

A Knowledge Management Approach to E-Learning

6.1 ABSTRACT The digital divide between developed and developing countries is increasing rapidly. However, a number of developing countries are striving to narrow this gap by enriching their societies through the introduction of ICT based business activities. Knowledge management and E-learning are examples of such ICT supported activities. Knowledge management applications are aimed to provide organizations with tools to manage their business knowledge, while the focus of e-learning has always been on managing the delivery of academic knowledge. Efforts to integrate both areas of research are lacking. This paper presents a knowledge management approach for e-learning applications. It highlights the joint characteristics of the two concepts and proposes a KM view of e-learning. The aim is to streamline the transfer of educational content among the stakeholders of a typical e-learning environment. The proposed approach has been implemented in the Kingdom of Saudi Arabia which is a developing country where many cultural issues have to be taken into consideration.

1. **INTRODUCTION** The wealth of a nation no longer depends on its ability to acquire and convert raw materials, but on the abilities and intellect of its citizens and the skills with which organisations harness and develop those abilities (Wijetunge, 2002). This includes not only organisational learning but educational learning as well. E-learning applications represent a paradigm shift in learning models. They have emerged as a result of the rapid penetration of technology in the delivery of education. “The real promise of technology in education lies in its potential to enhance the learning experience for learners” (Li, 2001). However, although the topic of e-learning has been subjected to significant research in many Western countries over the last two decades, there is no reason to conclude that findings from these countries may be applicable to other regions (Abouchdid & Eid, 2005). For example, the experience of e-learning in Arab countries is very limited and this can be attributed to financial, social and technical issues. However, the degrees of hindering issues are different from one developing country to another. A number of developing countries such as the Kingdom of Saudi Arabia (KSA) are paying greater attention to promote education at large because “education provides high living standards in view of human capital” (Tezcan, 2006). For this reason, the Saudi authorities are encouraging public and private educational institutions to promote learning by incorporating ICT in education. The aim is to arm individual citizens with state-of-the-art learning technology.

This goal is in line with the assertion made by Beynon (2006) that the relationship between individual learning and societal development is significant when thinking about education in relation to developing countries. In terms of e-Government Readiness (which include ICT infrastructure and other metrics), the UN Global E- Government Readiness Report has moved up Saudi Arabia ranking from 80 in 2003 to 70 in 2008. According to Sedgwick (2001), education in the KSA is gender-segregated and is divided into three separately administered systems: general education for boys, education for girls and traditional Islamic education (for boys). Al-Bayan model school for girls, which is the application domain of our approach, is a private secondary school. It was established in 1988 with the vision to be a model in providing quality e-learning programmes in the KSA

The experience of Al-Bayan Girls' School is a pioneer in a country where the primary educational model is essentially traditional. This paper aims to present the e-learning approach adopted by Al-Bayan. This approach aims to follow a knowledge management approach to e-learning. The paper is structured as follows: Section 1 highlights the e-learning concept, showing the urgency of its adoption especially in developing countries. Section 2 introduces the knowledge management approach, while the conjunctive relations between the two topics are presented in Section 3. Section 4 describes the technical constraints imposed by regional cultural issues. Section 5 presents scenarios of our approach as adopted by Al-Bayan Girls' School. Section 6 concludes the evaluation of Al-Bayan experience, and Section 7 discusses the conclusions for this case study.

