Managing knowledge in Academic Institutions using Corporate Taxonomy

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Abstract : This study aimed at providing clear understanding of knowledge management issues in academic institutions and its solution. The solution proposed a concept of taxonomy to managing knowledge in academic institutions. The problem of knowledge management in Institutional of Higher Learning (IHL) laid the foundation of the study. A total of 53 related literatures has been collected, thematically analyzed and discussed to come out with concrete view of how the present study undertakes to address issues in managing IHL's knowledge using corporate taxonomy (CT). Researcher found six importance of knowledge in IHL to the society, five issues in managing IHLs' knowledge, derivations of proposed solutions, five benefits of having CT in IHL and how taxonomy could be used as a concept of knowledge. Those findings formed the structure of this research for managing knowledge in IHL. Further investigation on development of CT is necessary before the real action (taxonomy development) take place.

Keywords : Knowledge management, corporate taxonomy, academic institutions, higher learning, managing knowledge.

1. INTRODUCTION

The existence of institutions of higher learning (IHL) is evidence that our nations need trustworthy and beneficial knowledge. As one of reliable knowledge producer, universities stimulate ideas, creativity and innovations. Knowledge contributed by IHL is vital to the academic institutions, government and industries. Discovery from 53 previous study related to academic institutions dated 1995-2016, revealed, that knowledge from universities (*i*) able to give extensive positive impact [1], [2] by promoting new innovative product, services and commercialization [3] to industry. This scenario shall also directly (*ii*) increase academic publications [4] and (*iii*) accomplish the national higher education strategic plan [5], [6]. Other than that, education domain also shall (*iv*) improvise the teaching and learning [2], [4], [7] and (*v*) enhance curriculum [8] to meet rapid technology changes which more economical and environmental friendly. Government, industry and education domain, gain impact from (*vi*) efficient management approach in establishing, enforcing and monitoring the implementation of policies and programs [9]. Indirectly the end benefits shall be distributed to every people in the world by having knowledgeable, innovative and creative citizens and members in organization [10], [11]. In order to assure availability of knowledge for the public, IHL has to make sure continues knowledge production [12], [13] to support a consistent growth of the nation. However, tremendous volume of data, information and knowledge has triggered the needs of managing them [14] for IHL internal usage and public benefits. Anyhow managing knowledge is a complicated tasks [15], requires a deep understanding of the scenario and right approach of the solutions.

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2.   KNOWLEDGE IN IHL ISSUES

IHL are facing difficulties in managing its own knowledge assets that will be used as a strategic knowledge for decision making [3], [16], [17]. IHL knowledge is being managed by individuals and units or departments that are unable to provide transparent knowledge sharing throughout the organization [18]. Problems faced by IHL in managing their valuable knowledge are to share them across the institution and brings benefits to all institutions members. Five main issues identified that – (*i*) knowledge is not supporting decision making, (*ii*) knowledge is scattered, (*iii*) knowledge is unstructured, (*iv*) knowledge is not recognized as strategic knowledge asset, and finally v) knowledge is not classified and presented as a central and standard (knowledge taxonomy). All of these problems laid the foundation of this research.

(*i*) **Knowledge is not supporting decision making :** Decision making process is important in any organization. Previous studies related to IHL in Malaysia [6], [18], [19], [20] shows that there are lack of decision making support for continues enhancement and improvement. This scenario is due to the process and policy in managing information and knowledge in IHL. There is no clear guidance and regulations for retrieving the latest and reliable sources of knowledge. The scenario stimulates various individual or group repository that unverified in term of used as a source for important decision making.

(*ii*) **Knowledge is scattered :** [18] in their study of OMS, highlighted that knowledge in IHLs are scattered. This issue was also mentioned by [19]. The scenario exists due to decentralize governance to unit or department in the IHLs. The distributed source of knowledge that becoming IHL asset has become the root of problem in not able to access transparent, reliable and important knowledge sources. In managing knowledge, this situation shall be the barrier in knowledge sharing [21]. Finally, knowledge won't be able to be shared and reused: for supporting decision making process.

