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FRAMEWORK FOR IMPLEMENTING KNOWLEDGE MANAGEMENT IN ENGINEERING INSTITUTE

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Abstract – Knowledge is the information that is learnt or understood from the education and experience. Knowledge is not just to be shared but also stored for mining new information. The present Indian Technical Education is changing alarmingly and needs to adapt to the rapidly changing technological changes. Also there is a need to bridge the gap between academics and Industry needs. With the ever changing expectations of the learner, we need to adapt to the technology to a larger extent to share knowledge. Knowledge sharing using technology is the need of the hour today. Institutions must manage knowledge effectively in order to take full advantage of the skills and experience inherent in their systems as well as the tacit knowledge belonging to the teachers of the Institute. Knowledge, being the most important resource needs to be managed effectively. Knowledge Management not only retrieves and stores the existing knowledge but also supports the growth of new knowledge. Most educational institutions have some type of Information systems in place to store knowledge, but there is lot of barriers that makes the sharing of knowledge difficult. There should be a proper framework to store assimilate and share knowledge in an institution. To cater to the knowledge needs of the institution, a framework for the knowledge management is designed. This system is designed keeping in mind the requirements of an Indian Technical Institute. This system will be used for creating, assimilating, sharing and overall Knowledge Management of an Institution.

Keywords – knowledge management; framework; technical education; tacit information; explicit information

I. INTRODUCTION

Knowledge is the information and skill acquired through education or experience. Knowledge may be theoretical or practical in nature. Knowledge may be recorded on paper or in most of the times in the persons mind. Most of the knowledge is there in the resource person's brain. Every individual has inherent knowledge with him. We need a mechanism not just to share but also to store this inherent knowledge. Knowledge is professional intellect, such as know-what, know-how, know-why, and self-motivated creativity, or experience, concepts, values, beliefs and way of working that can be shared and communicated. It is a kind of asset that is more difficult to be duplicated, therefore the knowledge advantage is much more sustainable as defined by Davenport [1] and Allee [2]. Knowledge Management (KM) can be defined as managing knowledge through the process of creating, sustaining, applying, sharing and renewing knowledge to enhance organizational performance and create value [3].

KM practitioners assume that knowledge is a modern organization's most important resource, the only resource not readily replicated by rivals. Knowledge Management not only retrieves and stores the existing knowledge but also supports the growth of new knowledge and adaptation of relevant information and data for a targeted activity. It

provides a solution to the critical issues of Organization adaptation, survival, and to face the challenges of the environmental changes [4].

The present Indian Technical Education is undergoing a rapid change. Today's Technical education system needs to revamp itself to adapt to the changing technology needs. It is essential to bridge the gap between what is taught and what is to be applied in the industry. This essentially needs competent faculties to deliver according to the changing needs. But with the ever changing expectations of today's learners we need to think of adopting technology to a larger extent to provide and share knowledge. Knowledge is not easily measured or audited, so Institutions must manage knowledge effectively in order to take full advantage of the skills and experience inherent in their systems and structures as well as the tacit knowledge belonging to the teachers of the Institute.

Lot of Industries have successfully applied the Knowledge Management principles and achieved their objectives, and this should act as a catalyst to all the Technical Institutions to adapt and implement the KM. The KM principles will enable the technical educational institutions in achieving their targets of imparting quality education [5]. Technical Institutions should move towards reusing the existing knowledge and recreate new knowledge.

Lot of study has been done on the application of Knowledge Management in the education field. This

paper will research about the implementation of a framework for Knowledge Management in Engineering Institute. This paper is organized as follows: Section 1 is introduction. Section 2 discusses the relevance of Knowledge Management in Education. Section 3 presents the framework for the implementation of the Knowledge Management. Section 4 concludes.

II. KNOWLEDGE MANAGEMENT IN EDUCATION

India has over 4300 Engineering colleges with more than 1.3 million seats in offer every year. This shows the unprecedented growth in the technical education in India. But with such a phenomenal growth arises another major issue of resource person for the institutes. There is a major shortfall of Knowledge and Resource Personnel in most of the technical institutes and this is resulting in poor outcome of engineering graduates. Studies have shown that less than 20% of these graduates are employable in the Industries [12]. These numbers are alarming. The present technical education in India is undergoing an alarming change. One of the major reasons is the lack of facilitators. We need more Knowledge managers who can share new knowledge than the one who just presents the existing information. Most of the Technical Institutions today face acute shortage of able Professors to teach. Migration of Resources is also another issue that most of the institutes have to overcome. With the migration, the entire knowledge of the Resource person is also moved to another new place. We need to build a system to store the knowledge of able minds so that the knowledge stays even with the migration of the person.

The education today is subject to the same pressures of the marketplace to spur innovation, improve customer service, or achieve operational excellence. KM connects people with the knowledge that they need to take action, when they need it. Educational institutions that develop initiatives to share knowledge to achieve business objectives are of tremendous value today.

