Evolving Use of Knowledge Management for Mobile Interactive E-Learning Systems

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Abstract Wireless technology has been increasingly used to access the interactive e-learning website. Mobile learning is getting the attention these days as the next wave of learning. However, evolving use of knowledge management plays an important role to enhance a learner's ability for problem solving. More recently, there are no relatively approaches to incorporate the conception of knowledge management into teaching activities. This paper proposes the framework of mobile interactive e-learning system based on use of knowledge management that allows learners to capture, store, share, apply and create knowledge.

Key-Words: Interactive e-learning, Knowledge management, Mobile learning, Performance Evaluation

1 Introduction

The wireless technology has gained much popularity recently because it can satisfy information needs at any time and anyplace. Rapid advances in computer hardware and wireless communication technology led to the development of distance learning systems. Using such devices as cell phones, personal digital assistants and laptops with built-in wireless cards, transactional or information retrieval tasks can be come true when people are away from office and would otherwise be unable to access the system. The knowledge economy is the foundation of the 21st century and knowledge management will be the trend of the future, with information technology education a powerful tool for the citizens of this century. The core of the economy is knowledge as well as its sharing, integration, management and creation. This revolution in knowledge is now the driving force behind future competition. Against this background, for learners to become a knowledge worker they must develop the ability to collect and filter data for problem solving. If the knowledge management concept can be incorporated during the learning process, the combined approach should be useful in training and enhancing a learner's ability to manage knowledge and process data. However, previous approaches for knowledge management focus on business applicability rather than to education [1-2, 6-7]. Consequently, this paper presents the framework of mobile interactive e-learning systems based on use of knowledge management that allows learners to capture, store, share, apply and create knowledge. The experiments were carried out the system performance using a cell pone-size, handled computer-sized and conventional desktop interface. With all three interfaces, learners succeed in completing a task by way of knowledge management learning model.

The Design Issue of Mobile Interactive E-learning System

The types of typical web-based learning systems discussed are mostly multimedia rich transformation and function embedded focused [5]. In contrast, web-based learning system to the interactivity process, multiple platforms environment, learner mobility and

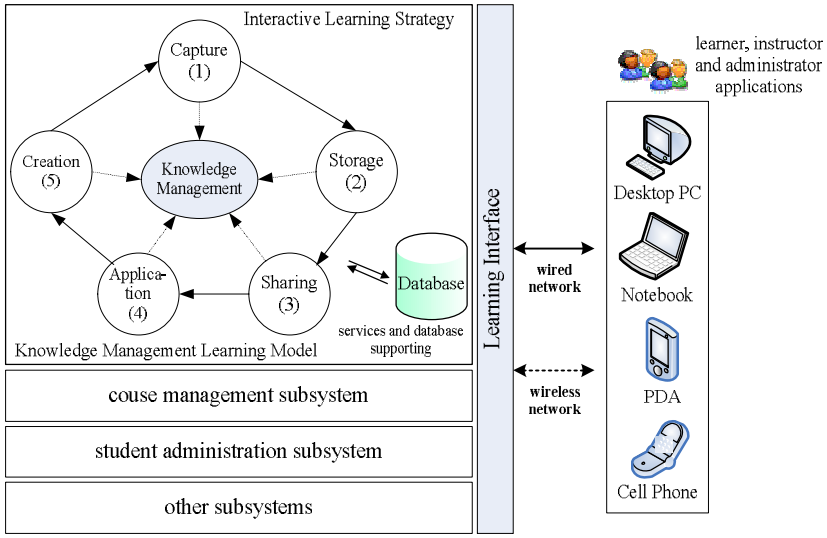

Fig. 1. The high level architecture of mobile interactive e-learning system based on use of knowledge management

satisfactory learning experience have yet to be researched extensively. The failures in providing multiple platform environments, the traditional web-based learning systems are also very static presentations. It delivers identical content regardless of learner conditions such as need, environment and communication condition. The characteristics for mobile users are not considered. From a mobility perspective, mobile learner is different from desktop learner. One of the unique characteristics of a mobile learner is the urgency of learning need (Chen et al., 2002). With increasing mobility, learning environment could be anywhere, such as a café, camping ground, a train or bus. The mobility of learning setting should be designed in the development phase.

The mobile interactive e-learning approach evolved out of our frustration with trying to develop the mobile e-learning system using what was then available to us. These are included dreamweaver design, php programming, flash presentation, and XOOPS website packages. The adaptation framework illustrated in Fig. 1 identified three core dimensions: interaction dimension, learner dimension and connectivity dimension [3].

