

Knowledge Audit on Special Children Communities

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Abstract. This paper reports on how knowledge audit analysis was conducted for special children (SC) communities in Malaysia context. The purpose of the knowledge audit is to determine the knowledge requirement of SC communities which may reveal the required, available and missing knowledge and the person involved related to SC. Four communities of practice (CoPs) have been identified namely Parents, Educators, Medical Experts and Researchers. The knowledge audit has been conducted in four phases. There are Knowledge Needs Analysis, Knowledge Inventory Analysis, Knowledge Flows Analysis and Knowledge Mapping. Questionnaires and interviews were conducted as knowledge audit tools for facilitating the collection of data, information and evident. In order to represent the knowledge audit results, matrices presentation is used. These representations help in tracing knowledge and verify the results with the CoPs more clearly. The result shows that knowledge audit yields a number of benefits that include the missing gap between required and available knowledge. The requirement can be used to develop a one stop center for SC communities to communicate among other CoPs. Subsequently, recommendations can be derived for better managing of the knowledge.

Keywords: Knowledge Audit, Communities of Practice and Special Children.

1 Introduction

Special Children with learning disabilities are different from typical children. They are unable to fend for themselves in doing any decision making due to their conditions, without the help from parents, teachers or others. Referring to Persons with Disabilities Act 2007, disabled person is identified as “*those who have long term weaknesses in physical, mental, intellectual or sense which prevent them from full and effectifely participate in the society*”[1].

In order to ensure the children get the best nursing and education based on their condition, there are many requirements of relevance knowledge that SC community needs. However, in Malaysia context, the provision of this knowledge in documented form such as books, journals, websites or others are very limited. Most of the knowledge is remain in the CoPs’ mind as they gained that knowledge based on experiences. Different group of people in SC community may hold different type of knowledge and carry out different types of processes. Therefore, they need to acquire knowledge from others in order to perform their daily work especially the parents.

There are so many questions raise up. They need the support and help from people who understand their situation.

Thus, it is important for SC communities to interact and communicate with each other to share their knowledge and experience. Therefore, we need to identify what is the relevant knowledge acquired by the SC community. It is the intention of this paper to determine the required, available and missing knowledge, the person involved and the government agencies related to SC. For this purpose, the authors have been conducted the knowledge audit analysis. A result from the knowledge audit analysis is reported in this paper.

2 Literature Review

This section explains the fundamental concepts of community of practice and knowledge audit.

2.1 Community of Practice

In order to practice knowledge sharing, community of practice offers a way to theorize tacit knowledge which cannot easily be captured, codified and stored [3]. Communities of practice are groups of people who share a passion for something that they know how to do, and who interact regularly in order to learn how to do it better [4]. This definition is inline with Debowski's definition towards CoP, where she defined the CoPs as groups of people with common interests who meet to share their insights in order to develop better solutions to problems or challenges [5]. According to Wenger, there are three fundamental characteristics of communities. The characteristics are:

- **Domain:** the area of knowledge that brings the community together, gives it its identity, and defines the key issues that members need to address.
- **Community:** the group of people for whom the domain is relevant, the quality of the relationships among members, and the definition of the boundary between the inside and the outside
- **Practice:** the body of knowledge, methods, tools, stories, cases, documents, which members share and develop together.

2.2 Knowledge Audit

Liebowitz defines a knowledge audit as a tool that assets potential stores of knowledge [6]. It is the first [6] and critical part of a knowledge management methodology [7]. The knowledge audit examines knowledge sources and use: how and why knowledge is acquired, accessed, disseminated, shared and used [8]. The main purpose of knowledge audit is to determine what it knows, what it does not know, what it needs to know and how it should go about improving the management of its existing knowledge [9].

