Knowledge Management:
Concepts, Methodologies, Tools, and Applications

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Knowledge Management Trends:
Challenges and Opportunities for Educational Institutions

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ABSTRACT

While the pressure of public accountability has placed increasing pressure on higher education institutions to provide information regarding critical outcomes, this chapter describes how knowledge management (KM) can be used by educational institutions to gain a more comprehensive, integrative, and reflexive understanding of the impact of information on their organizations. The practice of KM, initially derived from theory and practice in the business sector, has typically been used to address isolated data and information transfer, rather than actual systemwide change. However, higher education institutions should not simply appropriate KM strategies and practices as they have appeared in the business sector. Instead, higher education institutions should use KM to focus on long-term, organization-wide strategies.

INTRODUCTION

Knowledge management (KM) can be used by educational institutions to gain a more comprehensive, integrative, and reflexive understanding of the impact of information on their organizations. Specifically, the practice of KM, initially derived from theory and practice in the business sector as described in the previous chapter, provides a framework to illuminate and address organizational obstacles around issues of information

use and access (Davenport, 1997; Friedman & Hoffman, 2001). Yet introducing the concept of KM into the educational arena from the business sector has been a slow and often underutilized process. This is partially due to the fact that KM is a multi-layered and systems-oriented process that requires organizations to rethink what they do and how they do it (Brown & Duguid, 2000; Senge, 1990). Additionally, educational institutions are traditionally hierarchical with silo-like functions, making cross-functional initiatives difficult to implement (Friedman & Hoffman, 2001; Petrides, McClelland, & Nodine, 2004).

However, educational institutions can perhaps learn from KM efforts in the business sector, in terms of the limitations and drawbacks associated with KM. In fact, there are several compelling reasons why educational institutions have not, and perhaps should not, simply re-appropriate KM, as popularized by the business sector, into their own organizations. For example, in the business sector, there has been an appeal to focus on information technology and systems as solutions to problems of knowledge transfer and knowledge sharing (Hovland, 2003; Huysman & de Wit, 2004). Coupled with a profit motive, KM as it exists in the business sector is often limited in its ability to create far-reaching organizational change (Hammer, Leonard, & Davenport 2004). Furthermore, recent trends in the field also fail to fully distinguish between data, information, and knowledge (Huysman & de Wit, 2002). Consequently, organizations merely address singular and isolated data and information transfer, rather than actual systemwide and organization-wide change.

These particular limitations are especially salient now as higher-education institutions face an increasing number of challenges that have forced them to rethink how they are accountable to external demands, as well as how to improve internal accountability. Rather than focus on micro-level information-sharing activities, implementing KM strategies and practices

requires these educational institutions to examine the larger context of information sharing within the organization, specifically how their people, processes, and technology function within it. As such, neither data-sharing activities nor technological implementation should be viewed as the ultimate objective and final stage of a KM strategy. Instead, KM practices necessitate strategies that build upon current practice, leading to more comprehensive and organization-wide changes in knowledge practices and actions.

How then can educational institutions translate isolated sharing activities into long-term learning? This chapter illustrates how KM strategies and practices enable higher-education institutions to distinguish between data, information, knowledge, and action and how this iterative cycle can help organizations assess their available resources—that is, their people and processes along with their technology. In turn, this chapter demonstrates how KM can help educational institutions place themselves on the path toward continuous learning and organizational reflexivity.

CONCEPTS AND THEORIES

An overview of KM practices in the business sector demonstrates an overwhelming focus on simplified solutions, specific applications, and singular information-transfer activities. Recent accounts suggest that KM has seen limited impacts in the private sector due to overemphasis on technological hardware and software (Hammer et al., 2004; Hovland, 2003; Huysman & de Wit, 2004). This may be due in part to the fact that it is often easier to persuade organizations to acquire new technology tools than to modify or redesign existing organizational processes (Coate, 1996).

