

University of Science & Technology

Faculty of Computer Science & Information

Technology

Master's Program

Thesis Name:

**Knowledge Management System
for Industrial Training**

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ABSTRACT

Knowledge management plays a significant role nowadays by making knowledge available for others through transforming tacit knowledge to explicit and explicit knowledge to tacit. This research study shows how knowledge management principles could be utilized in the training program.

At this point of time, Training is gaining importance as universities are realigning their curriculum to suit companies' needs. The training apprentice program aims to adequately prepare students for the job market.

However, it was found that students who undergoing to training face many challenges and problems which include choosing companies that suit their specialization and getting themselves adequately prepared for jobs.

Furthermore, it was found that much of the knowledge and experience gained in overcoming problems at the workplace have not been shared with faculty or with other students because there is no platform or mechanism to share this knowledge.

This study uses mixed methods i.e. qualitative and quantitative approaches. Close ended and Open-ended questions in the questionnaire survey were used to find out the reasons for poor performance and participation in the training program and find out ways of improving the quality of training program.

User requirements obtained from the research findings were subsequently used in the creation of KMTS. Besides the practical contribution of KMTS, the study has developed an empirical-based framework on training which could act as a reference model for intending students who are going for the training.

The proposed system allows greater sharing of industrial knowledge and experience. This framework could further be used to serve as a general guideline for other subject areas.

مستخلص

تلعب إدارة المعرفة دوراً هاماً في الوقت الحاضر من خلال جعل المعرفة متاحة للجميع، و تحويلها من معرفة ضمنية إلى معرفة واضحة و من معرفة صريحة إلى معرفة ضمنية. هذه الدراسة تبين كيف يمكن الاستفادة من مبادئ إدارة المعرفة في برنامج تدريب الطلاب.

أصبح برنامج تدريب الطلاب الذين على وشك التخرج من المواضيع الهامة التي يجب أن توليها الجامعات اهتماماً كبيراً، و أغلب الجامعات اليوم تعمل على إعادة تنظيم المناهج لتناسب مع احتياجات العمل و يهدف برنامج تدريب الطلاب إلى إعداد الطلاب بشكل كاف لسوق العمل.

ولكن أغلب الطلاب الذين يذهبون للتدريب تواجههم الكثير من التحديات والمشاكل التي تشمل اختيار الشركة التي تتوافق مع مجال تخصصهم. بالإضافة إلى ذلك، وجد أن الكثير من المعرفة و الخبرة المكتسبة في التغلب على المشاكل في مكان العمل لم يتم مشاركتها مع الكلية أو مع الطلاب الآخرين، و هذا في الغالب لأنه ليس هناك أي منصة أو آلية لتبادل و مشاركة هذه المعرفة.

هذه الدراسة تستخدم أساليب مختلطة (النهج النوعي والكمي). وقد تم أيضاً استخدام منهجية الأسئلة المفتوحة و الأسئلة المغلقة في الإستبيان المرفق لمعرفة أسباب ضعف الأداء و المشاركة في برنامج تدريب الطلاب و البحث عن وسائل لتحسين جودة برنامج التدريب. و قد استخدمت متطلبات المستخدم التي تم الحصول عليها من نتائج البحث في إنشاء نظام الـ (Knowledge Management System) KMS. وإلى جانب المساهمة في عملية بناء KMS طورت الدراسة إطار عملي للتدريب يمكن أن يكون بمثابة نموذج مرجعي للطلاب الراغبين في الذهاب للتدريب. و يتيح هذا النظام المقترح قدراً أكبر من تبادل المعرفة و الخبرة العملية. و يمكن استخدام هذا الإطار العملي كقاعدة توجيهية لمجالات أخرى مختلفة.

1.1 Introduction

Knowledge is the body of understanding and skills that is mentally constructed by people (Clarke and Rollo, 2001). Davenport and Prusak (1998) suggest that knowledge is a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms. Knowledge is playing a key role in creating and sustaining the competitive advantage of business organizations in the economy that is based on intangible assets. Organizations cannot survive without value addition through innovative processes and products. The organizations, both in the public and private sector, need to bring about a radical change in their culture to facilitate the diffusion and transfer of knowledge by encouraging employee participation across all levels. They can do so by using knowledge circles that build upon informal relationships which are strong in a high context culture, but definitely under the right supportive organizational leadership.

Knowledge management (KM) is known as a systematic, goal-oriented application of measures to steer and control the tangible and intangible knowledge assets of organizations, with the aim of using existing knowledge

inside and outside of these organizations to enable the creation of new knowledge, and generate value, innovation and improvement out of it (Wunram, 2000). Knowledge management (KM) is further viewed as an increasingly important discipline that promotes the creations, sharing and leveraging of the organization's knowledge" (Fernandez *et al.*, 2004). In a nutshell, it means systematically and routinely creating, gathering, organizing, sharing, adapting, and using knowledge – from both inside and outside the organization – to help achieve organizational goals and objectives (Milton, 2002).

