on effective human resource management and workforce planning to best optimise employees' competencies and capability. Similarly, effective social learning is also dependent on satisfactory work force policies, supporting capabilities, and developing employee competencies within a supportive knowledge management environment. The Structural Architecture is shown in Figure 6 and is based on three broad categories:

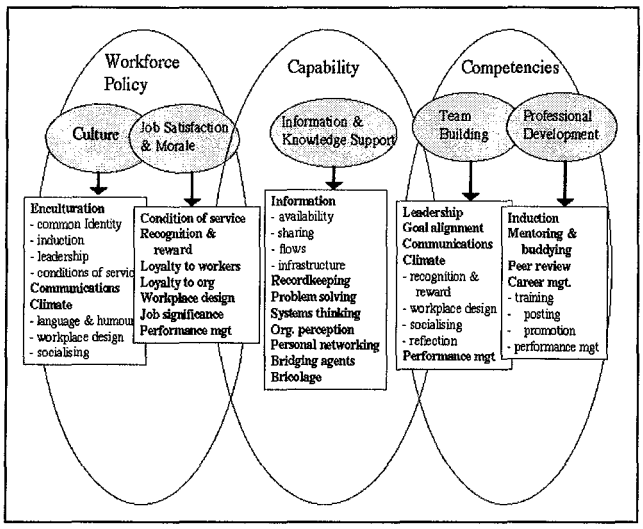

Figure 6 The Structural Architecture of Social Learning

- *Work Force Policies* is divided into two social learning constructs: *Organizational Culture*, and *Job Satisfaction and Morale*, as these are the essential components of workforce policy in terms of recruitment, retention, motivation for, and sustainability of social learning. Implicit in the *Organizational Culture* are the *Values* identified earlier.
- *Capability* is a single, but pivotal, social learning construct – *Information and Knowledge Support.* Organizational initiatives pertaining to this construct facilitate the acquisition, construction, generation, transfer, and sharing of knowledge among members of an organization, and as such, form a vital organizational capability and a fundamental requirement for effective social learning.
- *Competencies* is divided into two social learning constructs: *Team Building*, and *Professional Development*, as both of these constructs are considered fundamental to preparing fertile ground for dynamic social learning, knowledge transfer and knowledge sharing. The elements in Figure 6 overlap in order to represent the interrelationship

The inter-relationship of the elements is represented by the overlapping ellipses.

The next stage in the representation of the ESLA findings was to provide a disciplined approach for organizations implementing social learning. Such guidance needs to be applied under the umbrella of each organization's own values. To do this, it was necessary to take a different conceptual view of the research findings, and to use a fresh lens to examine the relationships between the factors that define social learning.

Toolset Architecture The processes and strategies of social learning, as discussed previously were collectively conceptualized as a learning toolset of actions, processes and strategies that an organization can deploy to achieve required

organizational outcomes. This conceptualization draws on the broad definition of tools derived from Activity Theory [14]. The Toolset Architecture is shown in Figure 7.

The impact of each tool on social learning and knowledge management is mediated in four distinct ways. The impact is determined as the cumulative outcome of the tool's role as a *Motivator*, *Enabler*, *Challenger* and *Inhibitor* of social learning. These roles collectively are termed *Effectors*. Each tool has a greater or lesser impact on social learning depending on how it is deployed, in terms of the *Effectors*, in a specific situation [4]. Using a building analogy, *Motivators* establish a sound foundation and *Enablers* provide the bricks or building material. In this context organizational *Values* are the mortar that binds them together.

The *Effectors* mediate the impact of the learning tools on organizational *Values*. But the *Values* influence how these *Effectors* mediate learning to achieve organizational outcomes. These reciprocal and interdependent relationships are the essential element of social learning. The *Values* within the organization are therefore pivotal to the successful implementation of social learning and knowledge management tools. *Values* steer the way the tools are implemented, used and accepted, but *Values* are also shaped directly by the tools.

The *Values* are also influenced by the organization's performance. This introduces a temporal dimension into the model, as there is often a time lapse between an outcome and when it is reflected back unto the organization by the external environment. This is indicated in the diagram by the arrows originating with the organizational outcomes in Figure 7. Another aspect of the temporal dimension are the *Challengers* and *Inhibitors*. These are environmental or personal factors that impede or erode an organization's learning capacity. In many instances their impact is more evident in the longer term as the social learning imperative of a tool is diminished over time for both internal and environmental reasons.

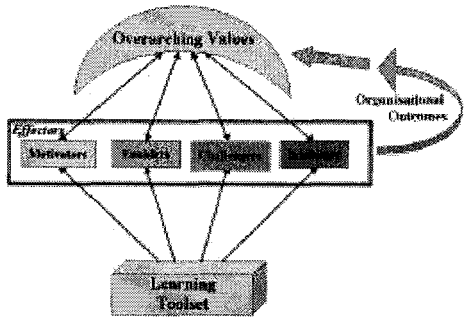

Figure 7 A Toolset Abstraction Model

Definitional Architecture To move towards a comprehensive operational definition of social learning, the issues and perspectives highlighted in the other architectures needed to be expressed within a single construct. After much discussion and testing against the data, the definitional architecture, shown in Figure 8, was developed. It is based on three interacting layers; *Culture*, *Resources* and *Practicalities*.

