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A Study on the Role and Importance of Information Technology in the Establishment of Knowledge Management in Training and Education

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Abstract

The main purpose of this article is to recognize the role and importance of Information Technology in the establishment of knowledge management in training and education. Rapid changes in today's world have posed various challenges for organizations. However, successful organizations are those that take advantage of resulted opportunities by using knowledge management and new technologies. For the success of an organization, knowledge should be exchanged between individuals and be able to grow as an asset. The supporting role of information technology is what facilitates the process of knowledge management in organizations which use it for overcoming problems, anytime and anywhere. In this paper, we assess the role and importance of Information Technology in the establishment of knowledge management in training and education by using descriptive methods, documentation, and review of the results obtained from other studies and articles in electronic research databases and library resources. This article is derived from the Corresponding Author's MA thesis in the field of educational administration.

Keywords: data collection processes, information systems, information technology management, information technology, knowledge management

Introduction

Knowledge management facilitates the process of creating and sharing knowledge along with providing a positive working environment and an effective reward system. In addition, knowledge management speeds up organizational learning and helps organizations to adjust quickly with hasty changes of today's world, keep up with changes and survive successfully. Knowledge management plays an essential and strategic role in organizational success and enables organizations to acquire and employ knowledge faster and more effectively than their competitors which will lead to the creation of a sustainable competitive advantage. Knowledge becomes a source for the production of more wealth when it is applied in the manufacturing of products and the provision of services. In general, knowledge management is a set of processes, rules and procedures within and between organizations, which seeks the optimal utilization of an organization's knowledge capital based on organizational, cultural and technological infrastructures. Furthermore, knowledge management pursues the transformation of individual knowledge into organizational knowledge and aims to achieve organizational knowledge synergy for a more competitive power. Considering these definitions, we can conclude that various authors have offered different definitions on the subject of knowledge management with different perspectives and motivations. These definitions include the shaping of knowledge, programs, practices and the methods that organizations use for situational analysis and communication, besides topics relating to culture, customs, and values as well as establishing relationships with customers and so on. Today is the era of accelerating and unpredictable changes. The status of management in our society indicates an imbalance between the increasing complexity of organizations and the inability of these organizations to anticipate and deal with these developments and complexities. Organizations are obliged to recognize their internal capacity, reinforce the strengths and compensate for weaknesses to tackle probable

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threats and opportunities. Management issues are so complex that are not easy to diagnose. The human-dependent nature of organizations and the complexity of employee behavior have doubled this complexity. In such circumstances, successful organizations are those that can recover and improve the situation for organizational growth and dynamics in addition to gaining extensive awareness and knowledge of environmental factors for survival and continuation. (Rahimi and Najafi, 2007). Studies carried out in successful organizations show that productivity; profitability, rapid response to customer needs; cost reduction and desirable quality do not belong to companies with more investment, machinery and manpower. According to Peter Drucker, successful organizations are those that have more knowledgeable manpower and use it for overcoming the competitive and changing business environment (Saedi & Yazdani, 2005). Knowledge management is the constant process of creating, gathering, and organizing, diffusing, refining and utilizing knowledge. Knowledge management in an organization is composed of the strategies and processes that can meet knowledge needs of the organization, its customers and employees (Kermani Alquraishi, 2005).

Today, companies try to reduce production costs, increase innovation in their products and services, and promote their own growth by the help of information technology. Information technology not only supports key business actions and decisions but also has the potential to change the competitive practices of different businesses (Ruiz-Mercader et al, 2006). In this view of the transition from an industrial society to a knowledge-based society, we have recently been witnessing an increasing focus on knowledge as one of the most important organizational resources. Peter Drucker believes that the role of knowledge as an organizational resource and process in today's competitive context is much more than physical assets. This has also been stressed by many other researchers. The focus on knowledge has led to an increasing attention to information technology as one of the most important sources of competitive advantage (Johannessen and Olaisen, 2001).

Today, the strategy to achieve a sustainable competitive advantage is only possible if organizations move towards creating, transferring and sharing knowledge (Edwards & Collier, 2005). However, organizations face with multiple problems today in the field of knowledge management systems:

First, if knowledge accumulates only in the minds of people, there will be no way to preserve and record it using a systematic method.

