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Strategies and Techniques for Designers, Developers, and Managers of eLearning

THIS WEEK — MANAGEMENT STRATEGIES

Establishing and Fostering Collaborative Online Communities in the Workplace

BY KATHERINE J. WERNER

Organizations today are faced with many challenges as they strive to increase product output and knowledge bases while coping, in many cases, with layoffs and restructuring of work groups. At the same time, corporations are transforming themselves into global entities. As cultures mesh and economies become interdependent, it is crucial for companies to develop heightened cultural awareness and a broad world outlook. As Jay Weinstein at Eastern Michigan University notes, due to the Information Age, technology has become both a driving force behind globalization, as well as an important tool for helping companies and individuals work well within the new global workplace.

In *Information Week* magazine, Jennifer Zaino recently wrote that employee collaboration is becoming a major focus of many corporations attempting to increase their intellectual capital. Using an online framework to increase meaningful contact among employees can help reduce product development time and decrease time-to-market by allowing employees to share information, such as instantly providing updates to all team members whose work will be affected by changes. By establishing communities online, employees can collaborate remotely at times and places most convenient and meaningful for them. According to an *Information Week* poll cited by Zaino, 59% of companies will increase collaborative initiatives in 2002. Many organizations are turning to online solutions as a cost-effective means to help local and remote employees work together.

All of these benefits of technology and collaboration are as applicable to training development groups as they are to any other department. The benefits also apply to learners when a collaborative model for

Continued on next page

As organizations grow into global entities, the need to develop communities of practice (CoP) is also growing exponentially. There are many key factors to ensuring that your CoP is successful and you'll find a great summary of them in this article... You need to have a sound strategy, and good technology to support that strategy. Learn how Tellabs tackled this challenge within their decentralized Product Training Services group using Groove™.

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learning is the basis for curriculum design. At Tellabs, the training development staff applies collaborative technology on a daily basis, sharing best practices and learning with each other. In this article, we will look at some of the specific ways we use Groove™, a peer-to-peer software tool, to support online collaboration. We will also look at the larger picture of online collaborative communities and the processes and procedures to establish and foster them. We'll make a case for peer-to-peer tools being used as an ideal framework for e-Learning development, and we'll briefly examine the use of peer-to-peer technology for training delivery. We'll conclude with a look at some limitations on the use of Groove; some of which apply to any peer-to-peer tool, and others are characteristic only of Groove and could change in future versions of the software.

Let's begin by looking at how communities, whether for work or for learning, are built and supported on line.

Community building: Best practices

Michael Feldstein of Feldstein and Associates suggests several methods for building online communities: identifying and recruiting an organization's leaders to join, as they will bring participants with them; designing the community to answer questions and help solve existing problems; establishing communities when there is a need for them; and focusing on ease of use, as the more usable the environment is, the more people will want to interact with it.

Jenny Preece, Ph.D., at the University of Maryland presents three general principles towards ensuring good usability, which "in turn helps users to bridge the gulfs of execution and evaluation." Preece states that online environments should be consistent, controllable, and predictable. Consistency requires that environments use the same terms and procedures for achieving the same functionality throughout—sequences of actions, navigation elements, color, and type should all maintain consistency throughout the space. Controllability allows users to maintain control of their environment — the software supports them vs. controls or limits them. Predictability "enables users to continually build on their experiences, and to develop more sophisticated and accurate mental models in their heads about how the software works." Thus commands that work in one situation in the environment will function in the same manner throughout the environment.

"Collaboration is the process of applying shared resources to achieve commonly agreed outcomes within an agreed timeframe," says Gerry White, CEO, education.au limited. Michael Schrage, co-director of MIT's Media Lab, adds that the goal of collaboration is the creation of value derived from the collective interactions of the members of the community. Forming such a community online can be most effectively accomplished using peer-to-peer (P2P) software tools. At this point, most people will probably ask, "Why peer-to-peer? Why not just use email and the Web?"

Why peer-to-peer?

Essentially, the answer is the leverage gained through a network of users. Metcalfe's Law states that the usefulness, or utility, of a network equals the square of the number of users. The power of a network increases exponentially as the number of users connected to it rises.