For this study, the knowledge audit have been conducted to determine the knowledge requirement of SC communities which may reveal the required, available and missing knowledge, the person involved and the government agencies related to SC. There is no universally accepted approach to K-Audit [7]. Based on multiple groups of practitioners' experience [6, 10-12], the authors adapted the knowledge audit tools and method that has been proposed and tested by those practitioners. Both tools and

method were subject to iterative refinement suggested by practitioners during the field trial. As proposed by them, knowledge audit should be divided into components or activities which are ideally performed in sequence.

3 Methodology

As mentioned in previous section, knowledge audit can be divided into components which result in milestone for the purpose of diagnostics and corrective measures. The authors adapted the knowledge audit method proposed by several practitioners [6, 10-12] as depicted in Fig. 1.

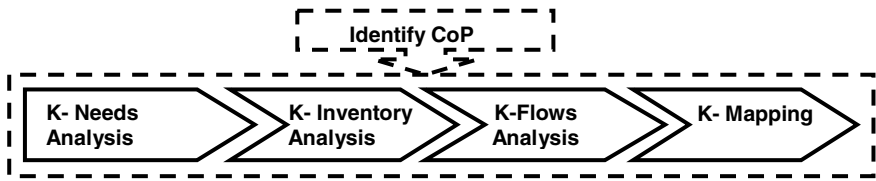


Fig. 1. Principal Component of Knowledge Audit

There are four components namely: Knowledge Needs Analysis, Knowledge Inventory Analysis, Knowledge Flows Analysis and Knowledge Mapping. These activities will be performed after the authors identify the CoP related to SC. A knowledge audit needs to be performed for each CoP and not necessary need to be conducted in sequence.

3.1 Knowledge Needs Analysis (K-Needs Analysis)

The needs analysis is a process by which information users are asked on what information resources or services that they needed to perform their job [13]. The major goal of this task is to identify precisely what knowledge the CoP possess currently

Table 1. K-Needs Analysis Activities

Activities	Objectives	Instruments/Tools	Deliverables
Background Study	<ul style="list-style-type: none"> - To understand the CoP/related agencies to be audited. - Define CoP/related agencies' goal & objectives. 	<ul style="list-style-type: none"> - Questionnaires - Interviews - Related Portal 	<ul style="list-style-type: none"> - List of goals & objectives - Background information related to the audit such as organizational chart & workflow
Draft an initial K-Needs Matrix	Identify precisely what knowledge CoP/related agencies: <ul style="list-style-type: none"> - Currently posses - Curently/Future required - Currently/willing to share 	- Pilot surveys	- Initial K-Needs Matrix
Verify K-Needs Matrix		<ul style="list-style-type: none"> - Surveys - Interviews 	- Final K-Needs Matrix.
Reporting	To report K-Needs Analysis	- Verified K-Needs Matrix	- Knowledge Asset Document

and what knowledge they would require from others in order to meet their objectives and goals[12]. It reveals knowledge that they are willing to share with others. Table 1 shows the activities involved in this task.

3.2 Knowledge Inventory Analysis (K-Inventory Analysis)

Knowledge inventory is knowledge stock-taking to identify and locate knowledge assets and resources throughout the entire organization. Knowledge inventory comprises of two entities: Physical (Explicit) Knowledge Inventory and Experts (Tacit) Knowledge Inventory. In this case, the experts refer to the educators of the SC. The K-Inventory analysis involved three major activities as shown in Table 2.

Table 2. K-Inventory Analysis Activities

Activities	Objectives	Instruments/Tools	Deliverables
Identify related portal, database and document.	To identify possible knowledge location	- Pilot Survey - Related portal - Interview	- Listing of the knowledge location
Draft an initial K-Inventory Matrix	To identify & locate k-assets & resources.	- Pilot surveys	- Initial K-Inventory Matrix
Verify K-Inventory Matrix		- Surveys - Interviews	- Final K-Inventory Matrix.
Reporting	To report K-Inventory Analysis	- Verified K-Inventory Matrix	- Knowledge Asset Document

3.3 Knowledge Flows Analysis (K-Flow Analysis)

Knowledge flow analysis focus at how knowledge resources move around the organization, from where it is to where it is needed [12]. According to Sharma and Chowdhury, by perform this analysis; it may reveal how CoP find the knowledge they need and how they share the knowledge they have and some barriers to effective flows. Such analysis looks at people, processes and systems. For this paper, the authors look into the processes which to examine how CoP go about performing their daily work activities and how knowledge seeking and sharing form parts of those activities. Table 3 shows activities involved in order to perform this analysis.

