Leveraging Synergies between Learning Objects and Knowledge Management

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Introduction

Improving organizational performance through "the harnessing of 'intellectual capital[Bev1]' within an organization so as to make it accessible to everyone who needs it" (Marshall, 1998, p.1) has been steadily gaining importance since the 1980's (Nworie & Dwyer, 2004, p.27). In an effort to become learning organizations[1], by 2002 80[Bev2]% of the world's largest corporations were involved in Knowledge Management[Bev3] initiatives (Rossett & Sheldon, 2002, p.280). These initiatives are aimed at creating, archiving, and sharing information, expertise, and insight across the organization (Rosenberg, 2001, p. 66). Concurrently, a second type of initiative has grown in acceptance: learning objects. Like Knowledge Management, learning object[2] initiatives also focus on identifying what information is worth capturing; how to best translate this information into knowledge that performers can readily use; and, how best to make the knowledge available to those who need it, when they need it using a collection of technologies, tools, and processes[Bev4].

This paper explores the similarities[Bev5] between Knowledge Management and learning object initiatives in corporations and offers recommendations for integrating the two to lower costs, increase consistency, facilitate participation, foster innovation, and improve the quality of the information being made available to performers[Bev6].

Comparing Knowledge Management and Learning Objects

The 21st century has been described as a knowledge economy in which corporate performers are the wealth and capability generators (Rylatt, 2003, p.37). In

[1] "A learning organization is an organization that has an enhanced capacity to learn, adapt, and change" (Gephart, Marsick, Van Buren & Spiro, 1996, p.26).
[2] "any entity, digital or non-digital, which can be used, reused, or referenced during technology supported learning" (Wiley, 2001, p.4).

this new economy, knowledge is the most important factor: Knowledge, at the most basic level, is what all corporations buy and sell (Allee, 2000, p.1). To harness individual and corporate intellectual capital and compete successfully in this knowledge economy corporations are investing what have been treated as two discrete types of initiatives: learning objects and Knowledge Management. Both these initiatives require structured processes and the support of web-enabled technologies and both focus on disseminating best practices to create optimum and consistence job performance. However, these two initiatives most often reside in different areas of control and are seldom linked, coordinated, or even aware of each other's existence (Carlile, 2002, p.35).

An Overview of Knowledge Management **[Bev7]**

Once it was recognized that the tacit[3], explicit[4], individual[5], structural[6], and organizational[7] knowledge residing in organizations is critical to successfully compete in the marketplace (Nworie & Dwyer, 2004, p.28), it became a business imperative to identify the most critical knowledge codified[Bev8] it, managed it, and disseminated it to the people who could make the most effective use of the knowledge (Clem, 2002, p.24). Successful Knowledge Management programs have produced returns of hundreds or thousands of percent (Madsen, 2001, p.18). Capturing and sharing critical data[8],

[3] Tacit knowledge (informal / uncodified): "heuristics often embedded in people's experiences and life's work, which is often the most elusive and valuable" (Rosenberg, 2001, pp.66-67).
[4] Explicit knowledge (formal / codified): "easily described and specific enough to be codified in documents, practices, and training" (Rosenberg, 2001, pp.66-67).
[5] Individual knowledge: "exists solely in the minds of the employees" (O'Dell & Grayson, 1998, p.4).
[6] Structural knowledge: "embedded I the bricks of the corporation through processes, manuals, and codes of ethics" (O'Dell & Grayson, 1998, p.4).
[7] Organizational knowledge: "the learning that occurs on a group or division level" (O'Dell & Grayson, 1998, p.4).
[8] Facts and figures without context and interpretation (O'Dell & Grayson, 1998, p.5).

information[9], and knowledge[10] outside the areas of primary use not only increases consistency but it also reduces errors and duplication of effort (Sevilla, 1998, p.1). As Rossett and Sheldon (2002) explain, "There is widespread realization that value is being frittered away through carelessness and attrition… successful practices typically linger in a company for years, often unrecognized and unshared" (p.282).

