A Report on the Role of Web 2.0 over the Next Five Years in Technical Communication

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Abstract

“A Report on the Role of Web 2.0 over the Next Five Years in Technical Communication”

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The authors conducted a study of the effects of Web 2.0 on three concentrations within the profession of technical communication. The study answered two questions. How will Web 2.0 and its successor technologies affect the profession? What major challenges will professionals face to remain effective in the profession? The authors concluded that Web 2.0 would profoundly affect the means for creating texts. Web 2.0 completely changes the environment in which professionals create texts. Prior to Web 2.0, professionals tended to work alone. With Web 2.0, professionals may collaborate interactively with other stakeholders. They do so with a range of new tools. Consequently, the authors recommend that professionals become aggressive about understanding Web 2.0 tools and concepts. Professionals must continually educate themselves about Web 2.0. They must learn to control the collaborative process. Finally, colleges and universities that teach technical communication should focus on Web 2.0. They should train students to work effectively with Web 2.0 tools and concepts.
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Executive Summary

Web 2.0 is a revolutionary technology concept. It will profoundly change the profession of technical communication. It will do so by potentially allowing stakeholders to collaborate in online environments to create technical documents. Stakeholders include trained professionals and untrained users.

Web 2.0 allows collaboration in every sense of the word. It allows stakeholders to collaborate at any point in the process. The technical writing process is normally linear. Through Web 2.0, it becomes multi-directional and multi-dimensional. The process also may have no end.

Web 2.0 ensures that the nature of communication will continue to change. To remain employable, technical communicators should gain command of the tools and concepts. Because social collaboration is ripe for conflict, they should also learn to control the collaboration process.

Professionals should also drive the actual changes affecting the profession. If professionals drive the changes, they steer the process away from potential chaos. They steer it towards maximum advantage for all stakeholders. This ensures the safety of stakeholders. This also ensures that the technology serves the stakeholders and not the other way around.

The authors used both secondary and limited primary resources to prepare this report. Secondary research involved a literature review. That review sought to understand the nature of technical communication before and after the advent of Web 2.0. Limited primary research included webinar attendance and college faculty interviews.

The traditional flow of communication in a corporation is from top-down. Web 2.0 introduces a range of tools that should challenge this tradition. It should do so by eliminating the gatekeepers who presently prevent stakeholder ideas from reaching management.

Corporations should benefit greatly from interactive collaboration. However, Web 2.0-based collaboration may present challenges to appropriate control needs. To benefit from Web 2.0, managers and corporate training departments must learn to navigate these challenges.

Web 2.0 provides stakeholders in education with new interactive media tools. Instructional designers, educators, and students use the new tools to enhance the eLearning experience.
allow students to customize content to meet individual needs. They also allow instructional designers and educators to more rapidly create and change the content that drives a course.

Stakeholders are now seeing the impacts of Web 2.0 on education. Wikis, blogs, podcasts, RSS feeds, and tagging help facilitate the flow of content among stakeholders. Each tool offers stakeholders the rich education experience that comes through collaboration. Stakeholders may now work together in a virtual space to solve a range of education challenges.

The technology of eLearning continues to evolve. Presently, Web 2.0 allows users to consume media content. Soon, Web 3.0, also called the Semantic Web, will allow stakeholders to assign value to and establish relationships between and within media content. This will allow stakeholders continually to evaluate which content is essential to the education process.

As Web 2.0 insinuates itself more into society, employment will depend on mastery of collaboration and Web 2.0-based eLearning technology. Upon graduation, students should be skilled collaborators who know how to use these Web 2.0-based tools.

Technical writers and editors are beginning to see the impact of Web 2.0. Web 2.0 potentially changes the writing environment from solitary to communal. They may now work interactively through the World Wide Web to create and edit texts.

A multitude of stakeholders may now contribute to creating a text. The potential benefits include instant feedback from an intended audience. The potential detriments include a lack of safety, usability, or suitability. If not properly managed, the Web 2.0-based process holds the potential for chaos.

Liability burdens continually arise from technical communication products. In a Web 2.0 environment, there may be no certainty about which stakeholders bear that burden. It may be impossible to locate the responsible stakeholders.

Stakeholders may not research or write with due diligence. They may not have the skills to construct a proper text. They may not know the required or voluntary safety standards implemented by various governments or sanctioning bodies. They may have no skills for localizing texts for stakeholders from different cultures.
Any business, organization, or academic institution involved with technical communication must take Web 2.0 seriously. It is already here. Stakeholders use its tools every day to create and deliver information. Stakeholders will likely continue to use Web 2.0 tools whether or not organizations choose to allow it.

Web 2.0 collaboration carries the potential to create better texts more quickly. Collaboration with non-professionals also carries the potential for great liability. Without the guidance of trained professionals, there is the potential for chaos.

The authors conclude that businesses, organizations, and academic institutions must allocate the resources necessary to train professionals. Professionals must understand and guide both the process of collaboration and the use of Web 2.0 technologies. If professionals do not understand and guide Web 2.0-based technical communication, the costs to society may be prohibitive.
Introduction

Discussing the Subject of the Report

The subject of this report is the effects of Web 2.0 on technical communication (the profession). With this report, the authors ask two questions. First, how will Web 2.0 and its successor technologies affect each concentration of the profession? Second, what major challenges will technical communicators face to remain effective in the wake of Web 2.0?

Web 2.0 is a technology concept that may potentially drive the profession over the next five years. It may drive the profession because both professional and non-professional stakeholders may now collaborate to create technical texts. They may collaborate across the World Wide Web without restrictions on time and space.

Web 2.0 holds the potential to help stakeholders create better texts in less time. It also holds the potential for chaos and danger. Consequently, professionals must become master facilitators. They must skillfully coordinate the collaboration process. They must also master the concepts and tools of Web 2.0. Society may depend on it.

Discussing the Purpose of the Report

It is the authors’ opinion that Web 2.0 will create revolutionary change within the profession. With every change comes challenge. This report hopes to inform stakeholders about these challenges. To remain effective and employable, professionals must prepare to meet these challenges.

The purpose of this report is also to suggest a course of action for educators. Professionals must learn to facilitate effectively the collaboration process. They must also master the concepts and tools of Web 2.0. Without these skills, technical texts may be difficult to use. Worse, they may be unsafe to use. Consequently, the authors recommend that curriculum shift to create graduate competencies in these vital skill sets.
Defining Key Terms

In this section, the authors define key terms used in report.

Defining Technical Communication

Technical communication is the practice of conveying technical, scientific, and professional information to a specific, well-defined audience. Professionals produce technical texts that meet the needs of this audience (Lannon, 2008).

The audience uses technical texts in a variety of contexts and industries. This audience also uses texts under a variety of physical conditions, from well-lit office buildings to sparsely lit coalmines.

A technical text provides its audience with information. This information helps the audience maintain awareness, make correct decisions, take correct actions, and remain safe and alive while doing so. The technical communicator must therefore construct an easily used, easily understood text for the audience.