(*iii*) **Knowledge is unstructured :** Issues of unstructured knowledge asset have been raised by few researchers of IHL, Malaysia. [17], [18] expressed knowledge in IHLs are has been stored in various forms and structure such as in repositories, databases, data warehouse, organization documents and all digital communication medias such as email, video and audio. Those container of knowledge has its own structure and knowledge stored in the container will be structure as per it is. Due to these condition, knowledge as the end result cannot be traced and shared to the other cross the organization in a way that all organizations members understand. When knowledge is kept in its working platform, some of other members cannot retrieve/access it and it will finally become undermined [16]. This is absolutely wasting the time and resources allocated and stimulate reinventing the wheel throughout the organization.

(*iv*) **Knowledge is not recognized as strategic knowledge :** Memories of organization can be in a form of data, information, or knowledge and they are used to solve problem and guide decision making [19]. The knowledge that could support strategic organization plan is also known as strategic knowledge (SK) or strategic knowledge asset (SKA). While [22] reported that in IHL conflicts happen during decision making due to inappropriate system in managing tacit knowledge, [23] reported that explicit knowledge is not readily available cross the organization. The problem of retaining explicit and tacit strategic knowledge in IHL is even serious when lack of pertinent knowledge or memories in the organization can cause "corporate amnesia" [18], [24]. Availability of tacit and explicit knowledge in an organization must be identifiable so that it could be in the list of resources as SK.

(*v*) **Lack of corporate taxonomy framework for IHL :** A study of ecosystem – taxonomy work by [25] revealed that taxonomy work has been done in various disciplines. The taxonomy work presented showed that data and document management for organization related domain has been penetrating the taxonomy work application areas. This is consistent with researcher initial study

related to application of taxonomy work. Among researcher that has contributed to data and document management related work are [26], [27], [28], [29],[30], [31], [32], [33], and [34]. Currently within higher education domain there is limited work related to taxonomy [35].

Previous researches in IHL that proposed a few solutions related to managing IHL knowledge shows certain trend. [36] and [17] proposed general knowledge management system for IHL, [18]; [19] and [37], developed Organizational Memory Information System (OMIS). Moving towards IHL goals, researchers' observation and preliminary study, [38] found that developing more computer based system shall not help in resolving the scattered knowledge asset. Instead, this will actually invent more distributed knowledge resources instead unmanaged existing knowledge sources. While IHL have demonstrated high interest to manage knowledge, developing and applying Corporate Taxonomy (CT) concept as a start, is essential. Table 1 show derivations of how CT could play a role in providing a solution to the scenario of knowledge in IHL.

Table 1

Proposed solution

No.	Knowledge in IHL issues	Knowledge issues proposed solutions
1.	Knowledge is lacking in making decision	[39] in her study on how to develop an Organization Memory System (OMS) for IHL in Malaysia found few researchers agreed on the importance of identifying knowledge in centralized for supporting decision making process [21]; [40]; [41]; [42]; [43]; [44]. However knowledge has not being optimized in the process of deciding what is the best for organization [17]
2.	Knowledge is scattered	By identifying important knowledge sources as knowledge assets in organizations, and centralize all the sources into CT that is shareable to every members in organizations, this problems can be resolved. [21]; [45]; [46]; [40], [42], [47], [48]; [49]; [43]; [50]; [51] and [52] believe organization needs central container: collection of knowledge due to the scattered knowledge.
3.	Knowledge is unstructured	Corporate taxonomy is the classification and structuring process for information and knowledge that able to dissolve the unstructured knowledge issue. Corporate taxonomy could be used as a centralize and standardize knowledge structure for the institutions. [53] proposed this solution while highlighting about the benefits of taxonomy.
4.	Knowledge is not recognize as strategic knowledge	Having CT shall retain knowledge available and reduce the risk of "corporate amnesia" [21]. This is agreed by [54]. [54] proposed effective knowledge system that at the same time ensures effective retrieval systems contribute towards the dissemination, sharing and diffusion. [55] in his research illustrates how public sector organizations can avoid the "great trap in knowledge management" by focusing on designing IT artefacts to make explicit the tacit knowledge in people's heads, and not in the information contained in document repositories. As a conclusions, previous study of IHL shows that strategic knowledge asset has to be recognized and then managed appropriately. This could be done by having CT.
5.	Lack of corporate taxonomy framework for IHL	[35] revealed that there are limited taxonomy developed in education (IHL) domain. The loop hole in IHL related to taxonomy motivates researcher to develop corporate taxonomy for IHL and to demonstrate the functionality of corporate taxonomy in managing IHL knowledge.

