Knowledge Audit for UTM Faculty of Computing Information Systems Doctoral Community

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Abstract—In order to educate students to conduct their research properly with high quality, Faculty of Computing of UTM has established the program for the PhD information system (IS) students. Supervisors and lecturers as one of the members of this community rely only on their pervious teaching/supervising background and this is not a good point in this fast growing knowledge sharing era. On the other hand, students who are involved in this program need the specific knowledge to conduct their research with high quality and this knowledge should be prepared for them by program’s head in the well-organized manner. These conditions will limit the quality of this program. Knowing the kind of knowledge and the actual placement of it in this program as well as the method of capturing, using and improvement of it are also crucial issues. In order to gain such kind of understanding, knowledge audit (KA) is the key. This paper presents the results of conducting knowledge audit among this PhD IS community. To capture the knowledge researcher used both interview (for supervisors and lecturers) and questionnaire (for students only). Among 75 active students the questionnaire was distributed only to 50 students and 5 experts lecturers were selected for interview. The results are presented based on the main components of knowledge audit which are knowledge needs, knowledge resources and location and knowledge flow, and also knowledge sharing analysis respectively. The results shows that almost 60% of required knowledge is available within university and based on it knowledge directory was proposed. Based on the missed knowledge author prepared recommendations for faculty to take care and prepare it as fast as possible.

Keywords – Knowledge Management(KM); Knowledge Audit(KA); knowledge sharing ;Information System

1. INTRODUCTION

In 2010, Universiti Teknologi Malaysia (UTM) was labeled as a research university (RU) by the Ministry of Higher Education (MOHE). The mission of Research University is to be an engine of growth of the nation where scholars and students exchange ideas as well as conduct research in a conductive environment that nurtures exploration and creativity discover knowledge and create wealth, leading towards an improved quality of life (Derived from www.UTM.my portal June 2013). In order to educate students to conduct their research properly with high quality, Faculty of Computing (FK) of UTM has established the program for the PhD information system (IS) students. In this program, in the first year of studying students must attend in some courses to get acquainted with some basic criteria related to IS discipline and methods for conducting research. This program could also be helpful for students to not be alone during the long and lonely journey of conducting PhD.

This program is the starting point for UTM to extend through other faculties such that other researchers can use the benefits of that. But like other new programs it has some problems and barriers. Therefore at the first stage this program should be improved. In order to improve the program the knowledge related to the community of people who are involved in this program including teachers, supervisors, coordinator and students should be gathered, analyzed, categorized and organized properly therefore that it could be possible to understand what knowledge they have, what knowledge they do not have and need to have. Then their possessed knowledge should be stored such that it could be shared among community and also missed knowledge should be provided by FK. In addition, knowing the kind of knowledge and the actual placement of it in the program as well as the method of capturing, using and improvement of it are also crucial issues. In order to gain such kind of understanding, knowledge audit (KA) is the key.

A. Background of problem

PhD IS community currently only relies on a basic Facebook page (www.facebook.com/ISSIRG) to deliver information among members but it is not focusing on knowledge sharing. The knowledge being shared currently also limited because it is not well organized based on the categories of knowledge. More importantly supervisors and lecturers as one of the members of this community rely only on their pervious teaching/supervising background and this is not a good point in this fast growing knowledge sharing era. On the other hand, students who are involved in this program need the specific knowledge to conduct their research with high quality and this knowledge should be prepared for them by program’s head in the well-organized manner. These conditions will limit the quality of this program. Consequently as stated above there are two important problems which FK faced in order to enhance the program. First the knowledge related to program is not being
captured properly therefore it should be gathered, analyzed, categorized and organized properly. It is feasible by conducting knowledge audit among community. Secondly there is no specific platform to store this organized knowledge such that it could be shared among people which are involved in this program.

After going through the problems that being faced by FK in running PhD IS program, one main question can be interpreted which is, “How can knowledge audit be conducted to improve PhD IS program in FK?”

B. Objectives of the Study

From the formulated problem which is addressed in the past section, the objective of this research work is stated as follows:

- To conduct the knowledge Audit among PhD IS research community at FK in order to analyze current existing knowledge, current required knowledge and future required knowledge which are owned by people involved in PhD IS community.
- To propose knowledge directory for PhD IS community which shows the actual location of knowledge related to the program.
- To recommend FK to improve the quality of program based on results of this research.

C. Importance of the project

UTM is claimed as a Research University (RU) so; conducting high quality research is a vital issue for academic research scholars. Recently, FSKSM has started its PhD IS program to guide students to develop their technical and empirical skills in conducting research.

This project is important since the knowledge needed for lecturers, students, faculty members and supervisors involve in this program will be captured and organized and one knowledge directory will be prepared therefore that this knowledge could be shared. In this way this shared knowledge could be used to improve the quality of program.