Professionals serve many roles. They use both traditional and innovative media technologies to create and disseminate information. Traditional media may include the simple pen and paper. Innovative media may include state-of-the-art computer-based eLearning systems. Consequently, technical communicators perform a wide range of activities with all sorts of media.

The authors recognize four distinct concentrations within the profession. In doing so, they adopt the criteria of the Department of Technical Communication and Media Production at Metropolitan State College of Denver (n.d.). These include:

- corporate communication
- interactive media production
- video and media production
- technical writing and editing
Defining Web 2.0

Web 2.0 is the Internet-based convergence of technology. This convergence allows users to participate in networks to achieve various goals. John Musser and Tim O’Reilly (2007), the latter being the creator of the term, define Web 2.0 as:

"...a set of economic, social, and technological trends that collectively form the basis for the next generation of the Internet-- a more mature, distinctive medium characterized by user participation, openness, and network effect.”

At first, it appears that most people interact with Web 2.0 through play (Schmid, 2008). Players currently use the following environments to facilitate both real-time and delayed interaction:

- online gaming environments, like World of Warcraft and Everquest, that reside on online servers
- social network software, like Second Life, that resides on combined local computers and online servers
- social network Web sites, like Facebook and MySpace, that resides on online servers
- media display Web sites, like YouTube and Daily Motion, that resides on online servers
- file swapping software, like iTunes and Rhapsody, that reside on combined local computers and online servers

Defining Texts

Web 2.0 offers stakeholders a new concept for creating texts. That concept allows stakeholders to collaborate online. They do so using a convergence of media technologies. This convergence allows them to create any text imaginable.

In this sense, the word “text” does not necessarily mean the conventional output of words and images to paper or computer screens. Rather, it means every imaginable form of computer-based creative expression.

Either separately or in combination, Web 2.0 allows for expression through:
• videos
• games
• animation
• fine art
• music
• films
• graphic presentations
• podcasts
• streaming netcasts
• words and images printed on paper
• words and images displayed on or with computer output devices

**Discussing the Scope of the Report**

In this section, the authors discuss the scope of the report. The scope includes discussions of the collaboration process and the Web 2.0-based concepts and tools as they apply to the profession.

**Discussing the Role of Collaboration in Technical Communication**

Professionals have different thoughts about the meaning of collaboration. This report makes use of the definitions offered by Jones (2007). These include:

• contextual collaboration
• hierarchical collaboration
• group collaboration

Professionals use contextual collaboration most frequently. It includes two forms: genre use and document borrowing.

Genre-use collaboration occurs when an author employs the genres, templates, and models created by others to form sections of a text. Document-borrowing collaboration occurs when an author recycles text elements from previously written texts. Professionals apply genre use collaboration more than any other form in Jones’s typology.
Professionals use hierarchical collaboration in moderation. It includes two forms: author-centered and sequential.

Author-centered collaboration occurs when a single author creates all elements for a completed text. These elements include original text, edits, and graphics. Sequential collaboration occurs when a different technical communicator edits the copy of an original author.

Professionals use group collaboration the least of all. It includes four forms: horizontal-division writing, group single-authored writing, reactive writing, and joint writing. Each form requires the interaction of two or more authors to create a text.

Horizontal-division writing occurs when "units" of writers work with little interaction on sections of the same text. Group single-authored writing occurs when one author creates the majority of a text, while others contribute small sections. Reactive writing occurs when a group of authors shares the work, separately creating each unit. Joint writing occurs when a group of authors interacts throughout the process to create a whole text. Jones indicates that joint writing is the least frequently employed form of collaboration.

Despite Jones's findings, this report contends that professionals will collaborate more because of Web 2.0. If you build it, they will come. This is because, compared to conventional technical communication, the interactive nature of Web 2.0 makes collaboration relatively easy and inexpensive.

Until now, collaboration was difficult. It spanned geography and time zones. It required collaborators to use relatively expensive, compatible software and hardware. At times, collaborators transported the draft text by mail or overnight courier. This likely increased the costs beyond the grasp of many independent professionals. If used at all, electronic communication was by e-mail or instant messenger applications.

Also until now, technical texts traditionally flowed one-way, from communicator to user. Feedback came through various forms of usability testing. Users had little direct input into the process of creating the text.
Web 2.0 changes all of this. It begins by changing the terminology. The authors suggest that we no longer use the words “author” and “user” to express these relationships. Rather, the better term is “stakeholders.” Any participant in the process is a stakeholder. Each now has a potentially direct role in creating and editing a technical text.

Web 2.0 allows stakeholders to work without the restrictions of time and space. It allows them to work online at little or no cost. It allows for the use of otherwise incompatible hardware. It allows for the use of Web-based, communal software. It allows information to flow interactively through a network rather than from communicator to audience. This may irreversibly change the top-down nature of the profession.

**Discussing the Role of Web 2.0 in Technical Communication**

Technical communicators presently provide content in several forms using Web 2.0 concepts and tools. These include:

- online help, user manuals, and professional manuals
- narration and scripts for games
- video scripts
- game scripts
- graphic presentation scripts
- content for online classrooms
- content management system scripts

Web 2.0 allows stakeholders to do something not easily done until now. They may collaborate online to create the technical, scientific, and professional texts. These are the texts traditionally printed on paper or displayed on computer screens.

Futurist Ray Kurzweil demonstrates in *The Singularity is Near* (2005) that, regardless of economic or social trends, humans always evolve new technologies. There is no reason to believe this will not be true for the future of Technical Communication.

An inspection of several college and university Web sites shows they organize technical communication courses around theory and application (Metropolitan State College of Denver,
n.d.; Regis University, n.d.; University of Colorado at Denver, 2008). They also include courses that prepare students to use software applications common to the profession.

To graduate competent professionals, academic programs should keep curriculum current about new technology concepts. Graduates must master the emerging, influential technology for the profession. Without technological competency, the money spent on curriculum by government, endowments, students, and higher education institutions may be for naught. The authors hope this report clarifies opportunities for developing an integrated curriculum for the emerging revolutionary concept.

Research suggests that, over the next five years, Web 2.0 may create a revolution in how technical communicators create texts. It also suggests that employment opportunities should flow to those who master Web 2.0. Equally as important, they may help advance the opportunities for collaboration within the profession.

**Organizing the Report**

This section details how the authors organized the remainder of the report. The remainder of the report contains four sections:

- Results
- Conclusion
- Recommendations
- References

The authors divided the Results into two sections. For the first section, they answered the following questions:

- How will Web 2.0 and its successor technologies affect each concentration?
  - What was the state of the profession before Web 2.0?
  - What is the state of the profession after Web 2.0?
  - How should professionals respond to Web 2.0 within each concentration
The authors reported their findings as follows, based on three of the profession’s concentrations:

- Daniel Sutter reports on corporate and, specifically, internal organizational communication.
- Bethany Lamer reports on interactive media production as it facilitates eLearning.
- Robert Sampron reports on technical writing and editing.