Table 3. K-Flows Analyssis Activities

Activities	Objectives	Instruments/Tools	Deliverables
Draft an initial K-Flows Matrix	To determine: - how CoP/related agencies find needed knowledge. - how they share the knowledge they have.	- Pilot surveys	Initial K-Flows Matrix
Verify K-Flows Matrix		- Surveys - Interviews	Final K-Flows Matrix.
Reporting	To report K-Flows Analysis	- Verified K-Flows Matrix	Knowledge Asset Document

3.4 Knowledge Mapping (K-Mapping)

Knowledge map is used in order to visualize CoP/related agencies knowledge based on the K-Needs, K-Inventory and K-Flows Matrices report. It demonstrates who has

knowledge, where these persons are located and with who they most often share and exchange knowledge[11]. Table 4 shows the activities involved in order to perform knowledge mapping.

Table 4. K-Mapping Activities

Activities	Objectives	Instruments/Tools	Deliverables
Study K-Needs/K-Inventory/K-Flows Matrices Report	- To locate important knowledge - To show knowledge user where to find the	- K-Needs/K-Inventory/K-Flows Matrices Report	- Analysis of K-Needs/K-Inventory/K-Flows Matrices Report
Draft an initial K-Map	knowledge in visual mode.	- Suitable K-Map Tools	- Initial K-Map
Verify K-Map		- Focus Group	- Verified K-Map
Reporting	To report K-Map	- Verified K-Map	- Knowledge Asset Document

4 Results

This section reports on the results of knowledge audit analysis in SC educator’s context. For a start, the related CoP was identified. Subsequently, the knowledge audit was conducted for each CoP.

4.1 Identification of Communities of Practice

Four major CoPs have been identified in this context. There are Parents, Educators, Medical Experts and Researchers in area of LD as shown in Fig.2. However, this paper reports only on Educators context.

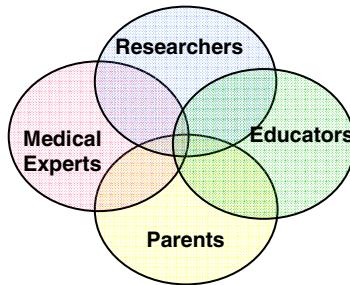


Fig. 2. Communities of Practice

4.2 Knowledge Audit Results

A number of knowledge audit tools have been used in order to determine SC communities needs (K-Needs Analysis). Up to this stage, knowledge audit have been conducted to parents and educators. To have better understanding on what are the

processes involve, some literature on related portal have been reviewed and a few sets of questionnaires were distributed to the possible respondents based on the identified CoPs. Table 5 shows the focus of the questions asked in the questionnaires and the purpose of asking them.

Table 5. The Purpose of Questions Asked

Questions	Purpose
List the processes that involve SC community?	To have a better understand on what are the processes involve each CoP pertaining to SC.
Describe the process flows (for each process)	
List the future, currently required, available & shared knowledge to perform those processes?	- To identify all processes performed by CoP - To identify knowledge needed to perform each process.
What is the format of this knowledge?	To identify tacit and explicit knowledge.
From whom you acquire those knowledge?	This information is for constructing knowledge flow, inventory and map
Who are the users for this knowledge?	
What are the mechanisms that you used to acquire this knowledge?	To identify communication media used by the CoP. This information can be used to identify mode of interactions between the CoP and type of knowledge
Knowledge sharing mechanisms currently use?	
Preferred mechanisms to acquire knowledge?	To determine the most suitable KS mechanism (based on LR and preferred mechanism by the CoP)
Preferred mechanism to share knowledge?	