Knowledge Management[Bev9] (KM) initiatives focus on converting individual knowledge into organizational knowledge (Madsen, 2001, p.22) by applying systematic processes and technology to identify, capture, manage, and disseminate the knowledge required to support quick and decisive problem solving, ensuring that performers have access to the knowledge required, in a format that makes sense to the performer. Most[Bev10] commonly, knowledge is captured and formatted as best practices since best practices "take information/data and put them in the context of real people and real experiences within the company" (O'Dell & Grayson, 1998, pp.11-12). Although it requires a robust database to store and manage the knowledge assets and web-enabled technology that supports authoring, tagging[11], archiving, submission of knowledge assets to the database, searching, and retrieval of knowledge assets from a performer's work site, Knowledge Management is not a software implementation. KM is about performers being encouraged to share, develop communities of practice, and actively locate and employ the best practices developed by others (Rosenberg, 2001, p. 66). Rossett (1999) outlines the four main aspects of KM as: 1[Bev11]) Collection of the best thoughts, practices and wisdom; 2) Use of a system (technology) that makes both tacit and explicit knowledge readily accessible; 3) Open and generous contribution to

[9] Patterns in the data (O'Dell & Grayson, 1998, p.5).
[10] Actionable information (O'Dell & Grayson, 1998, p.5).
[11] Assigning digital descriptors of the object's content and use.

the knowledge base by employees; and 4) An understanding on the part of Managers that knowledge workers[12] cannot and should not be coerced into sharing their knowledge (p.217).

Another criterion of successful Knowledge Management is the organizational ability to identify what information is of high value, to manage incoming information ensuring it is written, tagged[13] and published in a systematic and usable way (Rosenberg, 2001, p. 82), and to prioritize it. Standards, templates, and controls must be established that are sufficient to prevent the repository from becoming simply a data warehouse but which are also flexible enough so as not to limit innovation and usefulness. It is not enough to capture and codify data, information, and knowledge; it must be used to be of value. As Rosenberg (2001) explains, Knowledge Management supports 1) Learning by providing access to information on an as needed basis; 2) Development of a corporate vision and action by pushing important information to targeted groups of performers; 3) The corporate memory by being a storehouse of intellectual capital; 4) Task accomplishment by providing productivity tools; 5) Creativity by encouraging and supporting collaboration and communities of practice; and 6) Integration of knowledge between and across groups allowing for greater leverage (pp. 68-70[Bev12]).

An Overview of Learning Objects

A learning object is a digital entity, deliverable over the internet and which can be describe as being: 1) A collection of assets covering a topic or complex task as

[12] "The term "knowledge worker" was coined by Peter Drucker some thirty years ago to describe someone who adds value by processing existing information to create new information which could be used to define and solve problems"
Nagananda Kumar, Siliconindia.com, 2000.
[13] Provided with digital descriptors of their content and use.

described by a terminal objective; 2) A self-contained, context independent unit. Each learning object is modular and free-standing with no backwards and forward referencing with other objects. There can be nothing in an object that refers to other objects; 3) Reusable and transportable: Transportable among applications and environments and repurposable to different delivery structures. From a design point of view it means that there can be nothing in an object that requires it to reside in a sequence. From a technical point of view each object must be meta-tagged appropriately and coded in such a way as to operate in almost any LCMS[14]; and 4) A meaningful division of learning that can be found on accomplished in one sitting[Bev13] (Wiley, 2001; Longmire, 2000). Learning objects represent "a new model for digital learning – one in which learning content is free from proprietary "containers[Bev14]", can flow among different systems and be mixed, reused, and updated continuously" (Barron, 2000, p.1). They make it easy to access content anywhere and anytime. Because learning objects are self-contained, they can stand-alone (as reference or in a performance support system[15]) or they can be sequenced into learning events. Since objects are tagged and digitally stored they are easy to locate and update, increasing ease of use and reuse and lowering content maintenance costs. Also, since they are designed to be context free objects can be used by many audiences and in many situations.