3. TAXONOMY

As information being upgraded to knowledge for higher level of decision, the needs of managing knowledge in organization is rising. This is agreed by [14] and [34]. [56] mentioned taxonomy is needed to start KM project. There is a rise of taxonomy related issues [57] and stay high at 2010 [58]. Taxonomy for individual is call private taxonomy while taxonomy for the use of organization is known as public taxonomy [59]. In management science and Information System (IS) fields, the importance of taxonomy is well recognized [60]. This is agreed by [61] when he noted that in information sciences, the study of CT has been subject to considerable and longstanding interest among both researchers since 90's. [25] in his

presentation of "Taxonomies and Knowledge Management" revealed a survey results of 187 taxonomy professionals conducted from September to October 2009. The ecosystem of taxonomy work shows taxonomy related work has been done in various disciplines. They are most populated in information and knowledge management, information science, and library science domain order by most popular domain. Following them are linguistic, information technology, cognitive psychology and business analytics domain in descending order. Other than that are philosophy, management and publishing and editorial respectively. The applications areas affected by having the taxonomy have been shown wider disciplines blow. There are content management and metadata management, followed by archives and records management, digital asset management, document management, information architecture and data management. On the other down level, taxonomy has been applied to intranet management, usability design, text mining and web management followed by business management and research management. Other application areas include instructional design, IT management, software design, system analytics and technical writing.

Taxonomy definition has been variously discussed by previous researcher in practicing and developing taxonomy for various business applications. The researcher and taxonomist have agreed that taxonomy is a structured and classified information and knowledge in organization [53]; [59]; [62]; [31]; [61]). [15] noted that a definition of taxonomy mostly starts with "A taxonomy is a hierarchical arrangement of terms…". Mutual understanding of taxonomy projected by previous studied mentioned, are the involvement of controlled vocabularies, logical business arrangements and some representations of specific domain in conceptual map, for the purpose of generalization in the organization. Instead common understanding of taxonomy definition there are also conflict in the definition of the taxonomy. [25] argued that taxonomy may not be in the form of tree or hierarchical which most of the taxonomy definitions addressed.

Knowledge taxonomy or corporate taxonomy is mostly focused on ensuring efficient knowledge sharing and access among organizational member [62]; [59]; [61]. Besides that they act as a map of knowledge domain [59]. [63] and [62] clearly mentioned that knowledge taxonomy could provide standard and common understanding of subjects in organizations. [61] describe knowledge taxonomy in detail as precise, do not overlapped, has independent content, reflect organizational access needs and is a recognized industry standard. This study shall address taxonomy from the dimensions of knowledge.

3.1. Advantages of having taxonomy

Taxonomy offers huge benefits and is crucial for processing, storage, management and searching of knowledge in organization [64]; [65]; [53]. Taxonomy has universal applications in grouping knowledge so that it can be systematically developed, store and reused [61]. The followings five points provide supporting facts about advantageous of having taxonomy.

1. **Taxonomies contribute to make explicit knowledge available when necessary [53] :** The knowledge domains and benefits associated with taxonomies show that the latter are limited to the content of documents and databases, but able to activate the tacit knowledge that resides within people [59]. They helps the mapping and categorization of tacit knowledge embedded in staff expertise [59]; [61].

2. **Taxonomy is meant for managing local resources; managing experts and internal information [66], [61] :** It has to be treated as an integral part of the knowledge management strategy of the organization. When the strategy is implemented as a project, taxonomies are a key task that needs to be planned and implemented by teams equipped with the necessary knowledge and skills [53]. All organization's strategies (vision, mission and plan) resources (assets and liabilities) and stakeholders (staffs, customers, and suppliers) should be reflected in their corporate taxonomy.

3. **Taxonomy as a search tool :** The main benefit of taxonomy is that, when information is well-organized and consistent across an organization, staff will spend less time searching and browsing. As a search tool for investigation alternative search shows that user don't want to navigate more than four layers down in hierarchy and with extensive searching using taxonomy, user will get

the result fast and intuitively to enrich their research experience and leverage their expertise [67]; [68]; [69]; [31]; [70]; [71]; [61].