Peer-to-peer (P2P) technologies create

the possibility of increasing value by allowing all members to add input to the network, versus traditional centralized systems where people pull down information generated by a small number of contributors. In a P2P environment, all members can easily add value by contributing, and synergies are allowed to naturally flourish. Business processes are streamlined as duplication of effort is avoided. All files are shared and accessible via the P2P tool for utilization and collaboration. With P2P software, collaboration is a democratic process. As Stephen Brookfield, University of St. Thomas puts it, "in workplace settings where democratic participation and worker control are the norm, the conditions for critical thinking are favorable."

Why Groove?

"The choice of technology to be used as the primary communication vehicle for an online community is very important." So says Janine Bowes, Project Director for the National Quality Teacher Information Exchange Project, a Commonwealth government project. Janine is currently President of the Tasmanian Society for Information Technology in Education and Secretary of the Australian Council for Computers in Education.

Online communities will not thrive without nurturing. The reflex to seek support online from people you have never met is not natural. Take steps to ensure that new CoPs grow into effective environments.

Tool selection provides the framework and limits or expands the scope of all interactions in the online environment. According to Preece, different media offer different opportunities for interactions. "The amount and type of effort changes with the communication medium." In her view, the important characteristics of collaboration that are affected by media and tool selection include:

- Co-presence: A and B share the same physical environment, as in face-to-face conversation.
- Visibility: A and B are visible to each other, as in face-to-face communication and video conferencing.
- Audibility: A and B communicate by speaking, which can be very effective for conveying factual information.
- Cotemporality: B receives at roughly the same time as A presents, so the message is received immediately.
- Simultaneity: A and B can send and receive at once and simultaneously.
- Sequentiality: A's and B's turns cannot get out of sequence as in asynchronous communication.
- Reviewability: B can review A's message.
- Revisability: A can revise messages for B.

If one of these opportunities is not present, Preece maintains that "the communication is constrained by its absence, and ways of overcoming or dealing with it have to be found."

In our experience at Tellabs, Groove is an excellent and robust choice for a collaborative environment because it allows for all the interaction opportunities Preece lists, via its inherent and scalable functionality. Within my organization at Tellabs, we've used Groove to enhance interaction

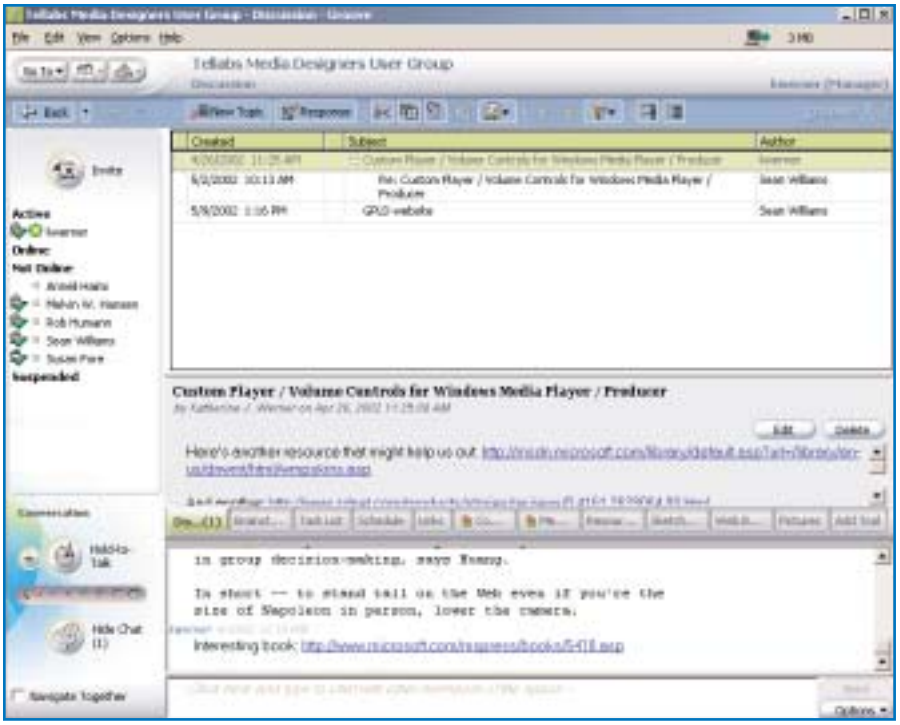

FIGURE 1 *Screen shot of Groove™ interface, illustrating Discussion tool.*

and collaboration among training development staff, enabling us to cooperate and learn from each other more rapidly and easily than through the traditional workplace communication modes of email and telephone contact. Groove fits neatly into our existing corporate I.T. infrastructure — it runs on Windows platforms with fairly basic hardware requirements, and integrates with Microsoft® Office and Outlook, which are standard software tools that are provided to all employees.

