

# Knowledge Elicitation in Unstructured Business Processes: The Preliminary Findings From a Case Study

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**Abstract:** This paper presents a knowledge audit methodology for unstructured processes, addressing on the phenomenal increase in the number of unstructured knowledge work. The implication of such trend is that organizations are no longer mechanistic entities but networks of complex and interdependent communities whose knowledge cannot be discovered and visualized using the traditional knowledge elicitation and representation techniques. With such argument, the authors developed a knowledge audit methodology exploring on narrative-based knowledge elicitation methods and pattern-detecting knowledge representation methods. The methodology was conducted in an unstructured process of an Information Technology Department (ITD) of a Hong Kong-based company. The results elucidate the complex activities in the studied unstructured process; its associated knowledge flow amongst stakeholders is also revealed for pattern detection. This paper contributes in opening gateway to the investigation of knowledge audit in unstructured processes.

**Keywords:** knowledge audit, anecdote circle, sense-making, knowledge elicitation, knowledge representation

## 1. Introduction

Time was, and not long ago, hierarchies and instructions were of utmost importance in work. The steps were clear, and the paths seemed obvious and structured. The structured work processes, say managing productive activities, work flows and order processing, are procedural and well documented. The knowledge requirement for overseeing a structured process is known and straight-forwarded to be defined. Nowadays, most knowledge work is of unstructured nature and cannot be described by a simple flow chart. Unstructured process is non-linear and there is no defined scope. Examples of unstructured process include designing a new computer model, establishing a new market, launching a new product, preparing a lawsuit. This kind of work leads to adaptive, rapidly changing systems. Knowledge workers need to collaborate and communicate more than ever. These boundaries make managing unstructured work different from managing structured ones. The activities involved and the knowledge requirement in managing unstructured process is complex, non-repetitive, and thus difficult to be categorized. Due to the complexity of this work type, workers shall better visualize the activity system, knowledge flow and stakeholder relationship in unstructured process. One of the ways to identify knowledge flow and stakeholder relationship in work process is knowledge audit. It is frequently employed to identify what knowledge to share from whom to whom. It can be a precursor to a new knowledge management journey. To conduct a knowledge audit, four steps, namely audit preparation, knowledge elicitation, knowledge representation as well as audit results reporting, are required. Amongst these four knowledge audit steps, the authors found two research gaps in the steps of knowledge elicitation and knowledge representation respectively.

Knowledge elicitation is a sub-set of knowledge acquisition that specifically refers to retrieving knowledge from a human expert(s) using a range of strategies (Nordlander 2005). Current knowledge elicitation methods in knowledge audit rely on questionnaires, interviews and focus groups. The questions used in questionnaires, interviews and focus groups tend to constrain the nature of the materials that can be collected and the general questions are often linked to what the researcher thinks is the most important (Snowden 2006). These methods are structured because they barely allow ideas to emerge. If hypothesis-based approach is being used, there is a risk that the researcher may not include all of the important activities in the study. Apart from knowledge elicitation, knowledge representation is another crucial step in a knowledge audit project. Knowledge representation concerns how people store and process information. It includes a variety of schemes that organize, manage and retrieve data and information (Hodge 2000). Two most important knowledge representation methods in knowledge audit are the knowledge inventory and the knowledge map. Knowledge inventory is the process of counting, indexing and categorizing implicit and explicit knowledge available in the company (Hylton 2002). A knowledge map is a navigation aid to explicit and tacit knowledge, illustrating how

knowledge flows throughout an organization (Grey 1999). While the knowledge inventory sufficiently provides details about knowledge items, knowledge maps has its limitations. The knowledge map often contains vast amount of information for both researcher and the respondents to interpret. Moreover, as they are not socially derived, idea emergence is impeded, complex relationship amongst activity system, knowledge flow, and stakeholder involvement cannot be depicted. Addressing the above research gaps, this research aims to develop and implement a knowledge elicitation and representation method in a knowledge audit project, elucidating the complex activities and its associated knowledge flow and stakeholder-relationship in unstructured processes. This research builds on but is substantially different from the existing body of knowledge audit methods. The paper is organized as follows: in Section 2, the paper presents the research methodology, which consists of four phases. In Section 3, a case study in the Information Technology Department (ITD) of a Hong Kong based company is illustrated. The paper closes with conclusions and references.

## 2. Research methodology

The knowledge audit project adopted a qualitative research approach with the following justifications.

- The identification of knowledge items shall be conducted in a contextualized setting.
- Interpretative naturalistic approach shall be taken such that respondents will be involved in both the data collection and interpretation process.
- Deductive, top-down research approach shall be avoided, while inductive, bottom-up approach will be embraced to represent the respondents' thoughts and input.