For the second section, they answered these questions:

- What major challenges will technical communicators face to remain effective in the wake of Web 2.0?
  - What are the general effects of Web 2.0 on professionals and the audience?
  - What new tools are available for professionals?

The authors jointly discussed the content of the following sections. However, they prepared each section separately.

- Robert Sampron authored the Introduction.
- Bethany Lamer authored the Conclusions.
- Daniel Sutter authored the Recommendations
- Robert Sampron edited the References.

The References section includes a detailed list of sources. The authors organized references according to the format detailed in the *Publication Manual of the American Psychological Association, 5th ed.* (2001).

The authors edited the document jointly, with Robert Sampron serving as executive editor.

**Discussing the Recommendations**

This section contains three recommendations. The authors conclude they are critical for the profession.
First, the authors recommend that all technical communicators become intimately familiar with Web 2.0. Their ability to work as professionals likely will depend on understanding the concept and working with its resulting tools.

Second, the authors recommend that technical communicators become strong facilitators of collaboration. They must become versed in collaboration in every sense of the word used by Jones. These skills will allow professionals to work with stakeholders anywhere in the world. By doing so, professionals will use Web 2.0 concepts to create texts that educate, inform, and ensure the safety of stakeholders.

Finally, the authors recommend that colleges and universities adopt curriculums reflect the reality of Web 2.0. This means developing curriculum around Web 2.0 and successor concepts, tools, and trends, and its central tenant of collaboration. This will ensure that the programs properly prepared graduates for the challenges facing them in the professional world.
Research Methods

The authors used the following research methods to create this report.

1. The authors used secondary resource materials to compile qualitative data.
   - These resources included:
     - journal articles
     - scholarly research papers
     - scholarly research projects
     - books
     - tutorials
     - industry magazines
   - The databases used to gather these materials included:
     - Google Scholar
     - Academic Search Premier (Ebsco)
     - LexisNexis Academic
     - IntegraConnect
     - Skyline at Auraria Library
     - Academic OneFile

2. The authors interviewed experts in the field.
   - These experts came from:
     - various departments of higher education on the Auraria Campus
     - the business community in the Denver metropolitan area

3. One author attended a webinar on the use of Weblogs in the profession.

4. The authors tested Web 2.0 by collaborating through several currently available Web-based tools.
   - The authors felt this first-hand experience would provide a personal perspective on Web 2.0. The insight proved invaluable.
• The Web 2.0 tools included:
  ▪ Adobe Buzzword
  ▪ Zotero
  ▪ Delicious
  ▪ Skype
Results

The following section contains the research results for this report. The authors organize the section by concentration as follows:

- corporate communication
- Interactive communication
- technical writing and editing

Though the authors discuss many of the same Web 2.0 tools throughout, they do so based on their uses within each respective concentration.

Corporate Communications

*Discussing the State of Internal Communication for Organizations before Web 2.0*

Prominent across the globe, corporations unite human capital to reach strategic goals and secure financial profit. Over time and through competition, corporations evolved into complex entities.

Corporations employ a diverse number of individuals who function in various roles. They also subdivide into functional departments. Because corporations are composed of diverse factions, they require management and coordination to regulate affairs, identity, and ensure that the corporation functions as a whole.

Communication is the vehicle that drives the collective action of corporate members. Communication both regulates corporate affairs and facilitates collaboration. Belasen (2008) depicts corporate communication as a tool used to “lead, motivate, persuade, and inform numerous audiences inside and outside the organization” (p.4).

Corporations also use communication to organize and structure the enterprise. Cornelissen (2004) notes that, in the eyes of internal and external stakeholders, corporations organize communication to manage their identities (p. 23).
Corporations communicate with both external and internal audiences. External audiences include investors, regulatory agencies, other corporations, and target markets. The internal audience includes all members of the corporation. Corporations use internal organizational communication (IOC) to target internal audiences. According to Belasen (102-107), IOC allows:

- members to seek and provide the information needed to perform role functions and build the corporate knowledge base
- members to share ideas and build collective knowledge to motivate action and inspire innovation
- leaders to regulate and direct the collective action of members toward a super ordinate goal
- members to create and re-create the corporation’s identity
- members to understand and integrate with the organization

**Discussing the Structure of Internal Communication for Organizations prior to Web 2.0**

Corporate leaders dictate IOC. Because IOC bolsters many important corporate activities, the leaders develop corporate communication policy. Cornelissen also explains that corporations often develop communication departments to oversee communication processes and policies.

Corporate communicators write, edit, and publish IOC texts to ensure that communicated messages align with corporate strategy and identity (p. 31-34). Corporate communicators manage both the vertical and horizontal activities of a corporation (p. 125).

Vasu, Stewart, and Garson (1998) describe two pathways for the flow of an IOC text in a corporation. The first is a vertical, top-down pathway from leaders to subordinates. The other is a bottom-up pathway from subordinates to leaders.

As seen in Figure 1, leaders may disseminate texts directly to subordinates in a top-down flow. In doing so, they often deploy the hierarchical and group collaboration methods described by Jones. Corporations use these forms of collaboration to create and distribute most top-down memos, letters, newsletters, training programs, and publications. Leaders also collaborate with
internal departments, including the corporate communications department, to decide which audiences to target, messages to distribute, and forms to use to best to convey those messages.

Figure 1. The pattern of corporate top-down, vertical communication

The Internet radically affects corporate communication. Most corporations communicate internally through Intranet Web-like sites. Leaders often use either the communications or the information technology (IT) departments to design and distribute messages through the Intranet. Therefore, Intranets are subject to top-down communication.

Figure 2 depicts the traditional, bottom-up pathway described by Vasu et al. Texts trickle from corporate subordinates up to corporate leaders, passing through gatekeepers along the way.

Tightly managed IOC ensures that messages align with the image and identity of a corporation. For this reason, gatekeepers review and filter messages sent by subordinates. Only select or modified texts reach their intended, higher-level target audiences.

This censoring, however, may have a negative effect. When censoring these messages, gatekeepers may deprive leaders and the broader corporation of innovative ideas, knowledge, and information. The gatekeepers in a vertical IOC may essentially deprive the corporation of more helpful collective knowledge.
Figure 2. The pattern of corporate bottom-up, vertical communication

Figure 3 depicts the typical horizontal IOC described by Vasu et al. Horizontal collaboration occurs among members of one department or between members of all or several departments. They collaborate and communicate to produce projects, reports, and other tangible texts.

Figure 3. The pattern of corporate horizontal communication.

As with vertical IOC, horizontal IOC may challenge the collective knowledge of a corporation. Belasen notes that IOC texts are often unique to the department from which they originate. Members from different departments may experience difficulty collaborating and communicating with one another because of textual differences (p. 5).
Available communication mediums may also hamper horizontal IOC. Communication mediums prior to Web 2.0 did not provide communicators with a common forum for collaboration.

