Knowledge Management Model and Design for Schools: GAMO

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Abstract: Some of knowledge management (KM) models have been applied successfully for business but few cases in education aspect. Since the characteristics of educational organizations are different from business that engaged in making profit. The knowledge management models for business cannot be transferred completely to schools. Therefore, to draw up an operational model of knowledge management and accelerate the participation for teachers is a very important issue for schools. This study proposes a knowledge management structure with a spiral operation model - GAMO (generation, application, modification, and organization) - for teachers to operate their practical knowledge. A web-based system IPPI also established to support instructional planning, practice, and introspection to let teachers externalize and manage their professional knowledge about the instructions.

Introduction

In recent years, most of the large-scale enterprises intended to reorganize their organization to be knowledge based, and adopted the knowledge management strategies to operate the intellectual capital. In educational aspect, school is a fulcrum point for educational and societal change. To create school that learns is very important mission with the pace of change accelerating (Senge, 2000). The characteristics of educational organizations are different from the business firms, such as the organizational objective, process, culture, and customers. The knowledge management models can not be completely transferred and applied from general firms to schools. We have to rethink the requirements from the main core knowledge in educational organization. That should be the instructional knowledge. Many researchers had indicated the importance of instructional design (ID) in educational organizations, and developed various ID tools to support these complex tasks and activities (van Merriënboer, 2002; Spector & Edmonds, 2002; Neiveen & van dan Akker, 1999). Besides, the knowledge management system (KMS) for ID is a new direction to facilitate the multiple individuals working on different aspects at different times and perhaps in different locations (Spector, 2002; Spector & Edmonds, 2002; Plass & Salisbury, 2002). But KMSs for schools are not only constructed by providing diverse tools to support communication, coordination, collaboration and control for instructional developers, but also put the concentration on most of the teachers. Sometimes we perceive these elaborative systems are dedicated to the ID experts, and can not be disseminated and popularized for all teachers. Therefore, the authors believe that we should put the emphasis on the operations of practical knowledge such as the knowledge generation, application, modification and organization. Furthermore, the objectives of personal knowledge management and professional growth of a teacher also need to be connected and in harmony with the school-based knowledge management.

The authors had developed an authoring system for teachers instructional planning, named IPASS (Instructional Planning Assistant SyStem), in 2002 (Liu & Juang, 2002). Based on this system, this study further developed a knowledge management structure with a spiral operation model which consists of knowledge generation, application, modification, and organization (GAMO) and built a system of instructional planning, practice, and introspection (IPPI).
to motivate teachers to share knowledge. The following sections will present the details of the structure with GAMO model and IPPI system.

**Knowledge Management with GAMO Model**

Since knowledge generation usually happens during the instructional planning and practicing. The innovations and feedbacks are also generated for further knowledge modification. Besides, even the instructional knowledge has been externalized and stored to knowledge base, yet they still need to be organized appropriately for reuse and sharing in organizations. In short, a KMS should provide the fundamental tools to support knowledge operations of generation, application, modification and organization. Therefore, this study proposes a practical model of teacher’s professional knowledge management that has three parts: vision, enablers, and operating steps (figure 1).

![Figure 1. The concept diagram of knowledge management structure with GAMO operation model](image)

**Vision**

Peter Senge (2000) indicated that learning is driven by vision. Improving the test scores and providing safe learning spaces are legitimate goals, but they cannot replace the power of a larger vision, personal and shared, as the driving force behind improving schools. Therefore, the essentials of school’s vision may be concerned about student’s capability and behavior, teacher’s professionalism, and school’s development.

**Enablers**

The enablers are the driving force to the spiral of knowledge operating steps described in next subsection. By referring to the concept of O’Dell and Grayson (1998), there are four enablers which are the culture, information technology, infrastructure, and measurement. The original idea about the four enablers comes from the application on enterprises. The authors try to give them new explanations to fit in schools. The culture indicates the tendency of sharing knowledge. Teachers are encouraged to share their professional knowledge through a reward or assessment system. Then, the next enabler takes advantage of culture to apply information technology to support the knowledge operation. Finally, by using the analytic tools of knowledge management to measure the effects and what has been changed, all of the staves can see the advantages and disadvantages that give them a chance of introspection.