The research methodology is composed of 4 phases as depicted in Figure 1.

Phase 1 Audit Preparation	+ Project scope and objective were defined. + Project respondents were nominated.
Phase 2 Knowledge Elicitation Workshop	+ Individual-Activity Maps were constructed + Knowledge items and categories were identified.
Phase 3 Knowledge Representation Elicitation	+ Knowledge-Activity Map was constructed from the results of phase 2. + Discussion on knowledge-activity map was conducted.
Phase 4 Audit Results Reporting	+ Knowledge inventory was created. + Audit results were generated from knowledge-activity map and knowledge inventory.

Figure 1: Research methodology

### 2.1 Phase 1: Audit preparation

The project scope and objective was defined and project respondents were nominated. A meeting was held with the management to address and discuss on the burning issues and concerns in the organization. This meeting helps to gain management buy-in and acquire contextual information about the cultural and operational aspects of the organization.

### 2.2 Phase 2: Knowledge elicitation workshop

In the knowledge elicitation workshop, two types of information, including individual activity maps and knowledge items, were collected. Firstly, each respondent was invited to construct an individual activity map which depicts their activities system, knowledge flow and stakeholder involvement in the

investigated scope. Respondents first wrote down their names and the stakeholders' name, whom they interact with, on a piece of paper. They were then invited to connect the stakeholders with arrows, which represent the activities happen between themselves and the stakeholders. In Figure 2, two examples of individual activity map are shown.

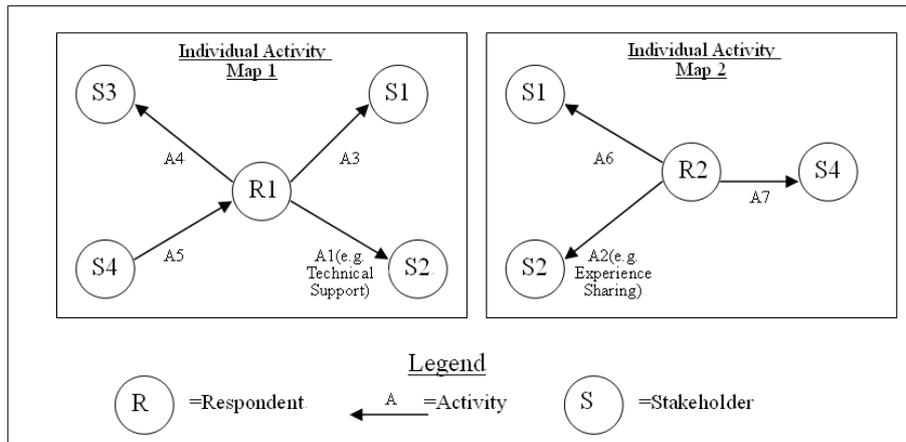


Figure 2: Individual activity maps

Secondly, knowledge items were collected. Instead of using direct elicitation methods, anecdote circle is used. Anecdote circle, when carried out, creates an informal environment of exploration that invariably reveals insights one could never predict from the outset (Callahan, Shawn. 2006). In anecdote circle, respondents shares stories and jots down both implicit and explicit knowledge items mentioned in the stories on posits. Collected the knowledge items, sensemaking exercise was conducted. Sense-making is a way that humans choose between multiple possible explanations of sensory and other input as they seek to conform the phenomenological with the real in order to act in such a way as to determine or respond to the world around them (Snowden 2005). Respondents arranged the knowledge items (on posits) such that coherent knowledge items are clustered. Figure 3 illustrates the above process.