In the pre-Web 2.0 environment, communicators used horizontal IOC to exchange memos, conversations, and E-mail messages. This required collaborators to balance both the medium and their independent calendars. This balance proved complicated.

The fast-paced, global business environment further complicated things in the pre-Web 2.0 environment. Collaboration, facilitated with horizontal IOC, often made communication disorganized, lengthy, and inefficient.

The trend towards corporate globalization also creates challenges for horizontal IOC, especially when combined with the trend towards the virtual office. Members who function outside of the physical corporation frequently do not expose themselves to corporate culture or other members. A lack of exposure likely limits both corporate integration and cultural assimilation. Collaboration likely suffers when members neither understand nor embody the corporation’s identity and culture.

**Discussing the State of Internal Communication for Organizations after Web 2.0**

Web 2.0 is the latest advancement to revolutionize technical and corporate communication. Web 2.0 and its decedent technologies may neutralize many of the challenges created by traditional IOC.

In their paper describing Web 2.0 business models, Hoeg, Martignoni, Meckel, and Stanoevska-Slabeva (2006) write that Web 2.0 bolsters:

- continuous and interactive maintenance of various opinions
- interactive accrual of corporate intelligence
- interactive exchange of information

These elements may be absent or lacking in traditional IOC. The integration of Web 2.0 transforms managed communication structures into collective, contributive systems. These
systems rely on contribution and communication of text from all corporate members. Holtz (2005) writes that the Web 2.0-based tools most likely to affect IOC are wikis, blogs, social networks, Real Simple Syndication (RSS), and folksonomies.

**Wikis**

Wikis epitomize collaboration, collective knowledge, and ease of use. Gerrits (2008) describes wikis as Internet-based texts that allow users collectively to create and edit the pages of a Web site. Based on permission granted by the corporation, users may add, delete, and modify wiki content. Therefore, wikis nix single-authorship of Web sites. They rely instead on community authorship.

Wiki software allows users to edit text elements over the Internet, without downloading Web-creation software. Wiki software enables authors to add and edit content in real time. Authors can easily learn and use wiki tools. They need not construct Web sites using code. Wikis also support authors who use a wide range of media content. These include:

- typed text
- video
- sound
- hyperlinks
- other embedded Web 2.0 applications

Wikis are widely applicable for IOC. Gerrits further writes that wikis may rival single-authored, corporate Intranets.

Based on permissions granted by corporate leaders, members may collaborate to build wiki-based Intranets. These author-stakeholders come from diverse backgrounds and have different roles to play when building wikis. Consequently, the content likely contains varying, non-standardized ideas, information, and perspectives. This gives stakeholders, ultimately meaning all members of the corporation, an outlet for expressing ideas and a means for accessing the IOC. Consequently, wikis breed Intranets that contain more expansive expression than top-down Intranets.
Apart from corporate Intranets, Holtz also writes that wikis may be effective tools for managing both corporate projects and knowledge. Wikis create a common forum through which individuals or departments collaborate. Collaborators then gain uninhibited access to information at any time and location.

Because collaborators have latitude to add or alter content, wikis facilitate the forms of group collaboration defined by Jones. When used as either project management or knowledge management tools, wikis serve as one-stop shops for communication.

**Blogs**

Blogs are Internet journals hosted on a Web site. They list content in reverse chronological order. Jackson, Yates, and Orlikowski (2007) write that some corporations already host blogs on corporate Intranets.

Corporate blogs allow posts, meaning messages and information, to become immediately available to the entire corporation. Traditional mediums confined corporation-wide messages and information to E-mails, memos, etc. Blogs achieve not only IOC output, but also input as readers comment on the posts. By commenting on posts, readers contribute additional information and perspective to the corporation’s collective knowledge.

According to Lee, Hwang, and Lee (2006), blogs take on many forms to facilitate IOC. Bottom-up blogs permit employees across the corporation to both post and respond to other corporate blogs. Top-down blogs encourage leaders to convey information and messages to subordinates.

Leaders may create a top-down blogging strategy that best fits communication and leadership objectives. They may also author their own blogs. One author may write a stand-alone blog. Others may collaborate on a communal blog.

In contrast, bottom-up blogs are not subject to select authorship. All members of the corporation may contribute to bottom-up blogs, creating an "employee-based blogging culture."

Lee et al draw attention to the balancing act between blogger autonomy and strategic IOC control. Blogs created through a bottom-up flow may not contain a more corporate-focused perspective. Leaders may not easily control the messages authored on each blog. On the other
hand, top-down blogs maintain tightly controlled IOC. As with pre-Web 2.0 vertical IOC, this strategy restricts collective knowledge and perspective.

Jackson et al also found that apart from collective knowledge and information exchange, blogs provide social benefits to corporate culture and identity. By reading information and perspectives from peers, members derive an understanding of each other. By reading blogs of diverse authorship, members may expand their ideas and understanding of the corporation.

**Social Networks**

Facebook and MySpace, both Web 2.0 applications, have become a part of commonplace technology. Old and young alike utilize social networking tools to make personal contacts, reconnect with past acquaintances, and conduct interpersonal communication around the world.

IOCs that resemble these Facebook and MySpace may find their way into corporate Intranets. Corporations could utilize public social networking Web sites. However, it is more likely they will utilize private, internal sites. Private sites, located on a corporate Intranet, offer more security than public sites. In addition, network membership is exclusive to those who work for the corporation.

A few corporations already have integrated social networking practices into their array of Internet-based tools. DiMicco et al (2008) studied the effects of IBM’s social networking Web site, Beehive. They discovered social networks in corporate settings allow members to “express themselves in rich, personal ways, so that other users could get an expressive picture of who an individual was on a personal and professional level.”

True to the nature of Web 2.0, corporate members control how others utilize their social network pages. Like wikis and blogs, heavy participation creates great amounts of information and perspective. High participation yields a broad base for collective sharing, community knowledge, and strong social ties.

Dimicco et al found that social networks produce advantages for IBM. They learned that members networked to meet other members, create stronger ties to the corporation, and communicate across different geographic regions and departments.
Dimicco et al further report that members utilize social networks to care, climb, and campaign in a corporation. “Carers” use networks to meet fellow members and learn about their perspectives and corporate responsibilities. “Climbers” use networks to establish a dialogue with those members who control access to job promotions. “Campaigners” use networks to promote and obtain feedback from other members about projects.

In a Web-based social network, communication channels are uninhibited. There is no interference between the senders and receivers of a message. Consequently, social network Web sites permit unimpeded development of both functional and personal relationships, all to the benefit of the corporation. This is the opposite of most vertical IOC policies.

**RSS and Folksonomies**

Corporations may utilize other Web 2.0 tools. Holtz (p. 25) identifies Real Simple Syndication (RSS) and social tagging (folksonomies) as useful IOC texts.