Perhaps most importantly for us, Groove provides security without necessitating any firewall re-configuration. Groove provides a high level of security by:

- authenticating users automatically via the use of 2048-bit public keys and digital fingerprints;
- providing members of a Shared Space with the ability to manually authenticate other members' identities;
- permitting members to join Shared Spaces only by the invitation of an existing, authenticated member of that space;
- requiring each member to select a passphrase to cryptographically protect her account file and access Shared Spaces (a passphrase serves the same purpose as a password except that it's generally much longer, and can include punctuation and spaces);
- and further protecting access to information in Shared Spaces by permitting manual assignment of roles and permissions for members.

Groove also works well for our small team collaboration efforts because there is no need to procure additional server space, which would be extremely costly. Due to its P2P nature, there are no servers and clients. Each member of a Shared Space functions as both client and server. Data is transmitted directly to all members in the same Shared Space, and a copy of the data is stored on each user's computer. Groove automatically and securely distributes and saves data that group members create. We were able to get Groove installed on several workstations and a Shared Space created within a matter of hours, with no I.T. support.

The P2P nature is also useful to us because it frees members from being tied to designated workstations. For example, a member of a Shared Space could have a Groove Shared Space installed on her computer hard drive at work and at home. Each time she logs in to her account, any new Shared Space data is instantly transferred to her computer, regardless of her location, as long as one other member of her Shared Space is running Groove online at the time. If no other members of a Shared Space are online, Groove will encrypt any new data on a Groove server temporarily. The data will be relayed to her computer — and the members of her Shared Space — as soon as they are online.

Overview of Groove Workspace

Groove Workspace is a peer-to-peer (P2P) application that supports various ways of communicating with people in a secure, private online environment. There are a number of elements in the Workspace.

The Groove Transceiver allows users to interact with each other, manage their accounts, and utilize, add or remove tools and features quickly and easily. The P2P nature of Groove means that all of the Transceiver data is stored on local end user computers versus remote servers. In order to join a Groove community, users must download and install the application, create a user account, and either start a new Shared Space (online community) or join an existing Shared Space.

Shared Spaces are private communities of Groove users sharing a suite of tools and information. The only way to join a Shared Space is to be invited by an existing member. Any Groove user can be a member of an unlimited number of Shared Spaces, as long as he or she is invited to join. Information generated in Shared Spaces is stored on each member's local computer.

Groove currently offers three versions of Workspace:

- Groove Workspace Preview Edition: freeware for personal use or a 90-day trial for business evaluation, with some limitations on functionality;
- Groove Workspace Standard Edition: $49 per license;
- and Groove Workspace Professional Edition: $99 per license with added functionality for project management and forms utility.

There are many tools available for trial within the Groove Preview Edition. Included in the tool suite are the following:

- Instant messaging
- Synchronous Chat
- Audio conferencing
- Calendar (calendaring tool)
- Discussion (threaded discussions)
- Sketchpad (whiteboard)
- Files (file sharing)
- Pictures (image gallery)
- Outliner (create outlines)
- Web Browser (browser embedded within the tool)

Instant messaging, chat, and audio conferencing all allow for real-time communication between members of a Shared

Space. Instant messaging is synchronous communication between two individuals, chat is synchronous communication between two or more individuals in the Chat Pane, and audio conferencing is synchronous verbal communication between two or more people using computer microphones and speakers.

The Discussion tool allows members of a Shared Space to communicate asynchronously via topic threads (see Figure 1 on page 4). Individuals can create a new topic or can post responses to existing messages. Postings generated in response to existing messages appear nested under the first message focused on that topic.

Other tools of note include the Pictures tool (Figure 2), which serves as an image gallery, the Sketchpad tool (Figure 3) which allows for collaborative whiteboarding, the Web Browser tool (see Figure 4 on page 6) which allows members to concurrently surf the Web within the Groove Transceiver interface, and the Files tool that allows users to share and collaborate on files.