To present the findings in a systematic way, matrices presentation were used. These matrices also used for verification purpose. This process was subject to iterative refinement in order to produce the final matrices. Table 6 shows partial results from the K-Needs analysis matrix in SC Educator’s context. This matrix yields that there is a number of required knowledge needed by educators in order to perform their job.

Table 6. K-Needs Analysis Matrix for SC Educators

Process	Knowledge		
	Current Exist	Current Required	Future Required
Diagnostic Assessment	-Collaboration information between teacher & related department. -Assessment process Specialist Advice	Complete information on characteristic of SC registered in the school.	Standard guideline on assessment and measurement level of children with LD
Registration (Education Department)	Process on placement of SC in special class suit with their qualification	Assessment process did by medical experts before SC will be placed in certain school	Detail information on SC background (from birth to date) before they are placed in certain school
Placement of SC in special class	Guideline for placement, Behavioral, Developmental and Achievements Test		
Teaching and Learning (T&L)	Syllabus for every level of LD which need to teach and finish for the whole year	Syllabus of subject for high level and skillful children with LD	JPU level

There are several activities involved in each process as listed in K-Needs matrix (see Fig 3). Three activities are involved to perform Diagnostic Assessment process. There are screening, diagnosis and assessment process. The research team was numbered each activity and refers it as a *Task No*. These tasks were revealed from the flowcharts which were gathered during the background study.

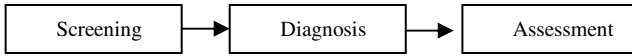


Fig. 3. Diagnostic Assessment Flowchart

In order to identify whether the knowledge is already exist and where the knowl- edge is located, the K-Inventory Analysis Matrix need to be formulated. Since this research was conducted to the society and not to the organization, the locations of the knowledge are referred to the owner of the knowledge as shown in Table 7. This table shows the K-Inventory Analysis Matrix for Diagnostic Assessment process.

Table 7. K-Inventory Analysis Matrix for SC Educators

PROCESS: Diagnostic Assessment					
TN	Purpose/ Decision Making	Knowledge Item	Knowledge Owner	E/T	Document needed (if explicit)
1	To consider if the child needs further assessment	Child’s behavior and skill	Parents SET SED’s representatives Medical Authorities	E	Special Needs Children Registration & Placement Suggestion Form (0-18 year old)
2	-To assess the child. -To provide a diagnosis	Child’s behavior and skill Symptom	Medical Authorities SET Medical Authorities SET	E E	M-Chat, Denver Schedule
3	-To assess the development and academic needs of the child - To get confirmation by medical authorities - To document child’s behavior & abilities - To write IEP	Child’s behavior and skill Symptom Academic needs of the child Education plan	Medical Authorities SET Medical Authorities SET Medical Authorities SET, SED Medical Authorities SET, SED	E E E E	Individual Education Plan (IEP)
TN- Task No; E-Explicit; T-Tacit; SED- Special Education Department; SET-Special Education Teacher					

By making comparison between earlier analysis of K-Needs and K-Inventory Matrix, the authors were identified the missing knowledge required by the educators. For example, the educators still required the complete information on SC’s characteristics at their school. However, this knowledge already exists and owned by the medical authorities.

Once the location of the knowledge already identified, the authors need to determine how the knowledge moves around from where it is to where it is needed. Therefore, the K-Flows Analysis Matrix was used (See Table 8). This matrix is used to determine how people in an organization find the knowledge they need, and how do they share the knowledge they have.