The advent of modern technologies has brought in an influx change in the academic world today. Academics has become more dynamic due to the introduction of computers, internet and software applications. The digital contents, online resources, have contributed to the rise of new challenges in the higher education [6]. The knowledge that is shared has to be structured by some means. The knowledge can be categorized into following as: Internal tacit knowledge, internal explicit knowledge, external explicit knowledge, and external tacit knowledge.

Technology plays an important role in the knowledge management. Knowledge management uses the technology for better and effective sharing and creation of knowledge. This includes data

mining, information retrieval, case-based reasoning, topic maps, weblogs, and e-portfolios [7]. The data mining technology helps in identifying patterns to extract knowledge which is embedded in the repository. The various techniques of data mining will allow us to retrieve information from the abundant resources stored in the repository.

Application of knowledge management in education is an inclusive way to discover, manage and analyze the resource of the education information [8]. This cannot happen without the proper support of the present information technology. This involves: Internet, Intranet, Extranet, the technology of memory structure, the multimedia database management system, the data collection and gain technology, the technology of communication, on-line analysis, and mining technology, the technology of the knowledge discovery, the technology of the knowledge sharing. Of these, the Internet and Intranet forms the foundation of the knowledge management in education. The effective technology is very important to the sustainable development of the education.

An institution has a large number of resource personnel. The knowledge repository can surely bring in improvement and accountability in education. An institution-wide approach to knowledge management can lead to exponential improvements in sharing knowledge – both explicit and tacit. Although there are lot of barriers in information sharing, there is a growing recognition that KM can enable higher education to evolve more smoothly to a highly and dynamic educational environment.

Using KM techniques in education is vital, in the changing environment. This will lead help identify expert resources; sift through information about different education strategies, and share experiences and insights into successful and failed interventions in education systems. The KM will bring in a change and have a lot of impact in the research process, curriculum development process, administrative services and strategic planning process. This is not devoid of challenges viz., lack of knowledge sharing, lack of KM understanding and its skills, improper organization process, lack of funding and incentives, lack of technology.

Academic culture must change from teaching book knowledge to knowledge sharing and innovation. Greater collaboration among all the resource personnel and institutional stakeholders in the area of knowledge management will result in better use of resources and improves services that are easier to access and use. The higher education should lead to more innovations, research than a simple course study. This needs vast resources that can be provided by KM principles. Subject matter experts can share knowledge with the students across globe. Expert resources need not be present in an institute always. The knowledge shared in the repository can be used anytime, anywhere.

III. FRAMEWORK FOR KNOWLEDGE MANAGEMENT

A. Need for a framework for Knowledge Management

In this challenging and competitive era, it is essential to maintain a strategic advantage for any firm. The knowledge is the most important and the only resource that is difficult to be replicated using any traditional methodologies. To maintain an advantage, the knowledge has to be stored for any future use and also we should be able to derive new knowledge from the existing one. An Organization should have a system in place to support knowledge creation. It should also ensure that the any relevant knowledge from any sources, external or internal should be recorded and indexed so that it can be retrieved and used anytime. Knowledge derived from any source should be recorded and stored for anytime use. Knowledge that is inherent should be derived by some means so that it can be also stored. The knowledge stored should be utilized to retrieve new information from the existing one. There should be ways to create new knowledge from such knowledge base.

Most educational institutions have some type of Information systems in place to store knowledge, but there is lot of barriers that makes the sharing of knowledge difficult. There are many external factors that influence the successful conversion of knowledge into a knowledge base. The Organization structure, culture, people mindset personal issues are few of the elements that would influence the knowledge transfer. There should be a proper framework to store assimilate and share knowledge in an institution.

B. System Specifications

We live in a rapidly growing knowledge economy. This knowledge economy will provide us all with unlimited opportunities to grow as effective knowledge driven individuals, teams, organizations and institutes. To cater to the knowledge needs of the institution, this system is designed. This system is designed keeping in mind the requirements of an Indian Technical Institute. This system will be used for creating, assimilating, sharing and overall Knowledge Management of an Institution. The system will allow storing knowledge in any storage format. The system is designed as a web application, thus enabling usage of the Knowledge management system anywhere anytime. The Overall Architectural design of the System is shown in Fig 1.

Technologies for KM play a role in the following two areas: storing data and information and provide data and information. Traditionally, KM has two source of knowledge: tacit and explicit knowledge [9]. The System has three divisions at the application level: Discussion forum, External knowledge and the Knowledge Resource management. The External Knowledge refers to the explicit information. The tacit knowledge is shared via discussion forums. And

the effective retrieval, sharing and the management is implemented at the knowledge resource management part.

Fig. 1 : System Architecture for the KM

The knowledge that is easy to code, put on paper, images, pictures, drawing or other media can be referred as explicit knowledge, which is possible to be transferred through detailed explanations. Tacit knowledge is the one that people have internalized,

which is difficult to be transferred. It is of importance to describe a process of knowledge transfer and transformations by observing the role of IT in support of this transfer/transformation. KM has to deal with both these dimensions of knowledge: explicit and tacit.