6.2 E-LEARNING The computer-supported educational systems have been developed as a motivation to apply computer abilities to various education domains and promote the activities of learners (Watanabe, 2003). This technical support to learning is briefly described as e-learning. In other words, it refers to learning scenarios where technology plays a major role in the delivery of the 'educational content'. Initially, the e-learning content is delivered via a range of technologies such as television, videotape, CD-ROM and computer-based training. However, the advances in communication technologies and the growth in the use of the Internet have massively reshaped e-learning capabilities because the Internet enables greater interaction between learners, tutors and the educational content. The Internet also enables learning materials to be accessed from anywhere through the web or Intranet. In addition to the usual face-to-face dialogue, tutors and learners can also communicate with each other using e-mail, chat or discussion forums. Such highly interconnected environment helps make students active

seekers rather than passive recipients of knowledge. This super connectivity also “enables education to occur in places where it normally does not, extends resources (information) where there are few, expands the learning day and opens the learning place as it connects people, communities, and resources to support learning” (Arko-Cobbah, 2004). In case of many developing countries, Internet-based e-learning environments are expected to provide opportunities to various socially-excluded communities where social and cultural barriers prevent them from gaining knowledge through traditional learning scenarios.

KNOWLEDGE MANAGEMENT Defining knowledge management (KM) has become rather like seeking a definition for ‘international terrorism’. Everybody can talk about it but no one can define it precisely. In other words, there is no universal definition of what knowledge management really is. This could largely be attributed to the differences in old philosophers’ arguments about what constitutes “knowledge” in the first place. Various KM definitions can be found in the literature. This could be justified by the multidisciplinary backgrounds of KM researchers.

The disciplines of KM researchers include management sciences, software engineering, artificial intelligence, sociology etc. However, in a broad context, knowledge management can be defined as the process of capturing, codifying, classifying, storing and sharing knowledge. Basically, the general scope of KM is to facilitate organisational learning where knowledge workers are supported to capitalise and share their know-how. The aim is to capture, store and improve the transfer of know-how within an organisation. In order to fulfil these promises, different KM strategies have been introduced. The main KM strategies to be employed by early adopters of the principle (Hansen et al., 1999; Mentaz et al., 2001) are:

1. The process-centred approach mainly understands KM as a social communication process. In this approach, knowledge is closely tied to the person who developed it and is shared mainly through person-to-person contacts. The main purpose of information technology in this approach is to help people communicate knowledge, not to store it. This approach is also referred to as the “personalisation” approach.
2. The product-centred approach focuses on knowledge documents, their creation, storage and reuse in computer-based corporate memories. This approach is also referred to as the “content-centred” or “codification” approach.

In the following section, we highlight the similarities and shared goals of the knowledge management and e-learning processes and how to enrich the cause of e-learning through the incorporation of KM practices.

4. CONJUNCTIVE RELATIONS AND THE SYNERGIC SOLUTION During the last decade, both KM and e-learning have experienced many innovations but are still largely unconnected (Althoff & Pfahl, 2003). Traditionally KM has been associated with the corporate sector; whereas e-learning has been traditionally applied more widely including the academic and vocational training sectors (Zuga et al., 2006). Though both concepts are intended to be very different approaches to different topics, we believe that these approaches have a common ground in terms of their goals and techniques. Basically, the general scope of KM is to eventually lead to establishing what could be regarded as the “organisational brain” or technically called the organisational memory system (OMS). On the other hand, the scope of e-learning is to help individuals’ brains in constructing and gaining prescribed ‘educational knowledge’.

If we look at the e-learning concept in an abstract way, we can easily identify certain KM activities which are embedded in the e-learning process. Firstly, since its inception, e-learning has been regarded as the process of maintaining a repository of electronic resources accessible by learners and educators. This goal has a common ground with the definition of KM as “the process of systematically and actively managing and leveraging the stores of knowledge in an organisation” (Rahman & Mohamed, 2001). The same e-learning task also matches the codification strategy of KM (briefly described in Section 2). But, “knowledge management is more than creating a knowledge archive and invoking retrieving mechanisms” (McBriar et al., 2003). It is also aimed at providing logistics for knowledge transfer (i.e. personalization strategy). Similarly, e-learning is also expected to provide communication channels not only between learners and the content but also between learners themselves, tutors and parents. For this reason, KM techniques can be used to provide logistic means for the transfer of educational knowledge. This includes facilitating learners’ monitoring and intercommunications management between learners and tutors. Notice that this view is also reflected in defining KM as: “getting knowledge from those who have it to those who need it”