Each object has two components: The object and its metadata tag. This tag provides context in the form of descriptions and keywords and is[Bev15] how the objects and assets are managed in the database and populated into the display templates. The

[14] LCMS = Learning Content Management System: An application that supports the creation, storage, assembly, selection, and delivery of content to the learner.
[15] An on-line repository of task-related materials that provide performers with the exact information or tools required.

best tagging schema limit the number of tags per object. The tag should capture the essence of the content and, often, the media in which the content is displayed. Every learning object contains one or more asset. An asset is the smallest component of the instruction that makes sense on its own, for example, a step-by-step procedure, a text description of a concept, or a short digital video showing a process. Assets are also reusable and transportable and as such have their own metadata tags. Assets can be reused between learning objects in different courses and they can be reused in performance support systems. (Mowat, 2002, pp.3-5)

The benefits for organizations implementing learning objects are: 1) Flexibility: Material designed to be used in multiple contexts can be reused much more easily than material that has to be rewritten for each new context; 2[Bev16]) Ease of Updates, Searches and Content Management: Metadata tags facilitate updates, searches, and content management by making content easy to identify and locate; 3) Customization: Assets can be recombined into any number of objects customizing them to meet specific needs. Objects can be created and combined to meet individual knowledge, skill and attitude gaps within a competency-based model; 4) Interoperability: Organizations can set specifications regarding the design, development and presentation of objects based on organizational needs while retaining interoperability with learning systems at other organizations; and 5) Increased value of Content: The value of content increases every time it is reused. The organization is also avoiding the cost of new design and development. (Wagner, 2002, p.4)

Synergies between Knowledge Management and Learning Objects

In comparing Knowledge Management and learning objects one finds that there are a significant number of similarities suggesting that it might be possible to realize synergies between these two initiatives in an organization. (See Table 1)[Bev17] Both Knowledge Management and learning object initiatives: 1) Support business goals and are oriented toward performance presenting information in a performance context (Cowley-Durst, 1999, p.23); 2) Require[Bev18] that employees be convinced to participate, "after all, in many cases employees are being asked to surrender their knowledge and experience – the very traits that make them valuable as individuals" (Santosus & Surmacz, 2001, p.2). Mining[Bev19] knowledge from performers is a challenge for both Knowledge Management and learning object initiatives that must be resolved since "as much as 90 percent…of the real value of intellectual capital is in the heads of your knowledge workers: their skills, experience, hard-won insight and intuition" (Barth, 2002, p.2); 3) Create artifacts, be they knowledge assets or learning objects; 4) Rely on a repository (database), a tagging schema, technology that facilitates management, searching for, distribution, and display; 5) Are more effective when templates, standards, and processes are put in place to standardize and prioritize contributions to the repository (Wytheville, 2003); and, 6)Require a shift in corporate attitude from restriction of access to information to rewarding performers, groups, and departments for sharing information. Both Knowledge Management and learning objects rely on knowledge being extracted from those who have it (Nworie & Dwyer, 2004, p.28), reformatted to be context-free allowing for seamless reuse in multiple contexts, and being made easy to locate and apply to new situations. On[Bev20]

Table 1: Comparing Knowledge Management and Learning Objects[Bev21]

	Knowledge Management	Learning Objects
Requires a repository in which content is meta tagged.	✓	✓
Create context-free artifacts in the form of assets or objects designed to support reuse and to be used in multiple ways (performance support, reference, and training).	✓	✓
Use web-based technology to manage, and disseminate content. (includes robust search capability)	✓	✓
Require standards, templates, and procedures to ensure quality and prioritization of contributions and to ensure that artifacts are managed and maintained.	✓	✓
Asynchronous (not constrained by location or time zone).	✓	✓
Goal is to support innovation and improve performance (effectiveness and consistency).	✓	✓
Support business goals with information presented in performance context.	✓	✓
Focus on supporting decision-making by sharing best practices.	✓	✓
Intent is for content to be available to performers across the organization.	✓	✓
Require that employees perceive value in contributing to the repository and take value from its use.	✓	✓
Should be integrated into normal work practices.	✓	✓
Encourages and supports collaboration and communities of practice.	✓	
Controlled by…	Information Technology or Business / Strategic Planning	Human Resources or Learning
Artifacts are used primarily for…	Sharing Processes	Formal learning & performance support

the down side, both types of initiatives have been known to fail: when not updated regularly with obsolete artifacts removed. “If dated content is left on the site, users may continue to rely on the inaccurate information without the benefit of more recent

knowledge… growing content clutter will soon make the site unmanageable" (Rosenberg, 2001, p. 82); when they are not integrated into normal working practices; if the technology is to complicated or if performers are not trained to use the technology; or if performers do not garner any personal or professional benefit from contributing or extracting from the repository (Rossett & Sheldon, 2002, p.293). The similarities[Bev22] listed above make combining the two initiatives appear self-evident. Why then are not Knowledge Management and learning object initiatives commonly combined in organizations?