Among the technology-based training development staff at my organization, we use Groove as our Knowledge Management forum to manage projects, communicate, and share knowledge about e-Learning initiatives. For example, using the Pictures, Sketchpad, Files, and Discussion tools, we collaborate on interfaces and interactions that are implemented in customer-facing product training courses. We use Groove to collaborate on the creation of global standards surrounding the design and development of e-Learning courses. By using Groove as a central repository for all of our developing documentation surrounding standards creation, we ensure that everyone involved has the most recent iteration (whether working on-site or remotely). We use the Outliner and Sketchpad tools to brainstorm these processes prior to document creation. The Discussion tool is also useful for us as a means to contribute and consume knowledge surrounding best practices for e-Learning design and development.

Groove is a very extensible application in that members of a Shared Space can easily add or remove tools to increase or decrease the capabilities of the Shared Space through the Add Tool functionality (see Figure 5 on page 7). Workspace is bundled with over 12 tools and additional tools can be retrieved from the Groove.net Web site.

Fostering collaborative online communities

Establishing collaborative communities is the first step, but online communities likely will not thrive without initial nurturing. Michael Feldstein notes, "Humans rely on face-to-face social networks as a matter of instinct. In contrast, the reflex to seek support online from people you have never met is not natural." Apart from selecting appropriate technology, steps should be taken to ensure that newly formed online communities grow into effective environments.

According to Rob Crompton and Peter Murchland, there are five common charac-

FIGURE 2 *Screen shot of Groove™ interface, illustrating Pictures tool.*

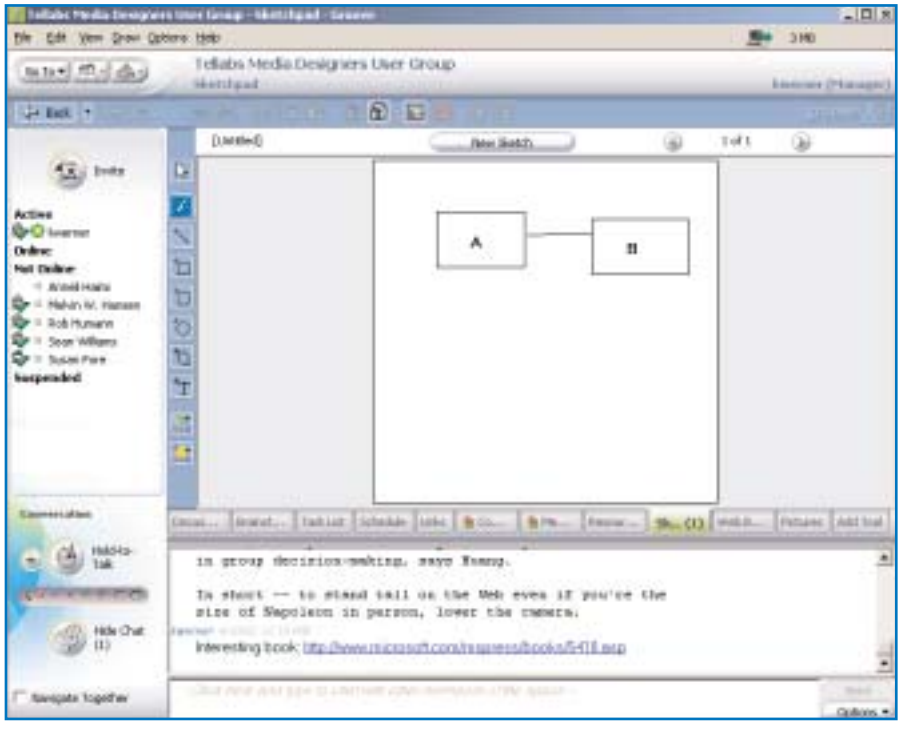

FIGURE 3 *TScreen shot of Groove™ interface, illustrating Sketchpad tool.*

FIGURE 4 *Screen shot of Groove™ interface, illustrating Web Browser tool.*

teristics that define successful online communities:

- They consist of a group of people with a common interest, point of focus, or purpose.
- They have a need to create and share knowledge.
- Participation and sharing occur on a voluntary basis.
- They rely primarily on asynchronous, text-based communications.
- They use an online, Internet based discussion forum.

Crompton and Murchland also list key features of technology needed to support successful online communities:

- Identification of the author, time, topic and keywords for each contribution;
- Capacity to edit contributions for a nominated period;
- Search facilities based on forum, keywords, text, date ranges and authors;
- Capacity to contribute files, documents and images to supplement text;
- Facilities to organize and index supplementary objects;
- Ability to determine what members had last read in order to determine whether they have had a chance to read recent contributions;
- Tools for monitoring participation, enabling leaders to contact those who withdraw to seek feedback and encourage participation; and
- Tools for survey, polls, or other mechanisms for determining opinions or making decisions.