RSS allows corporate members to subscribe to a Web site, so they may receive notice about new content when added. Members manage their subscriptions through an aggregator. Essentially, corporate members use RSS to track changes to pertinent information on the Internet, Intranet, wikis, and blogs. RSS streamlines the information-gathering process and mitigates the phenomenon of information overload, which is all too prevalent in our technology-driven era.

Members tag Web sites by leaving a text description about the site. Collectively, the tags create a categorization system known as a folksonomy.

Corporations deploy folksonomies to streamline the information-sharing process across the corporation. Members tag Web sites and blogs they perceive as essential or helpful to the corporation. As members construct the folksonomy, they access and share information. This allows them to build easily collective corporate knowledge.
**Discussing Effects of Web 2.0 on Internal Communication for Organizations**

Prior to Web 2.0, IOC conveyed only the dominant ideas and expressions of corporate leaders. By limiting the upward flow of input from subordinates, corporate leaders left underdeveloped countless scores of ideas, knowledge, and information. They let languish a pool of collective knowledge that could lead to further innovation and success.

Web 2.0 may pose a solution to many of the challenges created by traditional IOC. Because Web 2.0 relies on collaboration, it offers a solution to the limited expression of traditional IOC.

Take the wiki for example. Numerous authors contribute content created individually to one common text. Wikis culminate as a Web site rich in diverse expressions, perspectives, and information. The text benefits from the roles, education, experiences, and perspectives of each author. Therefore, information and ideas published on wikis are much richer than those published on single-authored sites are.

Web 2.0 orchestrates a continuous dialogue among all members of the corporation. Members may share and obtain ideas, knowledge, and information through one another. It perpetuates a constant flow of interactive expression that continually creates and re-creates collective knowledge.

Because Web 2.0 permits broad corporate expression, collective knowledge is limitless. Dynamic, shared information may readily stimulate new ideas. It may inspire the minds of corporate members. Constant, open-sourced information allows corporate members to play with each other’s ideas and arrive at new solutions to business challenges.

When integrated into a corporation, Web 2.0 allows members to become decision makers, or at least contribute to the decision-making process. They gain a responsibility normally reserved to management. This may give members pride-of-ownership over ideas and, by extension, the corporation. Self-organized communication replaces vertical communication. Ultimately, corporate members decide what identity the corporation will have and project to stakeholders. Figure 4 depicts how corporations shift toward self-organized, collaborative communication with the integration of Web 2.0.
Web 2.0 also consolidates communication tools. Wikis, blogs, social networks, RSS, folksonomies, and other Web 2.0 applications reside on the World Wide Web. Corporate members no longer need to download applications or resort to numerous communication media when sending and receiving messages.

With Web 2.0, communication tools are either located on or linked to one main source, such as a wiki or Intranet. Consolidated communication streamlines IOC and mitigates disorganized communication. Streamlined IOC facilitates communication across geographical and temporal boundaries.

Gerrits indicates that Web 2.0 may also support cultural assimilation and dissolve departmental segregation. Through Web 2.0, corporate members communicate and collaborate with one another to create text.

Collaborative work allows members to become aware and make sense of each other. Altebockwinkel (2008) found that corporate blogs foster contact and interaction among members outside of the Internet (p. 16-23). Web 2.0 texts take on a face, name, and personality with whom other corporate members may begin to form relationships.
Of course, Web 2.0 poses significant challenges to corporate communication. Web 2.0 theory and application are relatively new and unexplored. Traditional communication texts, like memos, meetings, formal training methods, and even E-mail, existed for a long time in corporations. In response to these mediums, corporations developed policy, strategy, and usage standards.

Corporations are yet uneducated in the strategies necessary to manage Web 2.0. They lack rationale for making decisions about its usage in the corporate setting. This will challenge corporations to make sense of theory and application. They must invent usage policies, norms, and protocols.

Corporate communicators must develop standards by which texts reach prescribed audiences to achieve purposeful results. Not all corporate members understand how communication theory and application relate to corporate identity. Chaos may reign when each member of the corporation potentially contributes to internal texts.

Once implemented, leaders have limited control over Web 2.0 content. Hostile, negative, misguided, or other inappropriate communication is possible. Web 2.0 also potentially allows messages to reach and influence external audiences, messages that are antithetical to corporate identity.

Web 2.0 ushers in both positive solutions and negative hazards to corporate communication. As Web 2.0 gains popularity and momentum, corporations must determine whether the positives of integrating Web 2.0 outweigh the negatives.

**Discussing the Changing Role of the Corporate Communicator**

Web 2.0 shifts IOC from the hands of corporate leaders to the hands of corporate members. Corporations with a record of tightly managed IOC may experience difficulty accepting this shift in standards. Altebockwinkel points out that corporations that consider using Web 2.0 must demonstrate a willingness to de-emphasize corporate hierarchy (p. 25-28).

Communicators will need to assess the corporation is willing and ready to take on Web 2.0. They will likely research how best to use it. If corporate leaders resist Web 2.0, communicators may then lobby for Web 2.0. If leaders accept, they may expect communicators to pioneer use of the technology and demonstrate its advantages or disadvantages to all stakeholders.
Prior to Web 2.0, corporate communicators primarily were doers. They wrote, edited, and published strategic IOC. They collaborated with other corporate members. Ultimately, they created and distributed IOC texts.

Web 2.0 makes every corporate member a potential author and distributor of IOC text. It makes each member an equal stakeholder in the IOC. Consequently, corporate communicators will likely need to transfer their skills and knowledge to these stakeholders.

Communicators should expect to train members to use the Web 2.0 tools and theory to maximum effect. They should also expect to instruct members to conform to the new text standards likely developed by corporate leaders.

It is unlikely that Web 2.0 will completely remove corporate communicators from their roles as authors, editors, and publishers. Rather, the context in which they deploy these roles may change.

Corporate communicators will likely guide stakeholders in the use of IOC. They will likely monitor stakeholder contributions for both content and effectiveness. They also will likely survey IOC texts to ensure they achieve their objectives while upholding corporate standards.

In the wake of Web 2.0, if they are not now under present IOC, corporate communicators will likely become strategic thinkers and decision-makers. They will likely select the Web 2.0 applications that will best benefit the corporation. Therefore, they will shift from merely authoring IOC texts to designing and implementing the entire Web 2.0-based corporate communication systems.

Web 2.0 applications will likely need usage policies. DiMicco et al (p. 712) write that these policies will minimally concern time limits, participation, networking, permissions, profile currency, appropriate content, etc. Corporate communicators will likely collaborate with corporate leaders to develop these policies.
Interactive Communication

**Discussing the Role of Web 2.0 on Interactive Media Production in eLearning**

Media professionals produce interactive media to facilitate eLearning. The Encarta Dictionary (n.d.) defines eLearning as “learning using electronic means,” and “the acquisition of knowledge and skill using electronic technologies, such as computer- and Internet-based courseware and local and wide area networks.” Professionals use a combination of media elements to create interactive content. These elements include

- text
- sound
- graphics
- animation

For eLearning, professionals use the following systems to deliver Web 2.0-based, interactive, eLearning media to users (Bournemouth, n.d.):

- computer games
- websites
- mobile devices and technologies
- webcasts of broadcast television and radio
- weblogs (blogs)
- podcasts
- E-zines and private publishing
- CD ROMs
- DVD ROMs
- web advertisements
- web databases
- interactive television
- on-line learning materials
The most common and widely used platform for interactive media is the World Wide Web, also known as the Internet, the Net, and the Web. Its original purpose was “to meet the demand for automatic information sharing between scientists working in different universities and institutes all over the world” (European Organization for Nuclear Research, n.d.).