However, these particular approaches to KM are less likely to embrace a systematic approach to how organizations function. By focusing too narrowly on isolated information-sharing activities, organizations are prematurely confined and

prevented from engaging in a more integrative approach to KM. These information-sharing activities, which some might argue are wrongly classified as KM, may include electronic search and retrieval, document management, and data warehousing systems. These examples demonstrate important yet isolated occurrences of information activities and practices. However, these practices are often implemented disassociated from a larger organization-wide strategy. Secondly, and perhaps more importantly, the interpretation of these as KM does not acknowledge a vital distinction between information and knowledge. It is this delineation that pinpoints the incremental process behind the implementation of KM strategies and practices: Information is data with contextual meaning, data that has been categorized, or subjected to a process of sense-making and interpretation. Knowledge is information that is put into action through the process of problem-solving, decision-making, feedback processes, and so on (Davenport, 1997).

Therefore, developing policies and processes that fundamentally support and organizationally align information-sharing activities to each other is one of the first steps an organization must take to embrace and develop successful KM strategies. Often, an organization will try, yet fail, to implement an entire host of activities related to data collection and information access, only to find that the necessary organizational conduits for information sharing and new knowledge creation are not in place. How an organization shares information, along with the incentives and rewards to do so, and a culture that supports information-based decision-making are all key components that need to be in place before KM can be successfully implemented.

People, Processes, and Technology

KM strategies and practices come to embody the interactions between people, processes, and technology. These three—people, processes, and technology—all function as an integral part of the ongoing dynamics as organizations struggle to meet their information needs. First, it is people, not systems or technology, who "know." Thus, it is people who manage the policies, priorities, and processes that support the use of data, information, and knowledge. KM strategies and practices seek to engage different groups of people across various levels of an organization in the process of collective sense-making and decision-making. Whether these groups are formal or informal, a KM strategy includes supporting individuals in coming together to share information to address their collective needs.

Likewise, self-evident processes or embedded, day-to-day work practices can greatly affect the exchange and sharing of information within any organization. For example, it may be common practice within an organization for decision-making authority to be exercised only at the most senior level. These kinds of decision-making processes can create barriers to ownership, in which individuals are not provided with the appropriate incentives to make their own decisions and changes, let alone use data and share information. By uncovering these processes, KM strategies and practices can help identify knowledge gaps, and thus enable people to obtain the information they need and encourage them to share it with others, sometimes creating new knowledge and improved decisions. In highlighting patterns of information use that might not be evident otherwise, KM practices encourage a certain level of organizational reflexivity, which allows organizations to better understand themselves, in turn leading to more informed decision-making.

Rather than situating technology as the focal point, KM practices approach technology as an essential resource that is necessary for changes in organizational process to occur, but not sufficient. Recent trends in KM may grant technology disproportionate authority in how organizations share information. However, technology and information systems are neither the driver of in-

formation sharing, nor are they tangential to the process. Instead, technology is of equal importance in its ability to impact how information flows throughout an organization. Therefore, KM is the combination of people, processes, and technology that come together to promote a robust system of information sharing, while guiding organizations toward ongoing reflexivity and learning.

In summary, recent KM trends in the business sector often do not explicitly address all of the organizational resources necessary to implement KM, namely, the people and processes as well as the technology. To some, KM is used as a phrase to describe the technology that is used to manage an organization's data, such as data on monthly sales figures or a database of successful sales strategies. However, the way that these information systems are used is fully contingent on the strategies and policies employed by the organization, and does not constitute KM on its own. It is not uncommon to hear a claim that a vendor has developed "knowledge management software," rather than "developing software that could be used to help an organization implement KM strategies and practices." Although this distinction may appear to split semantical hairs, we argue that these types of technology present only one part of a larger whole within organizations, but they often do not address the necessary steps to become an organization that uses information and knowledge to develop continuous learning throughout.
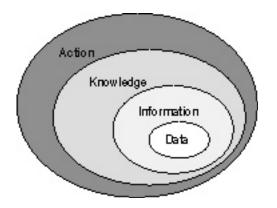
Data–Information–Knowledge–Action