At my organization, the technology-based training development community collaborates through normal discourse and boundary discourse. We all are members of the community of e-Learning creators, yet we also have sub-communities of instructional designers, media developers, and managers — each with its own specialized realm of knowledge. We've found that Groove facilitates our conversations, helping us to acculturate each other and increase our intellectual capital.

Applications to collaborative learning

We are not yet using Groove as an e-Learning environment at Tellabs. At this point, we do not have the infrastructure in place to support use of Groove for e-Learning delivery. However, collaborative environments are becoming more important in education and are well worth considering. (See "Peer-to-Peer Computing, Improve Your Interface, And More," by Bill Brandon in the May 14, 2002 issue of *The eLearning Developers' Journal* for more on this.)

According to Kenneth Bruffee, Ph.D., a leading collaboration theorist, social constructivist, and Professor of English and Director of the Scholars Program and the Honors Academy at Brooklyn College, City University of New York, "education requires complementary casual engagement in reacculturative conversation among peers. To learn is to gain fluency in the language that constitutes the knowledge communities we aspire to join or that others invite us to join." Bruffee posits that knowledge is constructed socially in three different ways:

- Through normal discourse, or negotiation among members of a community of knowledgeable peers,
- Through nonstandard or boundary discourse — negotiation at the boundaries among knowledge communities,
- And through negotiation at the boundaries between knowledge communities and outsiders who want to join them.

In order to aid collaborative learning via effective communication, Preece presents the following guidelines:

- Support personal presence.
- Establish common ground by compensating for limitations of the media.
- Encourage participants to develop explicit, sensitive, and sensible communication styles.
- Encourage empathy, trust, and cooperation. Focusing on the purpose of the community will increase familiarity among members, which leads to empathy, trust and cooperation. Help participants to make their intentions clear by providing emoticons and a menu of gestures.
- Develop clear policies to encourage all of the preceding guidelines. All of these measures will help to discourage aggression, flaming, and other inappropriate behavior.

Preece also indicates some requirements for the communications software itself. "Design choices that relate to the community's purpose, as well as policies for social interaction and communication tasks strongly influence usability." Preece's software tool guidelines for encouraging good communication in a collaborative learning environment are:

- Develop accurate conceptual maps for users with different levels of experience. Clearly word instructions and procedures for doing such basic tasks as reading, composing, and sending messages.
- Provide editing facilities. This means supplying various fonts and symbols, a spell-check capability, and templates for sending messages, among others.
- Enable the communication of emotion and intent. For example, include a dictionary of easy-to-understand icons that can be included in messages to clarify their meaning.
- Support different levels of experience.

For example, provide information about advanced editing features in a separate place, so that inexperienced users are not overwhelmed.

- Protect user rights. If privacy, security, and copyright are issues in the community, inform users about the mechanisms being implemented to protect them.
- Make communications easy to follow. This means, for example, that you should show as many lines of "conversation" on the screen as possible, and ensure there are sufficient channels available in chats.
- If graphical representations are used to indicate user activities, provide histories, enhance users' presence, and so on, make sure that graphics communicate information as intended.

Groove adheres to these guidelines in its form and function and by following best practices in the Shared Space, a Groove community is highly functional and useable for the members. For example at Tellabs, within the Discussion tool, we provide instructive text for new users who may be unfamiliar with threaded discussions. Groove's embedded online help, which provides clear, brief descriptions of each tool, guides new members and orients them to the tools. Once a user feels comfortable with a tool, she can hide the overview of that tool in order to reveal more screen real estate for the application.