The World Wide Web made its first appearance in 1990. By 1994, the Web had 10 million users. The Web is a revolutionary tool and continues to develop. Its next generation, Web 2.0, is already here.

Education is one area significantly affected by Web 2.0. Educators use the Web as another “place” for learning. Educators call this enterprise “electronic learning” and, more often, “eLearning.” Mark Nichols (2008), an eLearning specialist from Laidlaw College in Auckland, New Zealand, defines eLearning as “pedagogy empowered by digital technology.”

This section of the report explores the effects of Web 2.0-based interactive media production on education. It explores how instructors taught students before and after Web 2.0; how the role of technical communicators, known within education as instructional designers, evolved; and how technical communicators should respond to this new technology.

**Discussing the Roles of Audience and Creator in the Web 2.0 Environment**

Three stakeholders participate in creating and implementing an eLearning solution. They are:

- instructional designers
- educators
- students

**Instructional Designers**

Instructional designers are technical communicators who help develop eLearning tools for educators. Throughout the process of developing tools, instructional designers must be aware of the science and psychology of learning. They must also remain aware of the immediate needs of the users of these tools, the educators and students. Joni Dunlop (personal communication, March 11, 2009), an instructional design professor at the University of Colorado at Denver,
believes that because Web 2.0 allows for individualized study, designers should also team with educators to create the ultimate learning experience for students.

**Educators**

Educators are the content specialists in the learning process. They use eLearning tools, created by instructional designers, to convey information and enhance learning.

To create content and learning experiences, educators must also understand the science and psychology of learning. They must analyze the needs of their audience, the students. Instead of developing lesson plans in a week-by-week fashion throughout the course, educators usually prepare materials before students begin to participate in the class. This allows educators time to develop eLearning tools with instructional designers, working out in advance the technical issues that may arise.

**Students**

Students are the ultimate beneficiaries of the eLearning experience. They are the ultimate audience for eLearning tools. By engaging students through interactive tools, instructional designers and educators give students responsibility for their own learning experiences. Students no longer have information spat at them; rather, they may now tailor information to meet their personal needs.

**Discussing the State of Education before Web 2.0**

Beginning with B.F. Skinner’s 1954 essay, *The Science of Learning and the Art of Teaching*, various studies, theories, and hypotheses of education developed. According to Leigh (1998), Skinner’s movement began to shift pedagogy “…away from the uninformed application of instructional technology to the formulation of theoretical models of learning.”

Part of Skinner’s theory concerned the development of regimented learning. Regimented learning led to the development of a professional class of instructional designers. The first large-scale need for instructional designers developed during World War II. The United States quickly needed to train hundreds of thousands of people to support the war effort. To meet that need, Leigh writes that instructional designers developed several regimented learning method. These methods included the use of propaganda materials, instructional films, and instruction manuals.
In the pre-Web 2.0 environment, instructional designers continued to follow the first wave of education technologies. John Moravec (2008) refers to this period as “Education 1.0.” The pre-Web 2.0 concept did not encourage students to ask questions.

Designers did not evaluate the needs of social stakeholders when defining concepts. The definitions were concrete for all stakeholders in the education process, including instructional designers, educators, and students.

Teaching was essentially a passive activity, with educators verbally lecturing at students in a physical classroom. This meant learning occurred at a specific time and place, with licensed educators teaching in an orthodox manner. Technology, though expensive, was available to facilitate education. However, educators rarely used it.

Various companies hired instructional designers to design the pre-Web 2.0 education tools. These tools included:

- textbooks and workbooks
- films and videos, including documentaries
- sound recordings on long-play vinyl records, tape and compact disc (CD)
- speaker support positive print slide presentations
- overhead projector slide presentations
- computer-based speaker-support slide presentations

**Discussing the State of Education after the Advent of Web 2.0**

What would happen if a new technological concept made use of ubiquitous learning? What would happen to educators and instructional designers if that concept allowed them to create new learning tools? What would happen to students if these tools allowed them to interact with the curriculum? Stakeholders would consider this a revolutionary concept. This revolutionary concept is Web 2.0.

For education and instructional design, Web 2.0 evolved into eLearning. Instructional designers now investigate new concepts, theories, and technologies with an open mind. This results in designers adopting new technologies to deliver instruction. These technologies cost
less and no longer restrict the learning experience to the four walls of a classroom. Learning may now take place through technology and the World Wide Web.

**Discussing the Tools Available to Professionals and Students through Web 2.0**

**Learning Management Systems/Content Management Systems**

The Learning Management System (LMS), a form of the Content Management System (CMS) is a gateway to eLearning. This computer program allows instructional designers and educators to organize both content and tools. Educators may use an LMS as a personalized Website. To teach a specific course, educators grant different types of permission to access the Website.

The LMS includes a home page that links to different pages within the system. The different pages contain hypertext links to course content within and outside the Website. Different pages also contain hyperlinks to specific LMS tools. Depending on the permissions granted, these tools allow stakeholders, meaning the designers, educators, and students, to take tests, submit assignments, grade tests and assignments, and use social software.

Grodecka, Pata, and Väljataga (n.d.) report, “There is a need for the learning management systems connecting those individualized tools and supporting the learners to contribute to the learning communities.” There are several tools available to LMS users. Some involve personal publishing to the World Wide Web. Others involve social networking. They allow users to interact with course content and each other.

Thus far, the most important tools for creating an educational atmosphere include:

- blogs
- wikis
- podcasts
- social network systems
- bookmarking systems
- folksonomy (tagging) systems
• Extensible Markup Language (XML)
• Real Simple Syndication (RSS) feeds

While LMS creates a great start for eLearning, it also contains many challenges for stakeholders.

Blogs

An Internet-based blog is a type of online journal, in which articles, called “entries,” appear in reverse chronological order. Normally, a simple what-you-see-is-what-you-get (WYSIWYG) editor allows a blogger, the creator of blog entries, to insert text, images, and audio. Although originally used as a sort of diary, blogs now let bloggers ruminate and communicate. Bloggers create entries about their thoughts on certain topics, such as those about an industry or hobby. They then discuss these thoughts by commenting on entries written by others.

Individual bloggers usually manage a personal blog. However, a group may also publish a blog. According to Grodeka et al, when individuals collaborate through blogs, they create a “blogosphere.”