Barriers to building on such synergy[Bev23] exist due to the different backgrounds and language of the two groups; that fact that the two initiatives are managed by different functions with different funding, priorities, and business directives; and, that the two groups often use similar but different methodologies and technologies (Efimova & Swaak, 2003, p.2). Learning object initiatives normally are under the control of the human resources or learning department and focus on supporting formal learning and improving group and individual performance. Knowledge Management initiatives tend to be controlled by either the information technology department or the strategic or business planning executive and are concerned with sharing processes. Since shared processes impact performance this seems to be a somewhat specious differentiation. The purpose of training is transfer skill and knowledge to a performer through instruction. The purpose of Knowledge Management is to provide easily accessed resources which support performance (Rosenberg, 2001, p.77). In many jobs, and for many tasks, expertise does not need to be internalized but can be supported.

Consistent, fast, and innovative performance may best be achieved by teaching "people to be experts at finding information when they need it and then using it correctly" (p.76).

While neither Knowledge Management nor learning objects is feasible without technology, the danger is that both may be designed, evaluated, and managed as information technology projects (Abramson, 1999, p.1). This brings us to a key differentiator between Knowledge Management and learning objects[Bev24]: Knowledge Management has a social aspect as well as a management of artifacts aspect. KM is intended to facilitate dialogue between performers, and to promote action learning[16], communities of practice[17], and problem solving (Rossett, 1999, p.64). This aspect of Knowledge Management would not impede the combination of the other aspects with those of learning objects.

Another difference between the two initiatives is that Knowledge Management projects often have better access to intellectual capital than learning object projects while learning teams have more experience in structuring information to be of the greatest use to the performer: Focusing on performance outcomes. Combining forces to access the most valuable data, information, and knowledge and design artifacts to be of maximum benefit across multiple contexts would lower costs, simplify access and reuse for the performer, and ensure consistency of message. In the final analysis, learning objects and knowledge assets are both pieces of corporate knowledge, information, or data that need to be managed to achieve a return on investment (Godbout, 1996, p.3),

[16] A process in which a small group of people solves real problems while at the same time focusing on what they are learning.
[17] Organizational groups of people that assume roles based on their abilities and skills, instead of titles and hierarchy. Also referred to as communities of interest.(The Delphi Group, www.delphi-group.com)

keeping in mind that not all information is valuable and worth the cost of capturing and managing[Bev25].

And[Bev26], finally, Knowledge Management and learning object initiatives often use similar but distinct applications and different but overlapping tagging schema. In both cases, the tags describe key aspects of the artifacts that need to be tracked to facilitate storage, management, and access. Tags typically provide information on the topic, type of content, level of detail, the owner, the developer, the date and version, etc. Learning objects also have tags providing information on the level of interactivity, asset classification [concept, fact, principle, procedure, and process (Barron, 2000, p.2)], duration, the learning resource type, and copyright restrictions to name a few (CanCore, 2001). This difference in tagging schema could be overcome by establishing a two-tiered tagging protocol which a minimum set of tags that must be applied to all artifacts and additional ones that can be applied when necessary.

Conclusion

To reap the benefits of the synergies outlined in this paper organizations would need to: 1) Recognize[Bev27] that the end goals are to safeguard intellectual capital and to promote superior and innovative performance throughout the organization; 2) Place responsibility for the policy, budget, and resources related to these goals under one locus of control at the executive level (to ensure sufficient influence); 3) Establish an implementation team comprised of key skills from both the strategic business and learning groups; 4) Identify technical and procedural requirements that meet the needs of both initiatives and invest in a common technological infrastructure; 5) Create and

implement integrated processes, procedures, standards and templates; and 6) Implement an approach to reward and recognition that clearly demonstrates corporate commitment to knowledge mining and sharing.

By recognizing the synergies between Knowledge Management and learning objects organizations will be able to reduce costs by eliminating parallel implementations of similar technologies, standards, and procedures while benefiting from increased consistency, elimination of duplicate efforts in gathering the same data, information, and knowledge, and through shared development.

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