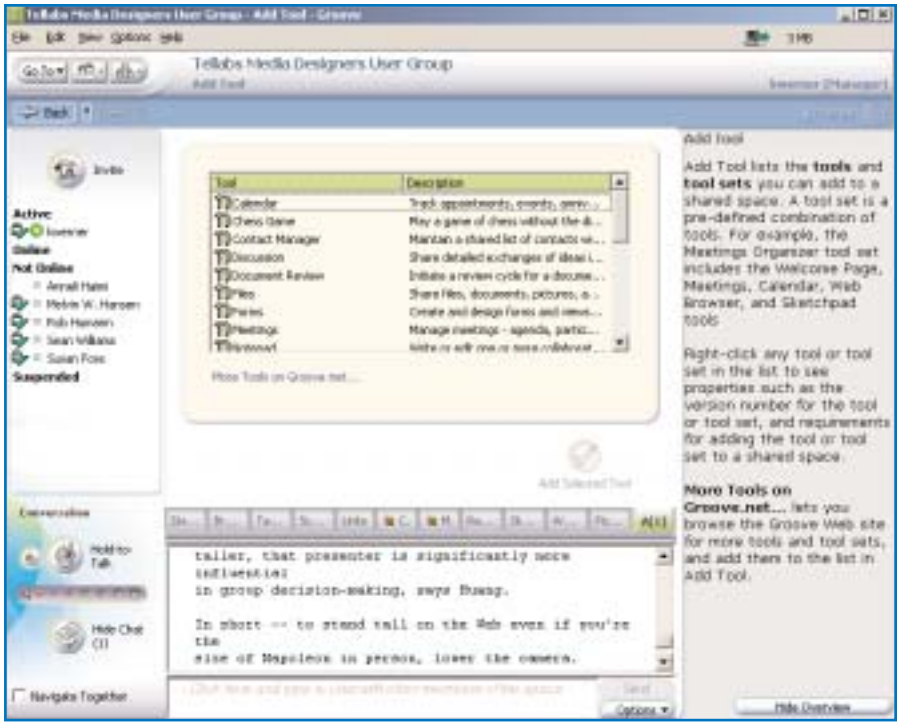

FIGURE 5 *Screen shot of Groove™ interface, illustrating the Add Tool functionality.*

Great, not perfect

While our experience with Groove has been generally positive, there are some limitations that potential adopters of this technology should keep in mind. These are related to computer hard drive space, platform and browser limitations, internet connectivity limitations, and language limitations.

Due to its peer-to-peer nature, using Groove necessitates that each member of a Shared Space store all the information contained within that Space on their computer hard drives. While typical Shared Spaces might not consume a great amount of kilobytes, as additional assets are added to a Space, the memory requirements increase. This issue will generally apply to any peer-to-peer application. Groove also requires 100MB free disk space, and additional disk space must be available as data is added to a shared space.

The dependence on members' hard drives also means that there is a slight risk of losing a Space due to hard drive failure. This can be more easily avoided if there are more members in a Space, since more members means wider distribution of the content. Additionally, there is a "Backup Account" feature in Groove that allows members to backup a Space in the event of such failure. The Backup feature stores information about preferences, settings, contacts, and Shared Spaces in a file with a .grv extension. This file can then be saved to a location where it can be retrieved later.

In some organizations, Groove's platform and browser requirements may be an obstacle to use. Currently, Groove is only available for the Microsoft Windows (98/NT 4.0/2000/ME/XP) operating system. In addition, Groove is compatible only with Microsoft Internet Explorer 4.0 or later.

Groove works best over a LAN or DSL or cable modem. It requires a minimum of a 56 kbps modem connection. Users attempting to work with Groove at slower connectivity speeds will likely be frustrated.

Finally, Groove only supports English. The company does have plans to offer support for additional languages based on customer demand.

Conclusion

Success factors for online communities should be observed in order to ensure the longevity and meaningfulness of the environment. Within an organization, support from leadership is one key to increasing the online community to a level of critical mass. Once employees are participating, feedback should be garnered from them in order to ensure usability. The framework for the community should be extensible so that changes can be made to the space based on participants' needs, and it should be revisited periodically to validate its effectiveness. "It takes time and energy to develop an online community to a point where meaningful discussion and knowledge construction can take place, so an established community is a great asset," as Janine Bowes points out.

The establishment and diligent nurturing of relevant and useable online peer-to-peer (P2P) communities is beneficial to organizations. Enhancing employee participation and contributions streamlines workflow processes by diminishing duplication of efforts and increases intellectual capital by encouraging knowledge sharing / learning. The online nature of such communities means that participation is not contingent upon being at a particular place at a particular time, as Crompton and Murchland point out. Enabling employees to work together without geographical or time constraints is vital to global corporate success. Most importantly, involving a broad spectrum of people with vast ranges of knowledge and experiences supports information exchanges which would otherwise not exist.

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