The *Culture* layer represents the organizational *Values* that were most enduring and pervasive aspect of the research findings. As discussed above, values are a dominant and dynamic factor in supporting social learning tools. The *Culture* layer provides the context for social learning and an important determinant in the organizational outcomes achieved through learning.

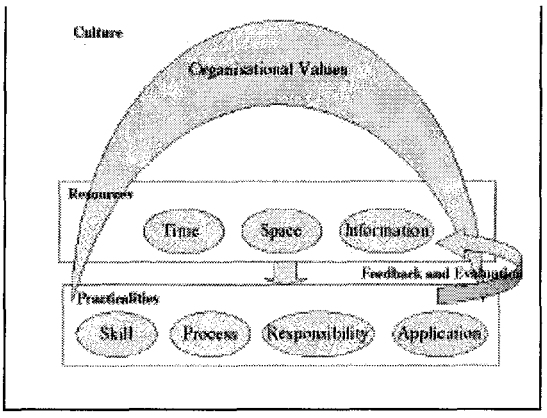

Figure 8 A Definitional Architecture of Social Learning

The *Resources* layer supports the organization's ability to disseminate the outcomes of learning. It is modelled in terms of *time*, *space* and *information*, where *time* is allocated, scheduled and prioritised for the tool's use; *space* refers both to conceptual and physical space available to use the tool; and *information* refers to the data, information and knowledge required to effectively deploy the tool.

Adopting the toolset perspective also brings into focus those aspects that support tool usage, the *Practicalities*. These are defined in terms of the *skills* required to apply the tool, a description of the *process* or activity that the tool is applied to, the person or persons *responsible* for applying the tool and the appropriate *application* of the tool. This layer effectively defines the tool. But it is the *Resources* layer that determines if there is enough time, space and/or information available to use the tool effectively. However it is the *Culture* layer that ensures the use of the tool is consistent with its *values* and it is the *values* that determine if the organization allocates time, space and data for that tool. Consequently, tool use in the *Practicalities* layer provides feedback directly into the *Resources* layer and indirectly into the *Culture* layer.

5. A FRAMEWORK FOR THE ADO KM ACTIVITIES

The framework of the socio-cultural study of organizational learning in the ADO, presented in Figures 5 and 8 is now analyzed from an Activity Theory perspective. Figure 9 depicts an activity system where organizational learning is the core activity with a series of support activities identified by the ESLA research. This selection of support activities may not be exhaustive but appear to be the most important.

These activities are the highest-level view which, according to the work of Leontiev [8], is the unit of analysis. Activities are accomplished by means of actions towards specific goals and operations appropriate to the conditions with which the subjects (people) of the activities are faced. Actions are however not meaningful in their own right and only make sense in the context of an activity. The goals of specific actions will be determined by the Motivators, Enablers, Challengers and Inhibitors described in the Toolset Architecture above and shown in Figure 7. The conditions for operations will depend

on the organisational Culture, Resources and Practicalities as described in the Definitional Architecture shown in Figure 8.

Because activities are what communities of people do in a social setting, the view in Figure 9 may lead to practical implementation of the findings of the ESLA study and may be generalizable to other organisations in different settings.

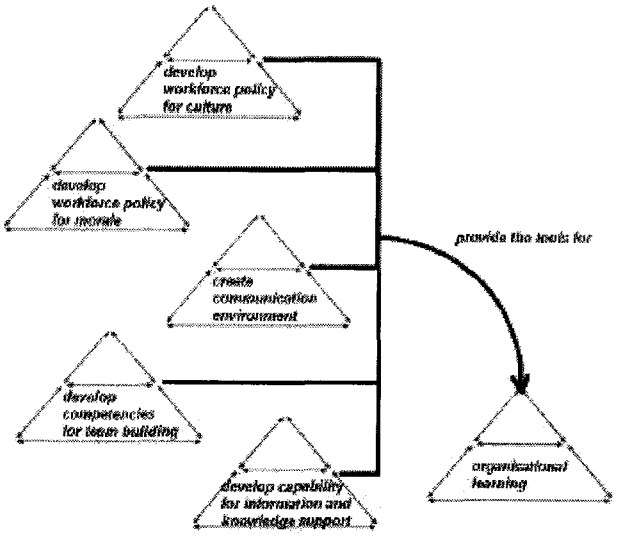

Figure 9 A decomposition of the ADO organizational learning activity system

6 CONCLUSION

To be viable, organizations need to sustain a culture in which learning occurs and this requires an understanding of the elements that foster the creation, sharing, and management of knowledge within and between organizational groups. This paper describes the evolution of a number of representations of learning and knowledge management based on findings derived from an ESLA research program. It is the authors' belief that these representations may be useful to other organizations seeking to improve and support the cultural social learning and knowledge management tools in their organizations.

The significant difference that Activity Theory brings to the study of KM is that it places the focus of study on the activities that are carried out by people in support of their interpretations of their role, the opportunities available, and the purpose for which the activity exists. This is both subjective, in the sense that it is a matter for individual interpretation, and objective, in the sense that the motives, purpose and context are a vital part of the realty of human work. In contrast to Western cognitive science, thinking, feeling and acting are considered as integrated parts of the one object in Activity Theory. These aspects of the human dimension were also found to be essential components of successful social learning in organisations.

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