4. **Taxonomy may support way of working :** Purpose of a taxonomy simply to the find ability of information and documents and to contribute to a broader vision of knowledge management and then, identify different ways for the organization staff to work together. This is because memory structures could become taxonomy structures [59]. Collective tacit memories of staff shall help in completing taxonomy construction. Taxonomy able to promote collaboration and sharing and distribution between units and departments of an organization [67]; [68]; [62]; [61]. They also help putting knowledge into practice by making sense of the knowledge of the organization and creating a common items and way of working.

5. **Taxonomy can perform as initial navigation level to assist and accelerate research and discovery or exploratory guide [69]; [70]; [60] :** It helps in understanding conceptual organization structure and categorization of business documents; standardize things, link idea, concept and word [72]; [73]; [34]; [31]; [26]; [71]; [65]. It will act as front end to search so that a new comers of subject area may begin the research process by navigating through taxonomy [67]; [68]. This shall helps as communication and training device at the same time providing history [61]. The well structure business systems should be able to drive better design of business systems, information and knowledge flow [70]. Taxonomy has been also mentioned have the ability to enabling business processes, protecting intellectual property [73] and depicts network of relationship as well as intensity of information and knowledge flow [71]. A well structured Corporate taxonomy shall be able to support enterprise portal [74], especially in the construction of contents as per required by organization.

3.2. Taxonomy in education

Table 2
Taxonomies in education

Taxonomy Name/ Taxonomy detail	Cyc Education Taxonomy Suite	Education, Skills & Children's Services Thesaurus	Gale Education Thesaurus	WAND Education & Training Taxonomy
Publisher	Cycorp, Inc. *http://taxonomies. cyc.com/*	Department for Education (UK)	Gale, Cengage Learning *http://www.gale. cengage.com*	WAND, Inc. *http://www.wandinc.com*
Description	The Cyc Education Taxonomy Suite is a subset of the master Cyc Comprehensive Commonsense Taxonomy Suite in the narrower domain of structured learning. It contains over 1,700 terms about teaching, learning, educational institutions, fields of study and degrees.	The Education, Skills and Children's Services Thesaurus covers the subject areas of education and children's services with subsidiary subjects including social concerns, employment, government and management. It is used to tag content in the UK Department for Education website.	The Gale Education Thesaurus is a subset of the master Gale Social Sciences Thesaurus in the narrower domain of teaching, training and learning. Includes: Educational institutions; Facilities; Students; Programs; Administration; Policies and practices; Concepts and theories; Educational standards; Testing; and specific types of school and training and trade schools, special training, and professional schools.	The WAND Education and Training Taxonomy covers products and services related to the field of training and education programs, kits, supplies and equipment. Educational services encompasses the full range of services from adult education, educational testing, library services, special education and schools.

Blooms taxonomy is the widely used taxonomy in education domain [75]. Some other example of taxonomies in education can be found in Taxonomy Warehouse website *(http://www.taxonomywarehouse. com/default.aspx).* Table 2 contains information about taxonomies in education from Taxonomy Warehouse website.

As difference scenario projected different taxonomy, most of the time, produced taxonomies only matched the studied environment and requirements. Since there is limited amount of knowledge taxonomy for IHL context produced before, a specific and comprehensive study is necessary [35]. This study further aims are to understand what are the strategic knowledge components in IHL Malaysia, and develop a corporate taxonomy for managing knowledge in IHL. Developing specialized and dedicated taxonomy, in its environment is an advantage because it will not be influenced on the classification of item that is not necessary or not even existed in IHL. [59] emphasized taxonomy as artificial memory is supporting the final outcome of taxonomy produced; shall be applied as content in developing any references or standard or even tools (repositories) for managing IHLs' knowledge.

4. CONCLUSIONS

As an alternative to manage and reuse corporate knowledge in corporate memory system, this study presented a new approach by optimizing corporate taxonomy that has been said to provide various benefits to organizations including IHL. Detailed literature study was done and the findings have derived to the using corporate taxonomy for IHL. While the theories have drawn some lines for the study, specific scope focusing on strategic knowledge assets of IHL is necessary to be used as a benchmark for the study. Data collection of the study should be based on the specific strategic knowledge assets of IHL before they are presented in a form of taxonomy as an initiation to manage knowledge in academic institution.

5. ACKNOWLEDGMENT

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