Blogging serves several eLearning functions. According to Grodeka et al, “Weblogs can promote various types of thinking (analogical, critical, analytical, etc.), creativity, and the ability to associate concepts and ideas.”

For example, as bloggers comment on entries made by others, they may offer constructive criticism and encouragement. In an educational situation, this means one student may write the draft for a paper as a blog entry. Then, other students may peer-review the draft by making comments.

Another example comes from a study conducted by Ebner and Maure (2007). Because they understood that learning does not always take place in formal settings, they used a weblog to enhance formal learning and encourage informal learning.

They gave students one topic to discuss within a blogosphere. They then discussed the same topic in class. In the blogs, students recorded their thoughts, theories, and feelings. They then discussed the blog entries among their peers.
When Ebner and Maure later covered the same topic in class, they discovered that students were more likely to internalize the information first discussed in the blogosphere. The students did so because they already had a conceptual idea of the topic.

Other uses of blogs in education include:

- developing a portfolio of class activities
- developing a student diary that charts academic progress
- providing students with class activity instructions
- introducing students socially to each other
- working in a “collaborative workspace”

**Podcasts**

Podcasts are audio broadcasts delivered over the Internet (Berge, Z., & Donnelly, K., 2006). Podcasters post the broadcasts to the World Wide Web as computer files in the MP3 format.

The podcast user may play the file directly with a desktop or laptop computer. They may also place the files on CD-ROMs and play them with special CD or DVD players. Next, they may place and play files using flash-drive equipped players, such as the Apple iPod. Finally, they may upload them to Digital Video Recorders (DVR) or other media server devices and play them on conventional or digital and high definition televisions.

Podcasting is attractive to users because the files allow portability and time shifting. Portability allows a user to play the pre-recorded file wherever desired. Time shifting allows the user to play the pre-recorded file whenever desired. Podcasts also allow users to multitask while listening.

Although podcasting is technically a Web 1.0 technology, it becomes a Web 2.0 technology through “podcatching”. Podcatching allows a user to select the podcasts they want to hear by subscribing to specific podcasts through Real Simple Syndication (RSS). RSS then automatically delivers a new file to a subscriber when available.

Podcasting may serve several different educational needs. Podcasts may engage students in different ways, creating a more personal connection with the message. It allows them to hear a
message rather than simply read text or view images. As previously mentioned, podcasts also allow for multitasking. It allows the user to complete an instruction set while listening to the podcast.

**Tags (Folksonomies)**

Tagging, also known as Folksonomy, is a way to index information on the Web. Previously, professionals and authors used metadata, which is data about data, to organize and catalog information. For example, they would associate an ‘equestrian training’ tag around all the information within paragraphs of a document that pertained to equestrian training.

Programmers build tags into a program. This convention denies users the ability to organize information as they see fit. In the Web 2.0 environment, users now tag/index Web-based information for their own personal needs.

Figure 5 shows the home page for the Website called “Delicious.com.” This site allows a user to post a link to a Website. It then allows the user to associate tags to the content at that Web site.

For example, the Web site www.norway.org may include the tags, “Norway,” “Scandinavia,” “fjords,” “oil,” “Oslo,” etc. This concept allows present users to create building blocks for what technologists now call the Semantic Web and Web 3.0 (Ohler, 2008).

Currently, Web 2.0 simply allows for the display of information. However, by using folksonomy, Web 3.0 allows users to assign value to information. This, in turn, allows users to create what they feel are relevant relationships between different pieces of information.
Figure 5. The folksonomy website "Delicious."


Jason Ohler offers this example from his article, *The Semantic Web in Education*:

“If you want to know my mailing address, currently you need to go to my web page and root around until you find it. That is because the current coding system used to build web pages, largely HTML, displays information without identifying it in any meaningful way. That is, my address is not coded as “an address,” it is simply presented as a series of characters on the screen.”

Folksonomy and the Semantic Web will have a profound impact on education. According to Ohler, students will no longer spend the majority of their time searching for information; rather, they will quickly comprehend, meaningfully apply, and critically assess the information.
Extensible Markup Language (XML)

Extensible Markup Language (XML) is a programming language and strategy that separates content from its presentation (O’Keefe, 2009). The language allows users to create a macro program for presenting content before creating it.

For example, a company needs to create a number of contracts for various business relationships. Some of the language used in the different contracts is the same. Rather than writing the same language into each of these contracts, XML allows the company to create a document based on page elements.

These page elements contain various phrases, clauses, sentences, paragraphs, tables, figures, and images. As when adding ingredients to a mixing bowl to bake cookies, users add different document elements to the macro document. The macro document contains blank spaces where the user inserts XML tags assigned to the various page elements. XML allows users to create standardized language for a range of documents with only a few keystrokes.

XML also allows for quick changes to page elements in existing documents. As with folksonomies, XML documents contain metadata tags (O’Keefe, 2009).

Metadata tags are attributes that describe the content in a document. Rather than using the paragraph tags discussed in the example on folksonomies, authors use metadata to place descriptive tags around layout features designed into a document. One example of a descriptive tag may be the frame for a photograph in a text. This tag creates an “address” for that frame within the document. Users and authors may then quickly search for the tag and populate the area with a different type of frame or none at all.

The same tagging may apply to single words or whole paragraphs of text. Continuing with the example above, the company decides to change the words for one page element in 50 different types of contracts. Rather than manually searching for this page element in 50 styles of contracts, the user simply updates the language for this page element in an XML-encoded database of page elements. This page element corresponds to a metadata tag within all 50 styles of contracts.
These metadata tags make it easy and quick to locate specific information addresses in an XML document. The change to this page element in the database then automatically updates, or populates, that page element in each affected document.

Figure 6 shows an example of XML coding. For XML to work correctly, a user or author needs to encode the document to read properly the XML page elements.

![XML code example](image)

**Figure 6. An example of Extensible Markup Language (XML).**

XML offers many uses throughout eLearning. For example, instructional designers and educators may create document templates of XML text elements by using metadata tags. They may then upload content to populate the document. They may also make changes just as simply and quickly as for the 50 styles of contracts.

XML may also be useful in creating and updating interactive applications. For example, an instructor creates a Web site for an art class. The instructor uses an XML database to archive content in the form of text and images. The instructor also designs a Web-based user interface. The interface uses text element placeholders for content, but does not include the content itself. It
merely passes through content from the XML database. Students then view the content through the Website interface.

Using a poll incorporated into the Website, an art instructor may solicit student opinions about which images are or are not art. The instructor may then easily change the images based on student opinions. Rather than changing the interface design of the Website, the instructor merely adds and deletes images to the XML database. This update then repopulates the Web site with those images.

If permissions are set accordingly, XML allows the students to directly add or delete images and to repopulate the Web site based on the instructor’s original interface design. It saves time, money, and creates a truly interactive experience for both educators and students.