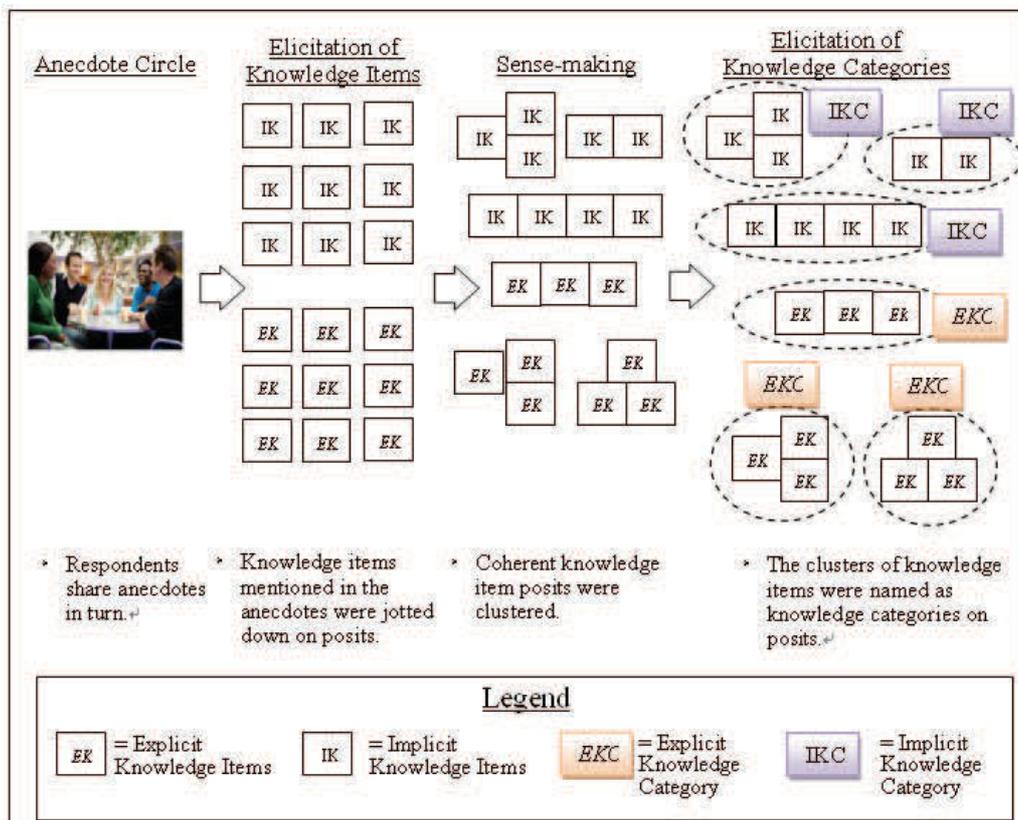


Figure 3: Knowledge elicitation workshop

### 2.3 Phase 3: Knowledge representation workshop

At the beginning of the workshop, the knowledge categories collected in the phase 2 were validated by the respondents. Subsequently, a collective activity map was presented to the respondents. This map integrates the data of all individual activity maps collected in phase 2. On the individual activity maps, different respondents may write down the same stakeholder's name; while in the collective activity map, the "same" stakeholder is only represented once. The collective activity map was then validated by respondents. If there was any discrepancy of the illustrative map and the actual situation in the unstructured process, respondents were invited to add, delete and amend any activity arrows and stakeholder names on the map. Figure 4 shows an example of the collective activity map.

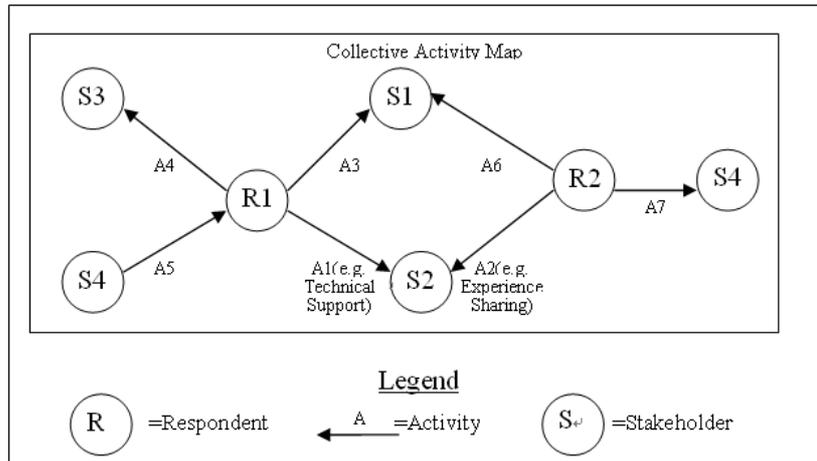


Figure 4: Collective activity map

After the validation exercise, respondents matched up the knowledge categories with the activity arrows on collective activity map to create the knowledge-activity map, as illustrated in Figure 5. To facilitate the matching up exercise, knowledge categories were written down on posits, while the collective activity map was presented on a flipchart sheet. Respondents were invited to place the knowledge categories posits on the activity arrows, indicating that particular knowledge categories are required for performing specific activities.