Knowledge management is a must for all sectors nowadays in light of the competitive nature of businesses and the increasing pace of technological advances. KM creates a new working environment where knowledge and experience can easily be shared and also enables information and knowledge to emerge and flow to the right people at the right time so they can act more efficiently and effectively (Smith, 2001).

Industrial Training programs for undergraduate students provide the opportunity to improve existing skills and acquire new ones. Industrial training exposes students to acquire part of the practical side in the industry that has been theorized in the academic curriculum (Stephen, 2005). Industrial training can therefore be viewed as an important strategy to expose students to real work

life situation and to equip them with the necessary skills so that they would be job ready when they graduate.

1.2 Problem statement

The effort to align university with companies requirements is very important and therefore be addressed appropriately such as need to impart the skills for students needed by the companies, to meet the employers' needs so as to remain competitive. Thus the student could match their competencies with company expectations. The problem of monitoring student progress in training and having a database on students' experiences need to be further addressed. In addition some students are placed in companies which are not relevant to their area of specialisation. Hence there is a mismatch regarding internship placement for students. This problem has to be looked into and this research attempts to address this problem.

Presently, there is no proper mechanism between companies and universities to monitor students and therefore the training undertaken is poor. For example students are sent to companies which do not match their learning knowledge obtained in the university. This problem can be minimized by having the correct mechanism such as knowledge management system to

monitor the students and bridge the gap between the university and the companies.

1.3 *Research Objectives*

The main objectives of this research are as follows:

- a) To study the method of managing knowledge of industrial training in an effective manner.
- b) To trace best practices for sharing knowledge on industrial training.
- c) To design and implement a knowledge management system for industrial training.

1.4 *Research Methodology*

This research employs a case study method supported by studying existing research literature to understand the use of KMS and it would include selection of a methodology for framework design and develop discussion board. A practical computerized knowledge management system framework will be proposed.

1.5 Significance of Research

One of the biggest challenges behind knowledge management is the dissemination of knowledge. People with the highest knowledge have the potential for high levels of value creation. But this knowledge can only create value if it's placed in the hands of those who must execute on it.

The significant of this research comes from the importance of the training period for the students whereby it is the first stage of practical work to him, and he gains so many experiences during the training period (at least he become familiar with the work environment). During training period the student may acquire some knowledge that might be important to other students, or to the University to bridge the gap between the university and the companies through creating knowledge management system for industrial training. Thus there is a need for industrial training guidelines, to improve coordination between institutions and organisations and better preparation of students for industrial training.

1.6 *Scope of the study*

The scope of this study is limited to the design of Knowledge Management System for industrial training in higher education, in particular for the Faculty of Computer Science, University of Science and Technology to bridge the gap between companies and the university by making use of knowledge management system.

1.7 *Expected Outcomes*

This research will produce a prototype of a knowledge management system (KMS) for industrial training to support the management of knowledge in the university and bridge the gap between the university and the company in tracking and monitoring the student performance during the training period. Using knowledge Management system for sharing the industrial training experience will give good results in the field of bridging the gap between university and companies by making better use of this training.

1.8 Organization of Research

This thesis is divided into five main chapters organized as follows:

Chapter 2: In this chapter the researcher looks at past researches done on knowledge management pertaining to industrial training in some other universities. A number of systems have been examined and the pros and cons were described in detail. The researcher then looked at the weaknesses of the systems. Some user requirements were obtained that will lay the foundation for creating a prototype Knowledge Management Training System.

Chapter 3: In this chapter, the researcher elaborates on the research methodology used in completing the dissertation. The research instrument employed for data collection is questionnaire. Copies of the questionnaires were distributed to students as well as the staff members of Faculty of Computer Science and Information Technology. Questions were asked based on students' industrial training. The Web Information Systems Development Methodology (WISDM) was discussed in detail as features of this methodology were used in system development of the proposed KMTS.

Chapter 4: This chapter looks at the process of program design, input form design, graphical user interface design and database design. The Functional and Non-Functional requirements of the proposed system was discussed. Besides

the hardware requirements and system architecture, the tools used in system development were again examined. UML diagrams using use case diagrams were elaborately described followed by system evaluation by ten users. In the last part of this chapter screenshots of the proposed system were placed to give a distinct view of the new system.

Chapter 5: In this chapter, the researcher states the summary of the findings in relation to the objectives. Other features that need to be included were discussed as future enhancements; a conclusion on this study and finally recommendations was given at the end.