Therefore, the effectiveness of incorporating the knowledge management approach in e-learning lies in providing customised learning cycles that suit the various mental and social capabilities of individual learners - learning is strongly dependent on the personality and progressiveness of individuals and it should not be uniformly anticipated. Providing customisable learning cycles is also in line with the objectives of the contemporary constructivist model of learning. This learning model is student-centred and it relies on the learner’s knowledge

construction and collaborative learning. According to Marshal et al. (2003), “the constructivist model emphasizes three main ideas. Firstly, there is no single “correct” representation of knowledge. Secondly, people learn through active exploration when exploration uncovers inconsistency between experience and current understanding. Finally, learning occurs within a social context”. KM techniques represent the vehicle through which all these features can be realised. Based on the above mentioned differences and joint characteristics between KM and e-learning, we proposed a new e-learning model that employs KM techniques to establish and manage customized e-learning cycles. This integrated approach is adopted by Al-Bayan Girls’ School. It is intended to realize the vision of this school to become a key e-learning provider in the KSA. Nonetheless, as in many developing countries, IT based solutions are affected by social and cultural issues. Though similar culturally-motivated restrictions are applicable to our application domain, initial investigations indicated that the implemented approach succeeded in empowering female students in a society that imposes certain restrictions on the educational process. Limitations related to cultural issues are briefly discussed in the following section.

5. CULTURAL AND TECHNICAL CONSTRAINTS It is not only financial or technical issues that contribute to the less than enthusiastic adoption of the e-learning concept in developing countries. Cultural issues also play a major role in causing this problem. Chaula et al. (2006) attributed the unsuccessful adoption of e-learning in developing countries to solutions imported from the developed countries whose cultures differ significantly from the developing world. This issue is also applicable to the KSA where many cultural and social issues shape up the society. According to Wurm (2008), the fundamental feature of Saudi society is the dichotomy between technological modernity and conservative religious values. For example, the Internet which is the backbone of e-learning was only introduced in the KSA in 1999. The decision was made after a long national debate about the social risks associated with it. According to Al-Saggaf and Weckert (2004), the Saudi authorities were reluctant to adopt Internet technology because it had serious concerns about the arrival of undesirable material on home computer screens and also due to other cultural, religious and political reasons. According to the United Nations report, The KSA government has invested heavily in firewalls and security systems to block access to a high number of websites deemed offensive to the local culture or religious beliefs (United Nations, 2007). All these cultural precautions represent a greater challenge for similar societies. But since learning has become a social process, IT supported collaborative learning will soon become the mainstream educational model. For example, contemporary learning models such as constructivism encourage the interaction not only between learners and tutors,

but also encourage interaction and knowledge sharing between learners themselves. Though the technology has made knowledge sharing easier than ever, organizational culture might not promote sharing (Lindvall & Rus, 2003). In the KSA, gender-segregation is the mainstream policy in education. In fact, “education is being used as a form of societal control” (Baki, 2004). Any type of interaction among unmarried and unrelated men and women is strictly prohibited.

All business organizations, governmental departments and educational institutions such as schools and universities are gender-segregated. For this reason, any form of cyber-based interaction is regarded as a societal threat, and technology could be used to bypass cultural walls. This issue is a major challenge for many IT applications proposed in similar societies. In the case of Al-Bayan, though there are many off-the-shelf e-learning solutions, taking cultural issues into consideration, the management of the school believes that a customized e-learning solution is more feasible. It has been stated in the software specifications submitted to the developer of the customized e-learning packages that any form of uncontrolled cyber connection should not be incorporated. Communications are only limited to interactions between learners, tutors and the content provided by the school. The following section describes the KM-based e-learning approach. It shows how the KM practices are exploited to realize the different learning cycles defined by our e-learning framework where cultural constraints are carefully considered.