2. KNOWLEDGE AUDIT METHODOLOGIES

Over the last 20 years, the knowledge audit and map have been acknowledged as important tools in helping to identify and visually represent the knowledge present in organizational contexts. Despite this recognition and the availability of theoretical material, there has been a dearth of literature relating to the application of these tools. Consequently, a number of methodologies based on KM practice and research emerged in the early 2000s; several of which still inform the knowledge audit and map processes today[1]. In this section some of them are discussed briefly.

Choy (2004) integrates various KA-related techniques into pre-audit preparation (focused on culture assessment and KM awareness rising), in-audit process (including structured interviews to capture process-critical knowledge) and post-audit analysis (including knowledge inventory, knowledge maps and knowledge flow analysis). Knowledge mapping and social network analysis are used to show the knowledge exchange in the organization and make the key knowledge suppliers and customers visible [2].

Cheung and et.al (2007) proposed one 8-steps KA approach. It starts with orientation and background study in order to get insight into the organization and prepare the KA plan. The second step was focused on KM readiness assessment, and in particular, organizational culture, knowledge sharing, learning abilities and communication tools. On this base they conducted a survey and interviews with experts to collect more qualitative data. Building knowledge inventory is an important step focused on available tacit and explicit knowledge assets in the organization which is used for visual representation on the next step by knowledge mapping. The audit result analysis, knowledge audit reporting and continuous-based knowledge re-auditing are the final steps of KA. [3]

Perez-Soltero and et.al (2006) considered the diversity of KA concepts and methodologies, and stress the need for better focus of KA, namely on core processes essential for meeting organizational goals and customer expectations. With their approach they focus KA and save time for not studying the whole organization [4].

A methodology for conducting a knowledge-enabled customer relationship management (KCRM) for knowledge audit was proposed by Abdelkader [5], which involves applying knowledge auditing principles to assess the existence and implementation level of KCRM processes within an organization. This type of audit enables an organization to thoroughly review the extent to which knowledge is generated, codified, distributed and utilized while the firm is identifying.

Marcela discussed possible applications of selected aspects of knowledge management in the field of collaboration in science and research, which is characterized by a high degree of knowledge specialization. The general recommendations and examples from the knowledge audit’s implementation was adjusted to match the environment of scientific research and cooperation and they were applied to a sample of about 100 members of the Collaborators.[6]

A framework of critical knowledge audit system for the students of department of information management was constructed by Yu-hui Chen. The main purpose of his study was to enable students to use knowledge audit system in selected self-vision of the future occupational categories, and according to knowledge of various job required to audit self-
knowledge of current status. By the results to view their own abilities, planning their study way of own vision for the future [7].

The importance of uncovering tacit perceptions during knowledge management (KM) audit, in order to identify cultural barriers that may interfere with KM initiatives was introduced and illustrated [8].

There are some other methods which are compared in the following table.

### TABLE 1: Comparison views of knowledge audit (KA) methodology

<table>
<thead>
<tr>
<th>Author or organization</th>
<th>Methodology and processes of KA</th>
</tr>
</thead>
<tbody>
<tr>
<td>[9]</td>
<td>Give high level view of knowledge; identify knowledge repositories; construct block map; conclusions</td>
</tr>
<tr>
<td>[10], [11]</td>
<td>Plan; collect data; analyze data; evaluate data; communications recommendations; implement recommendations; re-audit</td>
</tr>
<tr>
<td>[12]</td>
<td>Identify existing knowledge; identify missing knowledge; write report</td>
</tr>
<tr>
<td>[13]</td>
<td>Articulate knowledge management goals; describe each knowledge processes; describe the relationship between knowledge processes and people, structure and technology assess how well each process in fulfilling the goals set in step 1</td>
</tr>
<tr>
<td>[2]</td>
<td>Pre-audit preparation; in-audit process; post-audit analysis</td>
</tr>
<tr>
<td>[15]</td>
<td>Preliminary phase; the learning day; measurement criteria; audit interviews; development of knowledge maps; feedback event; implementation plan development; implementation</td>
</tr>
<tr>
<td>[4]</td>
<td>Analyze organization; analyze core processes; select processes for audit; conduct meetings, analyze data, finish audit</td>
</tr>
<tr>
<td>[3]</td>
<td>Orientation and background study; audit knowledge; developing KM strategy; continuous knowledge re-auditing</td>
</tr>
<tr>
<td>[16]</td>
<td>Apply audit instrument to assess the status of KM processes; analyze data; provide recommendations</td>
</tr>
</tbody>
</table>

3. **RESEARCH METHODOLOGY**

As stated in previous section there are variety of methods to conduct knowledge audit in one organization. Due to its simplicity, well defined and systematic format of the Cheung (2007) method, in this research we used this method to conduct knowledge audit among PhD IS community [2]. Figure 1 has shown the flow diagram of all steps which should be done respectively to reach the project objectives.