KM strategies and practices are predicated on the distinction between information and knowledge. Other research in KM makes this distinction to highlight that information undergoes a series of processes that transform it into knowledge as it flows and is exchanged among individuals within an organization (Davenport & Prusack, 1997; Drucker, 1998; Wilson, 2002). To further refine

this notion, we assert that information and knowledge need to be further delineated. As such, we propose four stages that comprise the KM cycle: data, information, knowledge, and action. Data are the facts and quantitative measures that are available within any organization. When groups or individuals take data and contribute their own interpretation and categorization, data can be transformed into information. In turn, knowledge is the resulting understanding that allows people to share and use this information that is now available to them. Once this knowledge is applied to make specific decisions or address problems, it is transformed into an action. Each component of the cycle builds upon the preceding element, feeding back and connecting actions and decisions and new learning, which eventually translates back to new questions that are informed by data once again.

There is a certain set of activities and practices that typically takes place in each part of the cycle, where each component builds upon the one before it, making it an iterative process of change or improvement. Data activities in the KM cycle can include accessing data by departmental request, or retrieving data directly from information systems and placing them within personalized spreadsheets. Information activities may include analyzing data to find patterns, problems, and discrepancies, or aggregating and disaggregating data, writing reports, or discussing findings from the data with colleagues. Knowledge activities entail formal and informal discussion and collaboration to address issues and problems in the context of the data and information. It is important to note that the knowledge stage of the KM cycle encompasses a process of collective sense-making, which includes ongoing discussion, collaboration, and feedback, thus shifting individual data and information practices into the organizational environment. The last stage of the cycle is then implementation of changes and action that result from the iterative process.

Therefore, organizations that simply engage in the collection and distribution of data are engaged in data management activities only. However, knowledge management is more than the mere aggregation of data management practices. KM practices include the management of the infrastructure that supports the data–information–knowledge–action cycle, as well as the implementation of the process. In these examples, we see then that KM activities and practices bring together all four components of the cycle: data, as well as information, knowledge, and action. In turn, KM strategies embrace practices at every stage of this cycle, and integrate the people, processes, and technology within the organization. It is important to note that each stage of the KM cycle is not mutually exclusive. An organization that fully adopts KM strategies and practices also demonstrates activities within each component of the KM cycle simultaneously. Engaging in the knowledge stage of the KM cycle also includes individuals engaging in data and information activities. In fact, KM practices necessitate that individuals simultaneously engage all three stages of practice, data, information, and knowledge as they implement changes and action (see Figure 1).

Figure 1. The data-information-knowledge-action cycle

Thus, the KM cycle demonstrates the dynamic qualities of KM strategies and practices. Their simultaneous, ongoing, and cyclical nature further highlights the necessary feedback and iterations that serve as the foundations for ongoing reflexivity and learning. As such, KM practices demonstrate how knowledge is most valuable not when stored in static repositories, but when exchanged across groups of people, used and applied to inform actions and change. KM strategies and practices can help organizations better identify their information-sharing and knowledge-generating activities, which, in turn, can help organizations capitalize on the iterative nature of knowledge-sharing activities.

CURRENT CHALLENGES FOR KM IN HIGHER EDUCATION

Increasing pressures and demands for data on student success have translated into an increased call for reliable information regarding critical outcomes in higher education. Due to rising public accountability pressures and strains on fiscal resources, many legislators have begun to demand information that can be directly linked to academic outcomes. As a result, these institutions are faced with requirements to provide accurate data and information around a growing number of issues and outcomes. In order to do so, the institutions are now re-evaluating their own knowledge strategies and practices.