I Interaction dimension

The purposefully interactive learning strategy in a specific can increase the learner's knowledge, motivation and learning experiences [8-9]. Through an investigative study into the various different types of interactive learning strategy early, it was decided that there would be three distinctly different types of strategies what will be employed on mobile interactive e-learning systems. They are concept pages, tutorial simulation and case studies [4]. Each strategy differs in the degree of interactivity.

The concept pages describe a certain technology in greater detail through hypermedia references. These pages give the user a general view, technical information, enlightening idea and useful tips about a certain topic area. The tutorial simulations offer a noticeable increase in interactivity as compared to the concept pages. The simulation were developed using Macromedia Flash technology. Each tutorial consists of several objectives, in each objective there are several goals that the users have to achieve. Case studies were used because they offer a good opportunity to show real world

application of the topic in question. Some studies found that learners who interacted regularly with their instructor and other learners were more motivated and had better learning experiences.

- Learner dimension
  The learner dimension includes attributes such as score, time taken, preferred difficulty level, learning style, learning equipment, date of last access and so on, depending on the learner profile. In particular, emphasis is given to the use of a database on the web server. The design and development of back-end database system incorporates learner tracking and logging of historical data for future analysis.
- Connectivity dimension
  Connectivity dimension consists of the two operating model, which are real-time on-line model and off-line asynchronous model. Here device capability, network reliability, connecting type and the attributes of depth and encrypted cookies are the main consideration for adaptation.

Knowledge Management Learning Model

Many Studies have been written about the operations and nature of knowledge management. Beckman believed that knowledge management should consist of 8 main steps: "identify, capture, select, store, share, apply, create and sell" [2]; Allee pointed out that the knowledge management process involves four levels: capture, sharing, application and creation [1]; Maryam and Dorothy proposed that the knowledge management process should include knowledge's creation, storage, conversion and application [7]. Taking the above proposals into account, this study defined the knowledge management process as involving five parts: capture, storage, sharing, application and creation. This was then used as the basis for study. Each concept and its operation are explained below and showed in Fig. 1.:

1. Capture: Knowledge is classified as tacit knowledge or explicit knowledge. Tacit knowledge refers to subjective actual knowledge that can't be expressed through language, such as insights and study tips during the learning process. These are closely linked to the individual subjective experience and are hard to transmit in a concrete manner; explicit knowledge is the opposite, being objective information that can be transmitted through words or writing. This may include research reports and technical documents that can be directly captured to be learned from. Though tacit knowledge is harder to disseminate and share, if it can be converted into explicit knowledge then this will make the knowledge easier to capture and share.
2. Storage: The main purpose of knowledge storage is to classify and collate all of an individual or organization's past information and experiences into useful knowledge. This is then stored within the organization in a systematic manner and regularly updated. The knowledge is not lost from the organization's assets but can also be reused by the organization members in the future, enhancing the organization's efficiency and facilitating the creation of new knowledge.
3. Sharing: Knowledge sharing refers to how an organization's employees and office staff use all kinds of channels (such as discussions, meeting networks, and knowledge banks) within or between organizations to share and discuss knowledge. Through the exchange of knowledge its value can be increased through more widespread use and creation of synergies in knowledge. The key here is that, through the process of sharing, knowledge is fully utilized to achieve maximum returns, energizing the individual or organization's growth.
4. Application: If knowledge is to be successfully transferred and applied, it must first be transmitted through the appropriate channels to the proper

person. The recipient of the knowledge must be willing and able to accept and absorb that knowledge then apply it correctly and effectively to help the organization realize the knowledge's value.

5. Creation: The creation of knowledge is a process of cumulative learning. Aspects such as acceptance, attitude and behavior, cause the individual, group or the organization to change. Be it the creation of an innovative breakthrough or a clever and innovative combination of existing knowledge, these all serve to break down the old boundaries and create new knowledge

Conclusions

In this paper, the framework of mobile interactive e-learning system based evolving use of knowledge management was proposed. It can allow learners to capture, store, share, apply and create knowledge. The experiments were carried out the system performance using a cell pone-size, handled computer-sized and conventional desktop interface. With all three interfaces, learners succeed in completing a task by way of knowledge management learning model. The experiment results demonstrate that the system delivers good performance when learners use the different mobile device.

Mobile interactive e-learning systems allowed learners to share knowledge and learn collaboratively through an online sharing and communication platform. This was considered to be beneficial to the sharing, application and creation of knowledge. The first was for more depth and variety to the teaching material content such as related information or website links. The second part was a preference for more animations and graphics as the teaching material used this time was mainly text with static images. Learners wanted more related animations or video content so the teaching material could be more lively and interesting to learners.

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