**A. First step: PhD IS Program & Community Background Recognition**

As it is shown in this diagram the research is started by full recognition of PhD IS program and its community to make sure that a general understanding of the PhD IS background, objectives and goals is achieved through studying carefully PhD IS Handbook, briefing slides and others in order to adapt the knowledge audit instruments.
PhD IS Program & Community Background Recognition

Lecturers/Supervisors

What Knowledge is required to Teach/Supervise PhD IS Students

Preparing Interview Questions

Conducting Pilot Study

Refine the instruments based on recommendations and pilot study

Preparation of Knowledge Audit (KA) instruments

Lecturers/Supervisors

Conducting Interview

Interview Data Analysis

Building Knowledge Inventory

Knowledge Mapping

Audit Results Analysis

Preparation of Knowledge Repository

Students

What Knowledge is required to conduct high quality Research

Preparing Questionnaires

Conducting Interview

Distributing Questionnaire

Interview Data Analysis

Questionnaire Data Analysis

Conduct Survey and Interview for Evidence Collection

FIGURE 1: Research Flow Diagram based on selected Methodology
B. Second Step: Preparation of KA Instruments

The common instruments to collect the knowledge are interview, questionnaire and a combination of them. In this step an initial list of knowledge should be recognized, therefore sample respondents (both students and lecturers/supervisors) were choose to critically think about their goals, objectives and activities of their day-to-day work. Based on this preliminary list of knowledge, the questions were created. Since the number of lecturers and supervisors are limited the interview was used as knowledge capturing method and for students questionnaire was preferred.

After preparation of questions, in order to verify if the questions of questionnaires are applicable or not a pilot survey was conducted between 15 students before distributing the questionnaires to the target respondents. In the pilot interview, a small number of lecturers were invited in order to understand the questions used are suitable or not in terms of achieving the objective of designing them. Thus, some questions were refined based on pilot survey results.

After refining the questions, the interview questions are prioritized based on the overall knowledge audit components (K-Needs, K-Flow, K-Inventory, K-Mapping). On the other hand, questionnaires are developed based on reviews from the knowledge need for academic research program where, the questionnaires have been divided into three sections, as below:

- Section A: The question is about the knowledge needed for students before starting their research.
- Section B: The question is about the knowledge needed during conducting research.
- Section C: The question is about the knowledge needed after getting research result

C. Third Step: Conduct Survey and Interview

Now, it comes to start to conduct survey and interview to collect information. Based on the results of the first step, it was found that since the number of lecturers and supervisors is limited the interview was selected to collect their knowledge but for students due to the large number of them questionnaire was chosen. The questionnaire is structured with fixed choices and it is expected that respondents will need about 10-15 minutes to answer all the questions.

Researcher managed to interview with five supervisors, two lecturers and also coordinator of PhD IS program. Their answers to the questions was recorded and translated to notebook for further analysis. In case of questionnaire, the questions need respondents to answer on knowledge existence, the important of the knowledge and location of the knowledge. Respondents also can give suggestion on the categories. All questions in the questionnaire including both open and close ended are 46. The total number of PhD IS students is 75 in UTM Skudai JB campus and distributed the questionnaires among 50 students but only 39 were collected. Table 1 shows the questions of questionnaire. The questionnaire data analysis is given in the next section.

<table>
<thead>
<tr>
<th>Section</th>
<th>Questionnaire</th>
<th>No. Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Knowledge needed before starting research</td>
<td>13+1</td>
</tr>
<tr>
<td>B</td>
<td>Knowledge needed during conducting research</td>
<td>14+1</td>
</tr>
<tr>
<td>C</td>
<td>Knowledge needed after getting research result</td>
<td>16+1</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>43+3</td>
</tr>
</tbody>
</table>

D. Step four: Building Knowledge Inventory

After analysis the availability, Importance, Situation (Current Exist, Current Required and Future Required) and Location related to each knowledge will be shown as a table like Table 3. This Table here shows the phase 2 results. Based on this knowledge Inventory will be generated: Based on the location it is possible to find the type of inventory whether tacit or explicit.
### TABLE 3 Summary respond for “During Conducting Research” phase