6. IMPLEMENTATION SCENARIOS Initially, Al-Bayan’s e-learning solution was designed to cater for the curriculum related to grades K7-K10. The initial stage started with digitizing all course materials (13274 pages) as prescribed by the Ministry of Education, KSA. In order to realize the KM-based e-learning approach for Al-Bayan, a set of learning cycles were defined. The aim is to set up a workflow management within the e-learning framework. Figure 1 shows the framework that describes the defined learning and feedback cycles. Firstly, the teacher prepares the Tablet PC based course content including tutorials and exercises. S/he then uploads the content and assignments to the installed MS Class Server.

Later on, teachers use the school network (See Figure 4 for technical details of the installed network) to give sessions for different classes. The content is broadcast during the class and the students can communicate and discuss the educational content with each other or with the teacher. The teacher can access the monitor of any student and establish a one-to- one dialogue. Alternatively, the teacher can also broadcast the screen of any individual student to all students in the class and

establish a group discussion. Students can also access the content repository off-campus (i.e. from home). They can retrieve assignments and submit the solutions to the Class Server. Later on, teachers can download and mark the assignments and send feedback to students. All correspondence between learners and teachers is carried out through a dedicated MS Exchange server.

7. INITIAL ASSESSMENT Because education in KSA is gender-segregated, the e-learning solution adopted by Al-Bayan prevents students from accessing the Internet. This restriction is made because of the fear that students would be able to communicate with the opposite gender. The same restriction is also meant to prevent students from accessing sites which are deemed by the authorities as immoral and incompatible with its cultural values. Though these cultural precautions represent a great challenge, even restricted versions of e-learning settings are expected to provide greater learning opportunities for the citizens in developing countries. This includes providing education to socially and culturally excluded communities. Despite the imposed restrictions made on learners' communications, a questionnaire was used to evaluate the impact of the introduced environment on learners and parents (samples of the questionnaires are shown in Appendix A and B). It included the technical and practical feasibility of the system. The survey achieved 170 responses and the questionnaire instrument consisted of the following parts. Parents' positive attitude toward technology is a very important factor to support the practicality of e-learning solutions. As shown in Figure 2, about 76% of the respondents regarded the system as helpful to their daughters compared to traditional educational scenario. Only 4% of the respondents regarded the introduction of e-learning environment as not helpful. In developing countries where ICT literacy is usually low, respondents' views are sometimes influenced by stereotypical impressions about the use of technology.

Very few respondents complained about the e-learning material uploaded late [8.67%]. Banning instant messaging is one of the main respondents' concerns. Recently there is huge debate in regard to the advantages and disadvantages of Instant Messaging (IM). Some scholars worry that Instant Messaging contributes to an increase in task interruption and also potentiality of exposing sensitive information (Garrett and Danziger, 2007). Others believe that IM helps to increase workers' productivity by allowing them to multitask more effectively. However, in KSA where it is difficult to assess how severe the social problems really are (Wurm, 2008), IM has been regarded as a catalyst for social ills. In the case of Al-Bayan, the culture issue is the main reason behind imposing this restriction. More than 30% of the respondents expressed their dissatisfaction in regard to banning instant messaging as means of communication between learners.

8. CONCLUSION Knowledge management technologies provide significant opportunities to enhance e-learning applications by extending its reach to wider communities. This is accomplished through streamlining learner-learner, learner-teacher and parents-teacher interactions. However, in certain developing countries where culture and religion profoundly influence every aspect of public and social life, cultural and social restrictions impose certain limitations on gaining the full benefits of the new IT-facilitated learning paradigm. This paper presents the knowledge management e-learning approach adopted by Al-Bayan Girl's school, KSA. Due to cultural influences, the system is developed to cater only for a moderate scope of learners' interactions. Full benefits of the available e-learning infrastructure are not gained as a result. But despite these technical restrictions, initial assessment of the application showed a very acceptable rate of satisfaction among learners and parents.