However, these processes of re-evaluation have proven to be challenging. To begin with, the information technology infrastructure at many higher-education institutions is problematic. Rather than having one robust and integrated system, educational institutions more often maintain several information systems that support various functions throughout the organization, some of which are antiquated legacy systems. In addition to this fragmented information technology infrastructure, there are often inconsistent priorities around

data collection, which can result in inaccessible or unreliable data. These characteristics translate into disparate data silos throughout the organization, redundant data gathering, and information hoarding, the cost of which is an impaired ability to sustain knowledge development, growth, and effective decision-making (Petrides et al., 2004). In an increasingly performance-driven climate, this only exacerbates these already problematic and costly practices.

Furthermore, cultural issues associated with information hoarding and overall disincentives for sharing and cross-functional cooperation can undermine KM implementation strategies in educational institutions. In a climate of accountability, data and information can appear threatening as well as politically charged, particularly when programs or other initiatives are under fiscal strain. Nevertheless, educational institutions can minimize these potentially negative consequences by developing KM strategies under a set of policies that explicitly encourage change and progress rather than penalize mistakes. A culture that is intolerant of mistakes can severely impede KM initiatives (Davenport & Prusack, 1997). The psychological instability that can arise is a very real challenge that can curtail any change initiative. As such, when implementing a KM strategy, educational institutions are better served by fostering an environment that reduces the sense of fear and retribution that individuals within the organization may face, for example, as they uncover data and information that may support unpopular opinions.

KM practices also require long-term strategies and commitments in order to fully realize their benefits. While educational institutions have tentatively begun to incorporate KM strategies, they will benefit from gaining a better understanding of the current limitations of these recent approaches to KM in the business sector, such as the narrow focus on seemingly easier-to-address solutions—for example, creating a data warehouse from which to extract student data.

In microscopically fixating on specific information solutions, many current trends in KM do not help these institutions build the capacity to sustain long-term organization-wide change, but instead limit the potential that information and knowledge sharing can have.

While KM researchers may recognize the importance of distinguishing between data, information, and knowledge, KM practitioners in the private sector have not necessarily taken into account these distinctions. In this particular conception of KM, knowledge is then simply used as an overarching term for all three—data, information, and knowledge. Subsequently, many of the products, repositories, and exchange activities that are currently termed KM prove to merely support data and information, rather than actual knowledge. Doing so runs the risk of prematurely curtailing the necessary feedback mechanisms for continuous organizational learning.

However, it becomes much more difficult to address systemic barriers to knowledge sharing. The desire to find narrow and short-reaching solutions is often rooted in a compartmentalized understanding of the nature of organizational barriers to information sharing, even though these problems are more than technological. These problems include people's prevailing attitudes, beliefs around knowledge sharing, and systematic and structural disincentives to share and exchange. For example, the politics of information are often heavily embedded in organizational culture and structure, which complicates efforts to change processes that could be used to potentially support and drive knowledge sharing and creation. Recent evolutions of KM do not necessarily take into account the organizational cultures and structures that serve as barriers to data sharing, information sharing, and eventually knowledge sharing. Furthermore, these recent developments in KM fail to acknowledge the evolving and iterative qualities of knowledge. Knowledge is only useful when it is shared, transmitted, or acted on in some capacity. During these exchanges, knowledge undergoes an

ongoing and continual cycle of change from data, information, knowledge, and action. However, these distinctions are lost as KM practitioners attempt to find solitary solutions to problems of data and information.

If these attempts at KM remain truncated and narrowly focused on simplified solutions, specific applications, and singular knowledge-transfer activities, these tools can only marginally improve an organization's use of information and knowledge and do not address the deep-rooted processes and strategies necessary to overcome these barriers. Information technologies and applications only incrementally improve an organization's ability to facilitate data sharing and information exchange. As such, these approaches demonstrate a bounded set of limitations that ultimately prevent organizations from overcoming their current obstacles and diminish their ability to build a self-sustaining and long-term organization-wide system, thus undermining the very benefits KM practices have to offer.