Second, even with a continual recording and coding of knowledge, the process of searching, retrieving and browsing will be still more complicated and this is the problem that poses many obstacles in the way of knowledge dissemination (Rodriguez et al, 2008).

In recent years, "Knowledge management" has become a critical issue discussed in business literature. Both commercial and scientific communities believe that organizations with the power of knowledge can maintain a long-term privilege in competitive areas. Knowledge refers to all the information and experiences of individuals as well as all the documents and reports in an organization (Merwick, 2001). Today, knowledge is one of the most important organizational assets. Knowledge management refers to organizational procedures seeking a harmonious combination of data and information under process for increasing the capacity of Information Technology in an organization as well as increasing the innovation capacity of organizational members. Knowledge management, from the perspective of information technology, is designed as a system to support the knowledge of businesses related activities and can include decision support systems, databases, computer and internet facilities, etc. (Butler, 2003).

Theoretical foundations and background of the research

Today, most education experts agree that training and education, as the most important teaching-learning institution in the community for meeting the challenges of the new millennium, is obliged to transform into learning communities, create a culture of knowledge sharing, and use the effective strategy of knowledge management (Nemati, 2006). In the industrial economy, organizations were able to maintain their strong competitive positions for years. They used to create or maximize values through the optimization (economization) process. Organizations with good performances optimized production process by reducing production time, improving product quality and reducing the number of employees. So, value creation depended so much on industrial capacity, capital budgeting and tangible and financial assets (Qilichlee, 2009). Into the new millennium, liquidity, raw materials and land

that were considered critical for the formation and growth of enterprises in the past lost their former importance (Akhavan & Heidari, 2007).

Contemporary organizations, because of the time period in which they are located, are very different from the past and have changed so intensely, based on the two concepts of complexity and turbulence, that the nature of the contemporary world is fundamental and discontinuous change. These changes have occurred so quickly and competition has increased so much that large, recently-developed organizations cannot survive in the emerging world of the twenty-first century (Niazazari and Amooee, 2007). If organizations do not adapt to these changes, they may be brought into an end (Taslimi et al, 2006). Considering the above definitions, we can conclude that knowledge management is now widely accepted as a necessity in organizations. Therefore, organizations should create an environment for the sharing and transference of knowledge among organizational members and train them in making sense of their interactions. The main issue of this study is to answer this question "what is the role of the establishment of information technology in knowledge management in training and education?"

Definition of Knowledge management

Knowledge management is a set of processes, rules and procedures within and between organizations, which seeks the optimal utilization of an organization's knowledge capital based on organizational, cultural and technological infrastructures. Furthermore, knowledge management pursues the transformation of individual knowledge into organizational knowledge and aims to achieve organizational knowledge synergy for a more competitive power (Daneshfard and Zakeri, 2009).

Definition of Information Technology

Information Technology involves a wide range of communication media and innovations that connect information systems and individuals, such as voice mail, electronic mail, audio conferencing, video conferencing, the internet, hardware and software. Information systems and information technology are often intertwined, and Information Technology is usually used for referring to them (Tseng, 2002). Information Technology is an intermediary that provides the possibility of expressing a wide range of information, ideas, concepts and messages. This phenomenon has different definitions due to its different characteristics. In a broad definition, information technology refers to a set of tools and methods for collecting, storing, retrieving, processing and distributing information in different forms. The term IT can be examined from two perspectives. In the first perspective, the term IT is used for describing the tools that help us in capturing, storing, processing, marketing, transmitting and receiving information. In the second perspective, IT refers to a set of tools and methods that provide the possibility of producing, processing and presenting information to users (Khalifa and Liu, 2003). One of the important features of the phenomenon of Information and Communications Technology is that it facilitates and enhances the relationship between man and man, as well as between man and the environment. In educational systems, Information and Communications Technology has a major role in transferring knowledge due to its ability to communicate dynamically with learners (Khalifa and Liu, 2003). With regard to the complexities of human life in today's world, the power of having knowledge depends on the employment of modern communication systems for achieving access to knowledge in the contemporary era (Merrewij, 1998).

Information Technology and Knowledge Management

Information Technology plays a crucial role in the success or failure of a knowledge management system (Johannessen, et al, 2001). The highest importance and value of Information Technology in knowledge management is that it helps to further develop the organization's domain of knowledge and increase the speed of knowledge transfer. In addition, Information Technology has a significant presence in the process of integrating existing knowledge and creating new knowledge (Ruiz-Mercader et al, 2006).