Explicit knowledge is easily understood and transferred. Explicit knowledge can be easily transferred through documents, presentations, drawings, manuals, reports. Best practices can always be noted and shared. The system takes into consideration all the formats for the storage of explicit knowledge. But the major issue rises in recording the tacit knowledge. Tacit knowledge that is not easily transferred or expressed is to be converted into explicit through interactions among the knowledge repositories. This process of knowledge transfer seems relatively simple because people have the ability to decode information from prior knowledge by a process of experience and use, learning by doing.

Tacit knowledge can be individual or collective, and proposes different topology: non epistle, socio-cultural, semantic, and sagacious [10]. Tacit knowledge demands for elicitation methods in order to be found, which are in the form of psychological models and assessments of individual and group behavior. Tacit knowledge emerges from the constant practice of the exercise of a non-routine activity [11]. Tacit can be individual or group; individual refers to memory that each person develops from perception that individually creates from observation and assessment, given to each experience. Tacit group denotes those concepts that can appear in the shared experience of group.

As the tacit knowledge is inherent to a resource person, we need to build an efficient mechanism to share the inherent knowledge. Faculty can share tacit knowledge by means of discussion forums, weblogs, which are later indexed for search. Efficient data retrieval techniques are used to sift through such data for the retrieval of the required information. Tacit information can be retrieved by individual knowledge collection and also by group discussions. These can be recorded and stored in the knowledge bank. Individuals should come together and share their ideas that will lead to creation of new knowledge. Knowledge can be share through formal or informal interactions.

Resource person can be interviewed on a particular topic and new knowledge emerging from such questionnaires is to be stored. Interviews can be formal, informal. One of the better technique to draw more information can be the self interview as the person with knowledge can articulate better. Group discussions on certain topics also can be conducted and the information shared in such forums can be again recorded and stored in the knowledge bank. The knowledge shared by a faculty remains permanent in the system and the Organization. This ensures that the organization retains the knowledge of a resource person even after he moves out of the Organization. Communities for knowledge sharing should be created where information can be shared.

IV. CONCLUSION

Knowledge is the information learnt, experienced by education or experience. Knowledge if not shared does not serves the purpose. A mechanism to share the knowledge by means of storing and retrieving new information from the existing knowledge is developed by Knowledge Management Techniques. KM provides a system of assimilation, analysis and adaption of relevant information and data for a targeted activity. It caters to the critical issues of organizational adaption, survival, and competence in face of increasingly discontinuous environmental change. With the rapidly changing technology enabled work environment, it is required for the Indian technical education system to produce competent professionals. It is essential for the professionals to be ready to run kind of who are able to both use current available technology tools as well as to adjust to the rapidly changing technology. Technical Institutions need to implement and adopt the KM practices and bring in a radical change and a new dimension for learning. KM initiative will help

learners and teachers to innovate and not just learn the existing information. Greater challenge arises in assimilating the tacit information. An open mind in sharing information will result in an efficient knowledge management. The innovative technology advancements are to be incorporated in the field of education. Learners will be able to acquire and learn new things more easily with this. The KM principles with the technology will assist teachers in delivering knowledge in a better way. The KM principles have been successfully applied to business organizations to achieve their objectives and these principles can also be applied to technical education institutions to achieve their targets of imparting quality education.

REFERENCES

- [1] Davenport, T. H. et al. , "Improving Knowledge work processes," Sloan Management Review, 1996, pp 53-65.
- [2] Allee, V, "The Knowledge evolution: expanding Organizational intelligence", Butterworth-Heinemann, 1997.
- [3] Wu Kebao, Dai Junxun, "Knowledge management technologies in education," International Symposium on Knowledge Acquisition and Modeling, 2008, pp 93-97.
- [4] Yogeesh Malhotra, "Knowledge management for E-business performance: advancing information strategy to internet time", Information Strategy: The Executives Journal, Vol 16, 2000.
- [5] Sanjay Agrawal, Prof. P. B Sharma, Dr. M. Kumar, "Knowledge management framework for improving curriculum development processes in technical education," Proceedings of the Third 2008 International conference on Convergence and hybrid information technology, 2008, pp 885-890.
- [6] Seema Jundale, G. S. Navale, "Knowledge management in education," IAMA, 2009.
- [7] Marc Henselewski, "Evaluation of knowledge management technologies for the support of technology forecasting", Proceedings of the 39th Hawaii International Conference on System Sciences, 2006.
- [8] Rongrong LU, Jun'e LIU, "The research of the knowledge management in the education," Proceedings of the 2008 International Symposium on Knowledge Acquisition and Modeling, 2008, pp 551-554.
- [9] I. Nonaka, "The knowledge-creating company", Harvard Business review, vol 85, 2007, p162.
- [10] J. Castillo, "A note on the concept of tacit knowledge", Journal of Management Inquiry, vol 11, Mar 2002, pp 46-57.
- [11] JMC Medina, ACTonini, MDM Spinola, "Role of the tacit information within knowledge management systems", 2002.
- [12] "National Employability Report", Aspiring Minds, 2011