The User Requirement Survey and Analysis System of Knowledge Management for Laboratories in Universities

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ABSTRACT

Knowledge plays a vital role in research-based laboratories, while compared to knowledge management theory and practice in enterprises with business background, the counterpart in academic field is received little attention. Aiming to better understand and analyze the process of knowledge sharing and creation in laboratories of universities, this paper conducts a questionnaire survey in East China University of Science and Technology (ECUST). It extracts useful information and knowledge from survey results by using an analysis system based on multiple criteria formulation and reference point method. Most important and critical problems are discovered by the positive and negative evaluations in terms of academic knowledge creation process. Then some suggestions are put forward in order to improve the knowledge sharing and creation in labs.

Keywords: East China University of Science and Technology (ECUST), Knowledge Management, Knowledge Share, Labs in Universities, Reference Point Method, User Requirement Survey

1. INTRODUCTION

From the early nineties, knowledge management is increasingly paid more importance with the realization that learning and knowledge creation ability is the only resource to obtain and sustain competitive edge (Katheleen, 2002). Terms like “learning organization” (Peter, 1990), “knowledge-creating company” (Nonaka, 1995) and “knowledge economy” (Zuo, 2000) are brought forward. However, the study and practice are mainly focused on business field.

When it comes to academic field, knowledge is the core assets for creating value and preserving competitiveness in universities and colleges. And as the important part of scientific research innovation system, labs are carrier of knowledge innovation, as well as technology and talents innovation. There are many differences between knowledge management in labs and companies. As the knowledge-intensive organization, it has its own features. In terms of people composing the organization, professors and postgraduates have their specific research

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field, which means knowing the cutting-edge theories and techniques in those fields. However, all these sectors are possibly relevant but not completely same, so it requires knowledge sharing and communication in the lab. In the knowledge creation process, everyone needs to acquire knowledge from other people and make use of his/her own knowledge at any given time. But when they face up to a vast amount of knowledge, it is difficult to gain knowledge beneficial to their study rapidly as well as accurately.

In recent years, with the increase of cooperation among enterprises, governments and research institution, more and more scholars are aware of the importance of knowledge management in academic field. Like Kidwell (2000) says, with KM colleges and universities have plenty of opportunities to support their tasks. Systematically study about labs in universities from knowledge management point of view is still rare, or in another word “in a sprout state” (Wierzbicki, 2008).

2. BACKGROUND

The creation of knowledge usually starts with a new combination of diverse data, information, knowledge, or wisdom (Nakamori, 2004a, b), but it further involves interactions between tacit and explicit knowledge (Nonaka & Takeuchi, 1995). Three processes of normal knowledge creation in academia are described in Wierzbicki and Nakamori: hermeneutics (gathering scientific information and knowledge from literature, web and other sources and reflecting on these materials), represented as the EAIR (Enlightenment-Analysis-Immersion-Reflection)Spiral; debate(discussing in a group research under way), represented as the EDIS(Enlightenment-Debate-Immersion-Selection)Spiral; experiment(testing ideas and hypotheses by experimental research), represented as the EEIS (Enlightenment-Experiment-Interpretation-Selection) Spiral. Since all of these spirals begin with having an idea, called the Enlightenment effect, they can be combined into a Triple Helix of normal knowledge creation Furthermore, a systemic and process-like method to knowledge creation called I-System (Ma & Nakamori, 2004) was developed based on Shinayakana Systems Approach. Five ontological elements of this system are Intervention (problem and requirement perspective), Intelligence (public knowledge and scientific dimension), Involvement (social motivation), Imagination (creative dimension), and Integration (synthesized knowledge).

According to the analyses of the Triple Helix theory, the questionnaire should concentrate on selected four main topics, i.e. Enlightenment (generating an idea), Hermeneutics (gathering scientific information and knowledge from diverse sources and reflecting on the materials; represented as Analysis and Reflection), Debate (discussing the idea in a group research under way), Experiment (testing idea by experimental research); but the theory of I-System suggests also fifth topic, Research Planning.

3. USER REQUIREMENT SURVEY

Our target of this survey is the graduates and researchers in labs whose knowledge management requirement needs to be analyzed with system engineering and software engineering. In general, requirement analysis includes three steps:

1. Extracting requirement: in order to make sure what is user requirement, the task of this step is to communicate with them;
2. Analyzing requirement: in this step the main task is to determine whether the stated requirement of users is unclear, incomplete or contradictory. Next, it is needed to be solved;
3. Recording requirement: user requirement is recorded in several forms, like natural-language documents, use cases or process specifications.
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