Information Technology Components

Information Technology is assessed in this study with three components: information systems, information acquisition processes, and information management, which will be explained one by one shortly.

Information System: Information systems are systems that provide information to users in an organization. Some authors consider the information system as a "system" - as the name itself suggests - and have defined it from a systematic perspective. They believe that an information system can be technically defined as a set of interrelated components that collect, process, store and distribute infor-

mation in order to support organizational decision making and control processes. Basically, information systems make up the heart of most organizations. In the information system, as in any other system, three main activities are performed. The input collects raw data from within or outside the organization. Processing converts inputs into meaningful data. The output presents processed data to users.

Feedback is essential in information systems. Feedback returns information to the right people at the organization so that they can evaluate or correct the input stage (Laudon, 2000).

Information acquisition processes

Data are a collection of separate realities about incidents and events. All organizations need data while some industries are heavily dependent on it. In such cases, recording, keeping, and managing data are essential to their success. Data only express what has happened and do not provide any judgment or explanation. On the contrary, information comprises messages that are usually in the form of a paper or audio-visual document. Unlike data, information has meaning. In fact, data turn to information when they become significant and meaningful. Knowledge is a mixture of experiences, quantities and information with a regular texture and provides a framework for evaluating, integrating and coordinating information and experiences. Knowledge is one step ahead of data. Certainly, data are all around us whether we want it or not. The art of management is to turn data into information by making them meaningful. Information acquisition processes like knowledge acquisition processes include: capturing, storing, processing, transferring and sharing (ibid.).

Information Technology Management

In recent years, information technology costs have increased in organizations all over the world, whether small or large, service or manufacturing, profit or non-profit. The costs of office automation and production automation - including computers, packaged applications, need-based software development, communications, computer networks and the Internet - are considered investments and are usually conducted to develop effectiveness, improve efficiency, and finally maintain and improve an organization's competitive position. Unfortunately, not all investments in information technology do lead to expected results. This fact, together with the rapid pace of change and obsolescence in information technology in the dimensions of hardware and software platforms, obliges organizations to consider long-term planning in information technology management (Gandhi, 2004).

Peirovi (2007) conducted a study titled "knowledge management system design using multifactorial systems technology". The purpose of this research was to design a system for tacit knowledge management in organizations. Therefore, a multifactorial system was designed and implemented for "professional peer" groups. Peirovi argues that according to the results, the proposed system can serve as a complementary knowledge management system in large organizations to facilitate the transfer and sharing of tacit knowledge among the staff. Furthermore, the system can support communication between professional peer members with a more accurate and convenient search (Peirovi, 2007).

Jalali et al, (2007) conducted a study titles "Designing and Implementing the Comprehensive System of Knowledge Management Software in the Islamic Republic of Iran, Ministry of Road and Transportation". The mentioned system was a web based software system which was composed of the subsystems of knowledge cycle, knowledge evaluation, examination cycle, knowledge map, knowledge packaging, and financial rewards, reporting to administrators, dynamic linking and organizational documents. Two models were uses to design this system: Nonaka & Takeuchi, and Foundations of Knowledge Building.

Niazazari, and Amooee (2007), in a study titled "factors affecting the implementation of knowledge management in branches of Islamic Azad University, Mazandaran Province," concluded that Information Technology is an important factor that influences the implementation of knowledge management whereas organizational culture, organizational learning and human resources, despite their importance, do not have an impact on knowledge management.

Saedi and Nadalipour (2006) conducted a study titled "implementation of the knowledge management model in Iran Khodro Co. based on learning- and resource-oriented approach to the company in the platform of Information Technology". They concluded that, by using the five-stage model of development including Emergence (appearance), Enhancement (Development), Interaction, Transaction (exchange) and Integration (unification), they will be able to develop knowledge management in an organization with the purpose of creating competitive advantage. Also, they concluded that, by relying

on and promoting the resources, core capabilities and competencies of an organization, they will be able to develop knowledge management in the context of learning and information technology (Saedi and Nadalipour, 2006).

