

# Knowledge Management in Technology Education

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## **Abstract**

Knowledge Management (KM) principles recognize that it is important for organizations to "know what they know." Are the concepts of knowledge management (KM) applicable to colleges and universities? All institutions inherently store, access, and deliver knowledge in some manner and educational institutions are no exception. However, although some examples exist, the use of KM in education is the exception rather than the rule. Knowledge management is a new field, and experiments are just beginning in education. This short paper explores how KM practices might be useful in a technology education setting.

## **1. Introduction**

Most organisations realise that “knowledge” is a strategic resource that gives them sustainable competitive advantage [Drucker] and helps them achieve long-term organisational goals. With the realization that knowledge is a core resource, organisations are now attempting to manage knowledge in a more systematic and more effective way. Knowledge Management is being gainfully used by organisations in leveraging knowledge to spur innovation, improve customer service, or achieve operational excellence.

Education today is subject to the same pressures of the marketplace. According to Brown and [Brown and Duguid], profound changes in competition have made universities and higher education institutions think like business. The educational markets are becoming global as universities attempt to internationalise their curricula and offer high quality programs to students regardless of location. Universities also have to adjust themselves and develop strategies to respond rapidly to the changes in technologies and increasing demands of stakeholders. Many have turned to a new paradigm that merges conventional distance education with computer and telecommunication technologies: “online distance education”.

Many authors have expressed their enthusiasm for introducing KM practices into the field of education. Higher education institutions have "significant opportunities to apply knowledge management practices to support every part of their mission," explains [Kidwell et al]. The problem is that it is such a "wide open area of study that it is difficult to understand the implications of knowledge management for an educational setting" [Thorn].

In the rest of the paper we provide some background information on Knowledge Management principles and practices and then go on to explore how KM may be useful in an educational setting.

## 2. Knowledge Management

### 2.1 Knowledge

What is knowledge? Knowledge starts as *data*—raw facts and numbers—for example, the market value of an institution’s endowment. *Information* is data put into context—in the same example, the endowment per student at a particular institution. Information is readily captured in documents or in databases; even large amounts are fairly easy to retrieve with modern information technology systems.

Before acting on information, however, we need to take one more step. Only when information is combined with experience and judgment does it become *knowledge*. Knowledge can be highly subjective and hard to codify. It includes the insight and wisdom of employees. It may be shared through emailed “best practices” memos or even sticky notes on a cubicle wall. And once we have knowledge, we can put it to work and apply it to decision making.

A popular framework for thinking about knowledge proposes two main types of knowledge: *explicit* and *tacit* [Polyani]. Explicit knowledge is documented information that can facilitate action. It can be expressed in formal, shared language. Examples include formulas, equations, rules, and best practices.

Explicit knowledge is:

- Packaged
- Easily codified
- Communicable
- Transferable

Tacit knowledge is know-how and learning embedded within the minds of the people in an organization. It involves perceptions, insights, experiences, and craftsmanship. Tacit knowledge is:

- Personal
- Context-specific
- Difficult to formalize
- Difficult to communicate
- More difficult to transfer

Most business actions require the guidance of both explicit and tacit knowledge.

How does knowledge work in organizations? Knowledge originates in individuals, but it is embodied in teams and organizations. In an organization, examples of explicit knowledge are strategies, methodologies, processes, patents, products, and services. Examples of tacit knowledge in an organizational context are skills and competencies, experiences, relationships within and outside the organization, individual beliefs and values, and ideas.

Knowledge also is embedded in work processes, and it exists in all core functions of an organization as well as in its systems and infrastructure. Effective knowledge management programs identify and leverage the know-how embedded in work, with a focus on how it will be applied. The challenge in knowledge management is to make the *right* knowledge available to the *right* people at the *right* time.

## 2.2 Knowledge Management

The term “Knowledge Management” (KM) is used to describe everything from the application of new technology to the harnessing of the intellectual capital of an organisation [Sallis and Jones]. It is not one single discipline; rather, it is an integration of numerous endeavours and fields of study. [Rowley] describes the term KM as follows:

*“Knowledge management is concerned with the exploitation and development of the knowledge assets of an organisation with a view to furthering the organisation’s objectives. The knowledge to be managed includes both explicit, documented knowledge, and tacit, subjective knowledge. Management entails all of those processes associated with the identification, sharing, and creation of knowledge. This requires systems for the creation and maintenance of knowledge repositories, and to cultivate and facilitate the sharing of knowledge and organisational learning. Organisations that succeed in knowledge management are likely to view knowledge as an asset and to develop organisational norms and values, which support the creation, and sharing of knowledge”*

In brief, KM is the management of processes that govern the creation, dissemination, and utilisation of knowledge by merging technologies, organisational structures and people to create the most effective learning, problem solving, and decision-making in an organisation.

In order to reap the benefits of KM, the two major aspects of *community* and *collaboration* will have to be put into practice:

**Community:** Community is a group of people bound together by certain mutual concerns, interests, activities, and institutions. From KM perspectives, the concept of communities is essential because knowledge in an organisation is often built up and generated by small, informal, self-organising network of practitioners [Senge]. In addition, the current advances in Information and Communication Technologies (ICT) also create new forms of setting in which people can communicate and share their knowledge across both geographical and temporal boundaries.

Community is also regarded as the model for dynamic, productive knowledge creation and sharing in education. [Lave & Wenger] argue that all learning involves enculturation in communities. Though the content may differ, the form of academic communities is much like other communities.