**Operating steps (GAMO)**

O’Dell & Grayson (1998) proposed the steps in the knowledge transfer process, which consists of creation, identification, collection, organization, sharing, adaptation, and use. With the perspective of learning and instruction in educational organization, it is more practical to modify them to the knowledge operations since knowledge is usually generated by using in practical activities of instruction. And teachers can go on from any operation step to contribute or acquire knowledge. So, the operations of knowledge management can be divided into four spiral steps, which are the knowledge generation, application, modification, and organization (GAMO). The four operating steps are processed cyclically and turn upward gradually as the spiral surrounded the organizational vision.

*Knowledge Generation:* The first step refers to externalize the tacit knowledge hidden in everyone’s mind. The practical and effective methods to advance this step can be considered as organizing various learning communities...
for group thinking, establishing a networked knowledge creating tool or system that can access it anytime and anywhere, and providing both tangible and spiritual reward to encourage them.

Knowledge Application: The valuable knowledge generated by the previous step should be passed through the practical test so that it can make a good impact on teachers and school.

Knowledge Modification: The mature and usable knowledge is usually modified for many times, so it can be applied and disseminated for a long time. This step will be processed through many times of discussions and sometimes back to previous step for test, so that the essential part of knowledge can be extracted and accumulated through each time.

Knowledge Organization: A lot of fragmental knowledge generated by the above three steps should be reassembled and organized by an integral view of school-based knowledge. Educators need to search and collect the externalized knowledge, and then knowledge management committee or the school development committee is responsible to integrate and contrast the valuable knowledge from school’s view, and make decisions about school development.

Knowledge Management System for Instructional Planning, Practice, and Introspection

By referring to the GAMO model, the authors attempt to create a knowledge management system by referring the GAMO model. A web-based system is built for teachers to operate the instructional planning, practice, and introspection (IPPI, see figure 2). There are four module matched the GAMO model in IPPI, and the provided functions will be described in subsections.

**Generation Module**

The knowledge generation module is built based on the IPASS system (Liu & Juang, 2002) and have some extensions which consist of authoring tools for instructional planning and material. The featured functions are: 1) template and object oriented tool for instructional design, 2) quoting related plan, 3) learning package arrangement tool, 4) co-design studio, and teaching resources management tool.

**Application Module**

A finished instructional plan or material should be practiced in the real world in order to evaluate the merit and defect. The application module mainly provides two practicing styles which are the materials player used in classroom and student on-line learning used before or after class. The *Materials player with teaching notebook* will arrange the display steps and give related instruction hits for teachers. Teacher can record some of the discoveries about instruction to teaching notebook (database) for further reference of modifying the plan or materials. Students can preview or review the learning materials provided by teachers on the “Student’s on-line Learning System.”

![Figure 2. The system module diagram of IPPI](image-url)

**Figure 2. The system module diagram of IPPI**

**Modification Module**

The knowledge generation module is built based on the IPASS system (Liu & Juang, 2002) and have some extensions which consist of authoring tools for instructional planning and material. The featured functions are: 1) template and object oriented tool for instructional design, 2) quoting related plan, 3) learning package arrangement tool, 4) co-design studio, and teaching resources management tool.
Modification Module

After the application of instructional plan and materials, the modification module embedded in authoring tools provides appropriate information for teacher introspection to modify their plans or materials. The appropriate information may be the assessment checklist from self, other teachers, or experts if authors agree to publish the instructional plans or materials, the students’ portfolio from the student’s on-line learning system, and teaching notebook from the materials player.

Organization Module

By referring figure 2, we can observe a circulation of knowledge generation, application, and modification, and some high quality content may be generated and need to be filtered out and reserved in instructional knowledge repository. The organization module is built by applying the concept of web journal system like the operation of academic periodical publication. Teachers can submit the instructional plans or materials to any domain of journals he interests in and will be reviewed by peers. Each contribution will be reviewed by two or three members of the journal’s editorial board, and periodically publishes on web. Besides, the curriculum committee can use school based function in organization module to develop school based curriculum.

Conclusion

When most enterprises are going to adopt vigorous measures of leading in knowledge management, we should turn the view to think about the operations in schools. Although some famous commercialized KMS products have been applied successfully in many enterprises, yet there are many different features and requirements about KM in educational organizations. The authors propose a knowledge management structure with spiral operation model GAMO for a reference. Since the instructional knowledge is the core knowledge in school, we apply this model to design a web-based system IPPI for teacher’s knowledge management. This system relies on three activities of instructional planning, practice, and introspection and provides a networked framework to assist teachers’ knowledge generation, application, modification, and organization (GAMO). It is more comfortable for knowledge management in schools rather than condescendingly use unsuitable model for enterprises.

References