Shaemi Barzaki (2005) in a study titled "Information Technology and Knowledge Management" came to the conclusion that information technology, as one of the main criteria for knowledge management, provides the structural capacity for knowledge management by supporting knowledge activities such as the creation, dissemination and application of knowledge. He also concluded that information technology increases the level of success in organizational strategies as a catalyzing and accelerating agent (Shaemi Barzaki, 2005).

Tseng and Shu-Mei (2008), in a study titled "the effects of information technology on knowledge management systems," concluded that Information Technology plays a pivotal role in determining the success or failure of knowledge management. In other words, the development of knowledge management is highly dependent on information and communications technology and it is only through the advancement of information technology that we can accelerate the progress of knowledge management (Tseng, 2008).

Yang (2007), in a study titled "developing a knowledge map for construction scheduling using a novel approach" concluded that the most important problem in the development of management in construction companies is the formulation and formation of a certain strategy.

That is why they managed to convert tacit knowledge into explicit knowledge by using the knowledge map and browser software method (Yang, 2007).

Hung et al. (2007) conducted a research on key success factors in the implementation of a knowledge management system for the pharmaceutical industry. In this study, seven factors were identified for the success of the knowledge management system, including: 1) Benchmarking strategies and effective knowledge structure, 2) organizational culture, 3) the information system infrastructure, 4) involvement and training, 5) leadership and strong commitment by the senior manager 6) learning environment and resources control, and 7) vocational training and teamwork evaluation (Hung et al., 2007).

Bhatt (2001), in research titled "knowledge management in organization: examining the interaction between technologies, techniques and people," concluded that organizations should quickly create a balance in knowledge management related activities in order to use knowledge. Generally, maintaining such balance requires changes in organizational culture, technologies and techniques. Some organizations believe that knowledge can be managed with an exclusive focus on people, technologies and techniques. An exclusive focus on these three factors is not what helps organizations to remain competitive; rather it is interaction between these factors that effectively empowers organizations in the management of their knowledge. By creating a dynamic and educational work environment, organizations can maintain their competitive progress. The pattern of interaction between people, technologies and techniques in an organization can gradually alter only after making changes in the organizational culture. When the environment is dynamic and complex, it is essential for organizations to continuously use new knowledge by creating, validating and applying it in their products and services. The use of technology leads to individual productivity and information integrity within the organization. As a result, social systems interpret data by providing different perspectives on the same subject. Research findings by Bhatt show that the main obstacle to the implementation of knowledge management is cultural and managerial factors (Bhatt, 2001).

Research Model

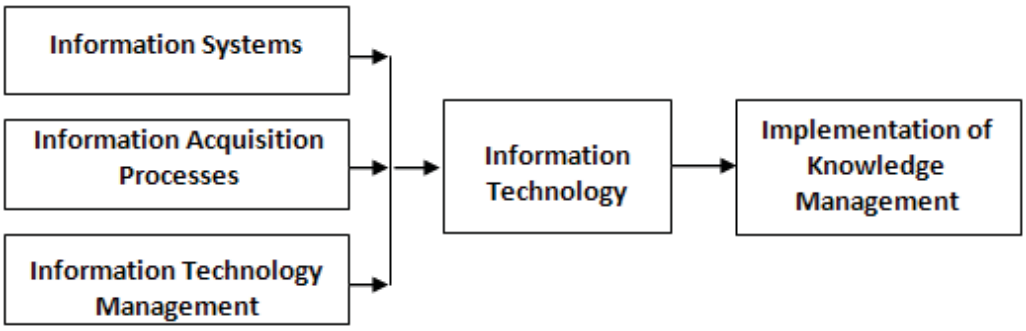

Figure 1. Research Model

Information Technology Tools for Knowledge Management

Knowledge inputs: The starting point of interaction in knowledge management and information technology is knowledge collection tools. These inputs include: scanners, microphones, hard drives and search tools.

Databases: Databases contain basic information like information relating to suppliers, products, sales, customers and so on.

Results: This tool works as an intermediary for gaining access to knowledge bases and has a very important role in knowledge management systems. Search engines provide the possibility of information classification, website ranking and more, and increase the speed and accuracy of knowledge transfer.

Electronic Document Management System (EDMS)

A large portion of important organizational information is stored in and protected by this system. Electronic magazines, the Internet, and the Extranet are among the most important means of electronic communication. In addition, the web also has a major role in the dissemination of knowledge.

