INTRODUCTION

Knowledge management (KM) has been investigated for many years but was not introduced into project management and project-based organizations until recently (Kasvi et al., 2003; Van Donk & Riezebos, 2005). Although the many features of a project (such as limited time and resources, stress, high complexity, or a new team) make it particularly suitable for learning (Schindler & Eppler, 2003), a project’s resources are limited, especially time, which is so important that it is rarely spent on learning. The return on investment (ROI) of learning is also not obvious (Ayas, 1996). Regarding the required equipment resources, Carayannis (1998) posited that successful project learning is usually low-tech. In other words, project learning does not require expensive equipment resources. In addition, Ayas (1996) mentioned that the best method of project learning is to facilitate contact between project members, and therefore project members should work in the same place if possible.

Summarizing the views above, how to make proper arrangements of the project members’ limited time to conduct joint studies and to enhance the performance of project learning is an important issue. This study is devoted to the planning of learning activities in a project.

ABSTRACT

Numerous difficulties and problems are associated with learning in a project. To tackle these problems, in this paper, an integrated project management model is constructed for facilitating knowledge learning. First, the depth of a professional or management skill is defined and evaluated using the analytic hierarchical procedure. A project cannot start until the depth of every necessary skill reaches a certain level. There is also stepwise increase in the scores of successive projects. A systematic procedure composed of fifteen steps is then embedded in the system to facilitate project learning. The proposed methodology is applied to the development of an e-commerce application system.

Keywords: Analytical Hierarchy Processing, Data Mining, Knowledge Management, Project Management, Project Learning
Research or practice in this area has the following problems:

(1) As mentioned previously, KM has not been imported into and linked to project management and project-based organizations until recently, so relevant literature is still lacking (Van Donk & Riezebos, 2005; Turner, 2005).

(2) Some studies emphasized the importance of project learning, such as Ayas (1997) and others stressed the importance of within-project studying for follow-up projects (i.e., the knowledge transfer between projects). Turner (2005) also mentioned the importance of a pilot study in project management, but none of the previous studies discussed how to conduct project learning.

(3) Some studies (e.g., Nonaka & Takeuchi, 1995; Kamara et al., 2002) emphasized the development of an appropriate project environment in order to stimulate knowledge development, but did not discuss how to measure knowledge and therefore could not accurately measure the effects of knowledge development.

(4) Some studies (such as Ayas, 1996, 1997) proposed a framework for specifying the management of project knowledge (including the sources, storage, and sharing of project knowledge), or followed this architecture to construct an information and expert system (Damm & Schindler, 2002). However, when to provide or share project knowledge was not discussed. Biggs and Smith (2003) said, “Under what kind of conditions that some of the ideas were learned, rather than the other, is in fact not clear.” As a result, it will be unable to assess and promote the efficiency of project learning. In addition, the function of these information systems is often limited to file sharing (Park et al., 1999), and cannot promote learning. Therefore, the object of management is only knowledge that can be easily documented. In fact, a project organization will always make the same mistakes repeatedly, even if the project knowledge library already has a number of related experiences or improvements (Biggs & Smith, 2003). One reason is that some people are not willing to learn from the experience or failure of others.

(5) The existing project learning models often focused on the supply side of knowledge—that is, how to enrich the project’s knowledge base to provide references to follow-up projects (Ayas, 1996, 1997; Damm & Schindler, 2002)—and less on the demand side of knowledge. This approach not only causes the project’s knowledge base to be full of knowledge that will not be referenced, but also increases the burden on the project team. For example, the project members were asked to fill in many of the “learning experiences (lessons learned)” forms as the source of project knowledge.

(6) As some project members keep coming and going, their learning experiences may not be able to remain when the project is completed or reviewed (Kasvi et al., 2003). Consultants from outside the company usually will not pass on their knowledge or experience, unless the companies pay an additional fee (Schindler & Eppler, 2003). In addition, some members of the project may not be willing to pass on their experiences, perhaps due to false modesty or fear of being penalized for communicating incorrect information.

(7) Many learned experiences in project execution cannot be remembered at the end of the project—the so-called project amnesia (Schindler & Eppler, 2003)—let alone applied to the next project.

To solve these problems, treatments are conducted in this study:

(1) Quantitative indicators are proposed to measure the depth of the project knowledge: First, the “project maturity score” or “project and program competency assessment tool (PCAT) score” is used for this purpose. In addition, the depth of profes-
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