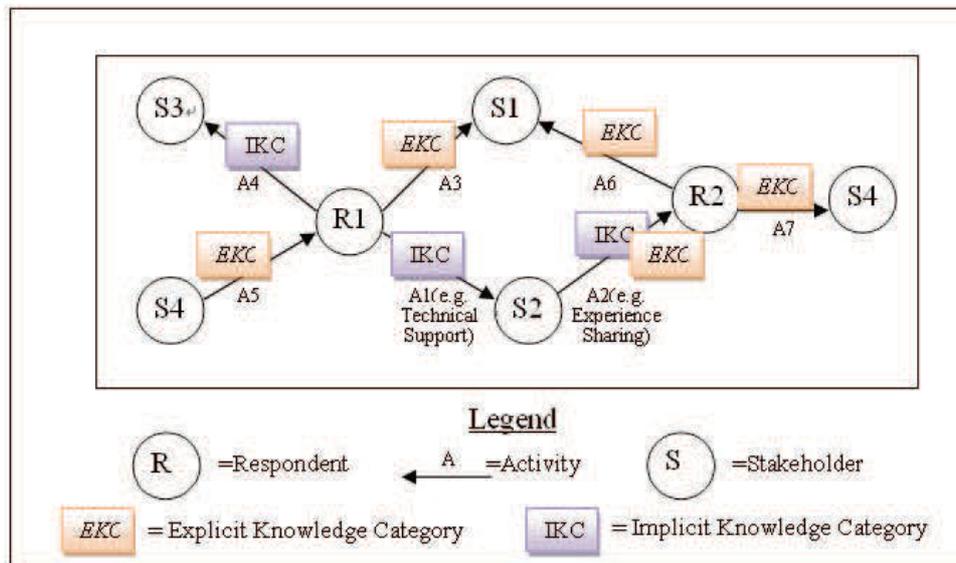


Figure 5: Knowledge-activity map

### 2.4 Phase 4: Analysis and results reporting

The knowledge audit analysis was conducted based on the data on the knowledge-activity map, which has three features as described below.

#### 1. Pattern Emergence

Rather than having considerable amount of information on a traditional knowledge map, knowledge-activity map is more systematically organized. The process of sense-making ascertains coherent knowledge items were clustered into knowledge categories. With this exercise, patterns emerge such that decision makers can respond to the pattern, stabilizing or destabilizing them.

## 2. Collaborative Exploration

The knowledge-activity map is collaboratively generated by respondents' efforts in knowledge elicitation and knowledge representation workshop. This produce bottom-up results which reflect respondents' consensus. The subsequent analysis will be accepted by respondents more easily.

## 3. Complex Relationship

The knowledge-activity map reveals the complex relationship in an investigated scope. People used to focus on their own ways of working, without reflecting on how to collaborate with others and better operate a process. This map helps the operational and managerial staff to grasp a multi-perspective view on a complex process.

Using the knowledge-activity map, analysis will be conducted. The analysis includes the implicit-explicit knowledge category ratio, critical knowledge owners and customers, critical activities and knowledge transfer analysis. These results are presented to the management, visualizing the complex landscape of the unstructured knowledge process.

## 3. Case study

The knowledge audit methodology was implemented in the information technology department (ITD) in a Hong Kong-based public utility company. The scope under study is ITD policy establishment, development and maintenance process. The knowledge audit was conducted for a Hong Kong team and a China one, while Hong Kong team was engaged in the knowledge audit first. The aim of conducting knowledge audit in these two teams is to identify knowledge transfer content between the teams.

### 3.1 Knowledge audit results

The knowledge audit results suggest that 13 implicit knowledge categories and 14 explicit knowledge categories should be transferred from the Hong Kong team to the China team. In addition to this result, the knowledge-activity map has provided much valuable information for analysis. The knowledge-activity map helps decision makers to use a probe-sense-respond tactic to manage a complex process. The map depicts an entrained pattern, making sense of three variables in a complex process, namely activity system, knowledge flow and stakeholder involvement. It facilitates fast and effective pattern detection, and increases decision makers' exposure to various perspectives (Kurtz 2003). Figure 6 shows the knowledge-activity map generated by the China team.

Many patterns have been sensed using this map. For example, a vendor and some external departments are involved in a number of knowledge-intensive activities. This pattern implies the risk associated with knowledge loss. Apart from pattern detection, the data embedded in the knowledge-activity map was used to generate various analyses, including the implicit-explicit knowledge category ratio, the distribution of knowledge customers and knowledge owners, a list of critical activities. In addition, a list of implicit and explicit knowledge transfer contents was identified such that the Hong Kong team can facilitate the policy establishment process of the China team.

## 4. Conclusion

This paper addresses the changing nature of knowledge work from linear planning to complexity management. To cope with the challenges arise from complex work processes, a knowledge audit methodology is developed, without disproving the uniqueness of existing ones. There are two major contributions in this research. Firstly, anecdote circle and sense-making were employed to elicit knowledge items to enhance respondents' interaction and generate collaboratively driven results. Secondly, knowledge-activity map was developed to provide a comprehensive view about the activity system, knowledge flow and stakeholder involvement in unstructured processes. Adopting the above knowledge elicitation and representation methodologies, the developed knowledge audit helps early pattern detection and therefore early exploitation of evolutionary opportunities in unstructured work.