Table 8. K-Flows Analysis Matrix | Education Context

PROCESS: Diagnostic Assessment				
TN	Knowledge item	Knowledge Owner	Knowledge User	Communication Media
1	Child's behavior and skill	Parents	Parents, SED,SET, Medical Authorities	Face-to-face, Phone, Formal letter
		SET, SED's representatives		
		Medical Authorities		
2	Symptom (Diagnosis)	SET	SET, Medical Authorities	Face-to-face
		Medical Authorities	Parents	Face-to-face
3	Child's behavior and skill	SET	SET, Medical Authorities	Face-to-face
		Medical Authorities	Parents	
	Symptom (Diagnosis)	Medical Authorities	SET, Medical Authorities	Face-to-face
			Parents	
	Academic needs of the child	SET	Medical Authorities	
		Medical Authorities	SET	Formal letter
Education plan	Special Education Teacher	Medical Authorities		
	Medical Authorities	SET	Formal letter	
		Parent	Face-to-face	

SED- Special Education Department; **SET**-Special Education Teacher

Based on the interpretation and understanding of K-Needs, Inventory and Flows Analysis Matrix, the authors were built the knowledge map as depicted in Fig.5. This map is used in order to visually represent the knowledge. In order to perform diagnostic process, each CoP communicates among the others to share the knowledge they have.

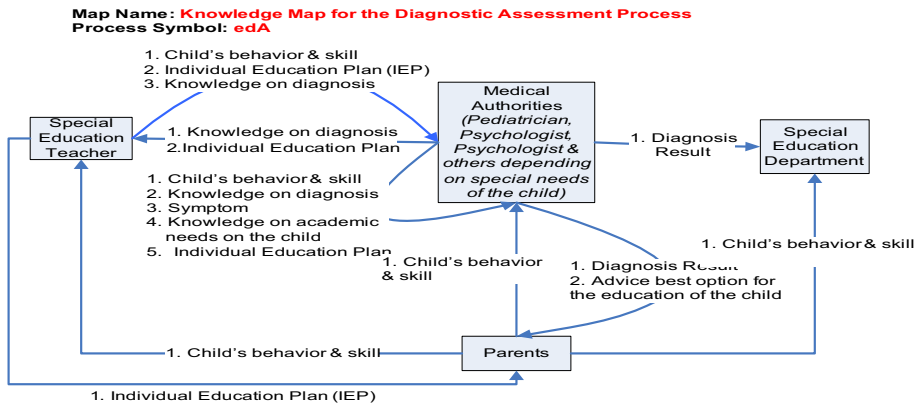


Fig. 4. Knowledge Mapping | Education Context

Box at the tail of the arrow shows the owner of the knowledge, and box at the head of the arrows shows who needs that knowledge. For example, Special Education Teacher owned three types of knowledge that needed by the Medical Authorities. The

knowledge is (i) Childs behavior and skills; (ii) Individual Education Plan and (iii) Knowledge on diagnosis. Vice versa, the Medical Authorities also owned some knowledge that needed by the Special Education Teacher. There are (i) Knowledge on diagnosis and (ii) Individual Education Plan.

5 Discussion and Conclusion

Based on the researches that were done, the authors revealed that SC knowledge is very complicated due to involvement from many CoPs. Different group of people in SC community may hold different type of knowledge and carry out different types of processes. Therefore, there is a need to conduct knowledge audit in order to reveal those knowledge. Knowledge audit allow investigating those processes and knowledge involved in each process more details.

The paper has reported on knowledge audit result in educator's context conducted by the authors. The approach for knowledge audit presented in this paper consists of four components proposed and practiced by the other practitioners. The components are K-Needs Analysis, K-Inventory Analysis, K-Flows Analysis and K-Mapping. In order to perform these components, sets of questionnaires were distributed to the participants and followed by the interviews session.

The results show that the knowledge audit yields a number of potential benefits including the identification of the available, required and missing knowledge and the subsequent recommendations of KM strategy that can be used for better managing the knowledge. Furthermore, the benefits will impact the people in SC community in different ways. For future work, the requirement can be used to develop a one stop center for SC communities to communicate among other CoP.

The knowledge audit results were represented in matrices presentation. The advantage of using these matrices is easy in tracing knowledge and verifies the results with the CoPs more clearly. Due to the iterative process, the missing knowledge in each matrix can be reduced while verification stage. As a conclusion, the authors revealed that, knowledge audit method used in this paper are systematic and suitable to the SC community's environment.

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