Therefore, we suggest that educational institutions should not simply appropriate KM strategies from the business sector and apply them to their organizations. If KM is being implemented poorly, does that mean it should be done away with completely? Or does it hold its own as a concept worth striving for? The current limitations and drawbacks of KM in the private sector should serve as a warning for educational institutions. These organizations should be careful not to prematurely fragment their KM practices and focus on narrow applications and solutions. Instead, higher-education institutions stand to benefit from an approach that incorporates a more long-term and inclusive strategy to their knowledge activities. As such, improved methods of data and information sharing need to be coupled with embedded and long-term KM strategies in order to address the organization-wide factors that can either impede or promote an ongoing culture of research, reflexivity, and long-term organiza-

tional learning. If the evolutionary qualities of knowledge management—as it evolves from data, information, and knowledge—cross through multiple groups of people within an organization, as well as traverse the three key organizational resources available—that is, people, processes, and technology—then the dynamic process that guides successful KM strategies and practices is more readily supported and maintained.

OPPORTUNITIES FOR KM IN EDUCATION

Educational institutions demonstrate a great need for improved knowledge-based systems. We already find that there are many formal and informal administrative processes, information-sharing patterns, work incentives, information silos, and other work practices that have flourished over time, yet these can also critically impede organizational and systematic information flow and knowledge exchange. KM strategies and practices can begin to integrate these disjointed systems. For example, the use of information maps and audits can initially be used to obtain a bird's-eye view of the current processes and practices, and their corresponding strengths and weaknesses. This type of initial diagnosis proves to be important for implementing KM in order to identify the most appropriate entry point for change. The cyclical quality of KM encourages organizations to take an honest and reflexive stance on what is already going on in their organization. KM requires that educational institutions candidly address their current patterns and processes, and only from this position begin to capitalize on the opportunities that KM strategies and practices can offer. This process of organizational re-evaluation and reflexivity proves to be the most difficult challenge for educational institutions. At the same time, the process offers the ideal opportunity for these institutions to integrate KM to promote

sustainable learning within their organizations in order to meet these external demands as well as improve organization-wide effectiveness.

Higher-education institutions can begin to translate these strategies into action by identifying their information shortages and needs, including finding out where people are already requesting more data and information. These institutions can also start by identifying groups of people who already maintain synergistic relationships of collaboration and sharing within the institution. In fact, educational settings already demonstrate many information-sharing activities in effect, such as existing formal or informal communities of practice. However, to sustain ongoing inquiry and continuous learning, educational institutions need to strategize as to how they will systemically embed these activities and practices within the very fabric of the organization. Taken individually, information-sharing activities can be used toward incremental improvement; however, when KM is adopted and executed as an organization-wide strategy, improved methods of data and information sharing can be used to continually promote the development of KM-based practices. This can help educational institutions become more informed in their decision-making as a whole. All of this helps to lay the foundation for a robust culture of inquiry and reflexivity, thus establishing the mechanisms for sustainable, long-term organizational learning.

Perhaps more importantly, student access and success are the likely benefactors of these KM practices. KM practices can promote organizational reflexivity in such a way that educational institutions better understand their own weaknesses and strengths, and can then allocate their resources to where they are most needed. As demands for accountability rise, educational institutions need to become much more adept at assessing students' needs along with their own institutional capabilities. KM practices can help bring these two together, that is, aligning institutional capabilities and resources to better address students' needs and thus student success. Subsequently, educational institutions that engage in KM practices for continuous learning at the organizational level also engage in promoting continuous learning for their students.

OPPORTUNITIES FOR CONTINUOUS LEARNING

In conclusion, to fully realize the potential of KM, educational institutions will need to change the focus of KM from isolated knowledge-sharing activities to long-term, organization-wide strategies. Thus, KM practices can help educational institutions meet their goal of improved decision-making to advance student learning, allowing these institutions to begin to identify the value of programs and services that contribute to student access and success. This requires not only addressing information policies, but also taking a closer look at the institution's own processes and current practices to stimulate ongoing and constructive data use. Therefore, KM practices can be used to help educational institutions develop a sense of reflexivity across all levels of the organization, thereby providing these institutions with the means for a sustainable culture of inquiry and continuous learning.

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