Electronic Bulletin Boards

All employees can put their messages on Electronic Bulletin Boards. EBB's are also an important tool for converting tacit knowledge into explicit knowledge (Jensen, 2005).

The advantages of using information technology in education

Creating equal learning opportunities: As emphasized in science education standards: Although we have recommended that learners assume the greater responsibility for learning according to past standards, it is basically and legally the duty and responsibility of teachers, planners and managers. The system and the teacher must provide learning opportunities for knowledge learners to expect academic achievement. The objective is to create equal learning opportunities by using new technologies.

Achieving high levels of thinking: The use of information technology in the world outside the four walls of the classroom motivates learners towards problem solving and decision making. There are websites that teach different skills of high-level thinking such as creativity, problem solving, comparing and contrasting, and evaluating. If these skills are accompanied by the guidance of skilled teachers, they can lead to the achievement of high levels of thinking (Tileston, 2006).

Learning more, faster and more efficiently: Learning using visual methods is easier for learners because the brain is familiar with visual and practical methods. So, this mode of learning causes the learner to learn more comprehensively. This method also increases the speed of learning and removes some restrictions relating to the time and space of learning.

Creating memorization patterns using visual and auditory stimuli: Learning by words and pictures simultaneously is more effective than learning merely by words. The simultaneous presentation of pictures and animations with speech gives learners the opportunity to develop conceptually verbal and visual models and make associations between them (Meyer, 2005).

Reducing learner discipline problems: We are unsatisfied with the weak performance of our students in science and mathematics but we still present these main courses in the form of lectures. Today, many children by the age of three can watch their favorite programs by themselves using videotapes and DVD's. So, it is no wonder that such people deprived of even minimum facilities during school and college years cannot rest. Such "visual learners" have to receive information visually (Tileston, 2006).

Encouraging and motivating learners: Computer programs, especially multimedia software, are very attractive. This attractiveness can be used to create and maintain learners' motivation in learning. Interactions and dynamics, which are the main properties of standard and appropriate computer programs, like active teaching methods, drive the learner from a merely passive field into the world of action and motivate the learner towards learning.

Moving beyond classroom boundaries and establishing relations with other nations: Using the internet, teachers are able to move beyond classroom boundaries in the blink of an eye, connect with other teachers, and use various sources of information inside and outside the country and take learners with them on this inexpensive journey.

Having access to stationary sources of information: Stationary sources make up the most common use of the Internet for finding required resources in teaching. Stationary sources refer to data that are stored on and retrieved from the Internet statically (Zoofan and Lotfipour, 2000).

Materials and Methods

In this paper, we assess the role and importance of Information Technology in the establishment of knowledge management in training and education by using descriptive methods, documentation, and review of the results obtained from other studies and articles in electronic research databases and library resources. This article is derived from the Corresponding Author's MA thesis in the field of educational administration.

Discussion and conclusions

In the view of the transition from an industrial society to a knowledge-based society, we have recently been witnessing an increasing focus on knowledge as one of the most important organizational resources. The focus on knowledge, in turn, has led to a growing attention to Information Technology as one of the most important sources of competitive advantage (Johansen et al., 2001). Knowledge management is not the simple task of storing, retrieving and transmitting information; rather, it is the interpretation and organization of information from different directions. The use of technology leads to information efficiency and integrity inside the organization. As a result, social systems interpret data by providing different perspectives on the same subject. Knowledge management is the conscious process of creating, validating, presenting, distributing, and applying knowledge. There are two main approaches in knowledge management that information technology can support: development and customization. In the development method, structured and explicit knowledge is collected and stored in the knowledge base. The main role of information technology here is to help people share knowledge through a shared storage. In the customization approach, often unstructured and tacit knowledge is shared mainly through direct communication in person. The role of information technology here is to help people find each other and establish communication so that the transfer of complex knowledge is carried out in the best possible way (Kankanhalli et al, 2003).

Recommendations of the study

- Developing information systems: providing appropriate information systems for creating, storing, transmitting and exchanging knowledge.
- Developing information acquisition processes: providing software banks including information relating to knowledge producers, knowledge resources and knowledge users, and presenting them to the public.
- Developing Information Technology management: Creating an electronic knowledge database in organizations so that individuals can share their tacit knowledge through e-mail, discussion groups, chat rooms, and audio-video conferencing without the need for face to face communication.

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