<table>
<thead>
<tr>
<th>No</th>
<th>Knowledge</th>
<th>Availability (%)</th>
<th>Importance (%)</th>
<th>Situation</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University rules and regulations</td>
<td>100</td>
<td>76.9</td>
<td>CE</td>
<td>a</td>
</tr>
<tr>
<td>2</td>
<td>Project timing schedule with a series of milestones to accomplish by a specific date</td>
<td>66.6</td>
<td>79.4</td>
<td>CE</td>
<td>b, c, f</td>
</tr>
<tr>
<td>3</td>
<td>List of references (books, journals, paperwork,…) related to your field</td>
<td>79.5</td>
<td>89.7</td>
<td>CE</td>
<td>e</td>
</tr>
<tr>
<td>4</td>
<td>Procedure for budget calculation &amp; purchasing equipment</td>
<td>33.3</td>
<td>69.2</td>
<td>CR</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>List of software and common tools related to project</td>
<td>38.4</td>
<td>79.4</td>
<td>CR</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Guideline on developing questionnaire</td>
<td>69.2</td>
<td>87.2</td>
<td>CE</td>
<td>f</td>
</tr>
<tr>
<td>7</td>
<td>Guideline on conducting appropriate interview</td>
<td>69.2</td>
<td>87.2</td>
<td>CE</td>
<td>f</td>
</tr>
<tr>
<td>8</td>
<td>Data collection</td>
<td>82</td>
<td>92.3</td>
<td>CE</td>
<td>f, e</td>
</tr>
<tr>
<td>9</td>
<td>Guideline to conduct data analysis</td>
<td>69.2</td>
<td>84.6</td>
<td>CE</td>
<td>f, e</td>
</tr>
<tr>
<td>10</td>
<td>List of best sample research and project report</td>
<td>46.1</td>
<td>69.2</td>
<td>CR</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Guideline on writing research report</td>
<td>61.5</td>
<td>87.17</td>
<td>CE</td>
<td>a, c, e</td>
</tr>
<tr>
<td>12</td>
<td>Guideline on presenting research report</td>
<td>58.9</td>
<td>79.4</td>
<td>CE</td>
<td>a, c, e</td>
</tr>
<tr>
<td>13</td>
<td>Supervisory and progress report forms</td>
<td>84.6</td>
<td>74.3</td>
<td>CE</td>
<td>e, b</td>
</tr>
<tr>
<td>14</td>
<td>List of related conferences/seminars</td>
<td>56.4</td>
<td>89.7</td>
<td>CE</td>
<td>a, b</td>
</tr>
</tbody>
</table>

In this table letters ‘a, b, c, d, e, f’ refers to locations where knowledge could be found. These locations are listed in table 4.


TABLE 4. Knowledge Location

<table>
<thead>
<tr>
<th></th>
<th>UTM portal</th>
<th></th>
<th>Library(PSZ)</th>
<th></th>
<th>PhD IS program courses</th>
<th></th>
<th>Others; please specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Faculty/department Website</td>
<td>b</td>
<td>SPS Website</td>
<td>c</td>
<td>RMC portal</td>
<td>d</td>
<td></td>
</tr>
</tbody>
</table>

E. Final Step: Knowledge Repository

In order to make the research finding applicable in FK the findings will be stored in one digital repository, which in this case it is added to the Facebook page of IS community (www.facebook.com/ISSIRG).

4. RESEARCH FINDINGS

The exploited list of knowledge from interview and questionnaire is attached to this paper as an appendices No.1. Figure 2 summarizes the overall existence status of knowledge related to all phases which is derived from the respondent’s answers to the questionnaire. In phase 1 and 2 the majority of knowledge has current exist (CE) status while in phase 3 more than 50 per cent of knowledge is currently required.

This shows that FK should pay more attention for those students who are going to be graduated.

![Figure 2: Overall existence status of knowledge related to all phases derived from respondents](image)

Figure 3 summarizes the overall actual existence status of knowledge related to all phases which is derived from interview and discussion with expert people within faculty.
As it is shown in all phases the majority of knowledge has current exist (CE) status but comparing to the respondents answers, students mostly do not have enough information about the actual status of knowledge needed to conduct their research and it is not a good point for one research university in this high growing era of education. To address the problem this inconsistencies should be informed to FK head and they must take an immediate action about that.

The main contribution of this work is preparing one knowledge directory which includes the whole knowledge available within UTM with real actual location and proposes this knowledge directory to FK head. In order to recommend FK about the existed knowledge and their relevant location, the knowledge directory is created which is discussed in the next section.

5. CONCLUSION

The knowledge owned by PhD information System community at Faculty of Computing of university teknologi Malaysia was audited. Both interview and questionnaire was used to capture the community knowledge. The results presented based on the main components of knowledge audit which are knowledge needs, knowledge resources and location and knowledge flow, and also knowledge sharing analysis respectively. The results shows that almost 60% of required knowledge is available within university and based on it knowledge directory was proposed. Based on the missed knowledge author prepared recommendations for faculty to take care and prepare it as fast as possible.

REFERENCES