**Collaboration** : Most organisations realise that they will improve performance if their staff work together. However, building collaboration is not an easy task. KM practitioners apply many different approaches to develop the type of culture that builds the desire for teamwork and a collaborative working [Senge] [Nonaka & Takeuchi]. Techniques such as meetings, forums and discussions are used extensively to create knowledge through the processes of social interaction and collaboration. Tools such as e-mail and intranets are also used to encourage active collaboration among people in organisation.

Collaboration is one of the most critical issues in educational context, especially in online distance education where people and knowledge are distributed across time and space. A number of studies in education have examined the relationship between collaboration and learning [Dobos]. According to [Christiansen & Dirckinck-Holmfeld], collaboration is a way of overcoming two major problems in distance learning: the problem of accommodating to the academic discourse and the problem of becoming part of the academic community living at a distance.

### **3. Applying KM in Education**

Using knowledge management techniques and technologies in higher education is as vital as it is in the corporate sector. As public, private, and for profit higher education institutions alike respond to the phenomenal growth of online courses, cyber colleges, and virtual universities, these same reasons to adopt KM apply. It is with KM that colleges will be better able to increase student retention and graduation rates; retain a technology workforce in the face of severe employee shortages; expand new web based offerings; work to analyse the cost effective use of technology to meet more enrollment; transform existing transaction-based systems to provide information, not just data, for management; and compete in an environment where institutions cross state and national borders to meet student needs anytime/anywhere.

Consider the number of faculty and staff who possess institutional knowledge. For example, what institution does not have a faculty member who has led successful curriculum revision task forces? Or a educational administrator who knows how to navigate the complex proposal development or procurement processes? Or a researcher who has informal connections to the AICTE? Or a special assistant to the VC who has uncovered (or generated) useful reports that individual deans or department chairs could use to develop their own strategic plans? Relying on the institutional knowledge of unique individuals can hamper the flexibility and responsiveness of any organization. The challenge is to convert the information that currently resides in those individuals and make it widely and easily available to any faculty member, staff person, or other constituent. An institution-wide approach to knowledge management can lead to exponential improvements in sharing knowledge—both explicit and tacit— and the subsequent surge benefits.

Knowledge management applications could benefit a number of university processes and services including:

- The research process,
- Curriculum development process,
- Student and alumni services,
- Administrative services,
- Strategic planning process

### **3.1 Granting Body Case Study**

An educational grant giving needs to better reflect on and share the lessons it is learning about effectiveness: How can they learn from what has worked – or hasn't – from previous education grants and strategies? How can foundations and donors access knowledge about effective practices and use it in decision-making? How can they shorten the cycle from research and experimentation to practice and the marketplace?

With these questions in mind, the organisation may develop a web-based system to help grantmakers collect and share knowledge with each other about effective education philanthropy. This “knowledge management” initiative will help grantmakers identify expert resources, sift through information about different education strategies, and share experiences and insights into successful and failed philanthropic interventions in education systems.

The challenge facing such organisations isn't just how to share explicit knowledge about effective education strategies, although this is important. It also includes figuring out ways to capture the tacit or implicit knowledge and experience of organisation officers as they work with grantees, watch projects develop over time, and test different hypotheses. And it includes how to make sense of a burgeoning amount of data and conflicting research findings that are easily accessible through the internet.

The organisation plans to build a knowledge management system that helps foundations and grantmakers share information they can apply to their work and that captures evolving lessons from the field about effective education grantmaking. The KM system will focus on the following:

#### *What is – and isn't – working*

Grantmakers want more information on what isn't working and understanding lessons learned. They would like more access to evaluation results, both of successful and unsuccessful projects. They lamented both the unwillingness of many foundations to share information about failure and the amount of reinventing the wheel that takes place in education philanthropy.

#### *Networks*

Grantmakers placed high value on person-to-person connections as a source of learning. They would welcome a system that helped them find people working on common issues to share expertise.

#### *Measurement and assessment*

Grantmakers are looking for metrics and methods that help them evaluate the impact of their foundation as well as the impact of programs. They are seeking better ways to link investments to impact and outcomes. And they want help setting expectations about the time horizon for achieving results

#### *Synthesis and filtering*

Many grantmakers say they are suffering from information overload and what they need most is some way to make sense of the information. They are looking for ways to synthesize and organize existing information – especially research. They struggle with how to reconcile contradictory research. Many rely on the web as a primary source for finding information, and they are troubled by the quality of what they find.

#### *Who is funding what*

Grantmakers want to know what projects are currently being funded and to learn what happens with these projects. They want to identify both collaboration opportunities and niche areas that are not currently being funded.

### **3.2 Challenges To Implementing KM**

There are obvious challenges to the implementation of KM. Some of them are the following:

- Employees have no time for KM
- Current culture does not encourage sharing
- Lack of understanding of KM and benefits
- Inability to measure financial benefits of KM
- Lack of skill in KM techniques
- Organization's processes are not designed for KM
- Lack of funding for KM
- Lack of incentives, rewards to share
- Have not yet begun implementing KM
- Lack of appropriate technology
- Lack of commitment from senior management

Educational institutions would have to overcome these challenges in order to reap the benefits of KM.

### **4 Conclusion**

Colleges and universities have significant opportunities to apply knowledge management practices to support every part of their mission—from education to public service to research. Knowledge management should not strike higher education institutions as a radically new idea; rather, it is a new spin on their *raison d'être*. But implementing knowledge management practices wisely is a lesson that the smartest organizations in the corporate and not-for-profit sectors are learning all over again.

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