**Discussing the Effects of Web 2.0 on Instructional Designers, Educators, and Students**

With the new amounts of information available, the thirst for knowledge has become almost immeasurable. This creates an information overload (Moravec, 2008). Grodekia et al writes that, based on the iCamp Project’s in-depth study of the effects of Web 2.0 tools on eLearning, “… control of learning itself (is placed) in the hands of the learner.” In other words, Web 2.0 lets learners control the flow and amount of information.

Because they have more control, eLearning potentially allows students to tailor the learning experience. This means students are able to choose which tools help them learn most effectively.

For example, student Sarah knows she learns best through hands-on work and examples. She learns well through repetitive auditory information. As a result, using Web 2.0, Sarah listens several times to an instructional podcast while blogging with other students about applicable concepts.

In another example, Joe prefers to reflect on information. To do so, he blogs about information he tagged while conducting research.

When learners individualize content, the process has a strong potential to depersonalize the experience. This results from an imbalance between synchronous and asynchronous communication.
Synchronous communication occurs simultaneously among two or more people. It often occurs through auditory voice, either in a common physical location or through videoconferencing (Hrastinski, 2008).

Asynchronous communication includes learning through texts, such as textbooks or instructional manuals. The result is often a lack of social contact among students and educators. Each person may feel lost, isolated, and unimportant. This hinders learning.

Hrastinski states that “instead of trying to determine the best medium (synchronous and asynchronous communication), the eLearning community needs an understanding of when, why, and how to use different types of eLearning.” To be effective and to understand the when, why, and how of eLearning, users and creators should learn how to collaborate using Web 2.0 tools.

Web 2.0 tools allow stakeholders to work together to create a useful education experience. Collaboration helps students feel less isolated from each other and their instructors. Collaboration also makes use of collective information to further individual learning, memory, and cognition.

It is important to create new knowledge. The continuing evolution of technology and eLearning concepts is here to stay. As a result, to remain professionally relevant, educators and instructional designers need to develop a philosophy of awareness. They need to learn, prepare for, and accept future changes in technology. Technological change may be a significant way to solve current challenges.

For students to find employment in the future, they should develop a similar philosophy. Several industries universally use Web 2.0 tools. They will most certainly use these and future tools to train and prepare employees.

One example of a needed change is to create a more user-friendly LMS. The current LMS has an archaic, confusing feel. Often times, educators have a hard time making the systems work to meet instructional requirements.

Instead of the LMS working to help facilitate individualized learning, educators center learning on a specific LMS tool. In his 2004 article, George Siemens stated that when using an LMS, an educator’s intent should be to,
“...give the end user the control needed to respond effectively to personal learning goals (that extend beyond those identified by the course designers [and] instructor). Learners learn [...] in chaotic ways, based on personal interest, context, opportunities for application, etc. The learning ecology of tools utilized should permit learner control – both for the type of content explored and the manner in which it is explored...”

Those involved with eLearning should understand that Web 2.0 tools merely facilitate learning. They continue to evolve just as society, technology, and the science of learning evolves. The LMS is no exception.

Instructional designers, the media professional stakeholders in the process, need to understand the broader impact of Web 2.0 on the world and, specifically, in education. This understanding may lead to new methods for using eLearning tools. It may lead to developing new tools. Ultimately, eLearning tools will evolve to create the most productive educational experience possible.

Stakeholders who participate in eLearning will individualize the learning experience. However, they may also lose the personal touch of the pre-Web 2.0 environment. Those who use and create eLearning experiences may overcome this alienation from the group by collaborating, innovating, and opening their minds to more a personal Web 2.0 experience.
Technical Writing and Editing

Western culture taught its children, since the ancient Greeks, that writing was a solitary activity. Armed with his tools, and for most of history writers were male, he recorded what he envisioned in his mind’s eye, using stone and chisel, papyrus or vellum and quill, typewriter and paper, or computer and recording media.

Reading was almost as solitary an activity. With the exception of the public reader of ancient Rome or the invaluable schoolteacher who read to her class after lunchtime, to this day most readers sit in a quiet place, open a text, and digest its words. Even while reading technical texts with the aid of a computer, most read alone.

Until now, writing and reading were essentially a monologue. If the text were successful, its meaning would cross from a writer’s mind onto paper. Then from paper, the meaning would cross from the reader’s eyes and into his or her mind.

Following the instructions of Adler and Van Doren, in How to Read a Book (1972), sometimes the reader would jot down notes into the margins of the text. In doing so, the reader would have a dialogue of sorts with the writer, though the writer never knew it.

A reader would also occasionally reply to the editor of a newspaper, periodical, or professional journal. That, however, was the extent of the two-way exchange between writer and reader.

Web 2.0 changes this. It does so profoundly for technical writing and editing. It opens the process to collaboration in every sense of the word offered by Jones.

Defining Technical Writing and Editing

Technical writing is a specialized form. To write a technical text, a writer uses specialized tools and techniques to create a work. That work facilitates understanding or aids people to complete a task.

These texts include but are not limited to:

- reports
- requests for proposal
- help guides
- user manuals
- process and instruction sets
- descriptive essays
- localized texts for translation into other languages

As Markel explains in *Technical Communication* (2007), the specialized tools and techniques include:

- planning the text
- developing textual elements
- developing visual elements

Technical editing is also a specialized form. To edit a technical text, an editor creates and/or uses a stylistic plan to ensure the accuracy, readability, legibility, usability, and safety.

This stylistic plan focuses on copyediting and proofreading for the various elements of a text (Rude, 2006). These include:

- Textual elements
  - spelling, punctuation, grammar, and usage
- Technical and quantitative elements
  - tables, numbers, statistics, measurements
- Structural elements
  - tables, figures, headings, and body text placement
• Visual elements
  o as photographs and illustrations

• Globalization and localization elements
  o technical text used across world cultures

**Discussing the Process of non-Web 2.0-based Writing and Editing**

As Jones suggests, there was usually some form of collaboration when creating a technical text. Until Web 2.0, this collaboration resembled Henry Ford’s automobile assembly line. The writer(s) and editor fitted together one piece of the text puzzle after another until complete.

Figure 7 shows the pre-Web 2.0 writing process. In that process, a project manager-editor creates a style guide for other team members to follow. The style guide then helps another team member or members build their respective sections of the text.

After some research, one member may create the text elements. Another may create the graphic elements, such as tables, figures, and illustrations. Another may create the layout for these elements, based on a template. The template itself may be the product of a commercial software manufacturer, like Adobe or Microsoft. If so, though they do not work directly on the project, they are indirect members of the team. Finally, the project manager-editor copyedits and proofreads the text through its many revisions.

Markel suggests that before setting down a word on paper or into computer memory, team members should research the subject and analyze the document’s audience and purpose. After creating a near-final draft, the team assesses the document’s usability. This may involve testing the document with members of its intended audience.

Finally, the editor ties together the various elements to make a coherent whole. This linear flow makes each stage of the process almost as solitary as when Plato wrote his dialogues on papyrus. It is a process of discrete steps tied together by the project manager-editor.
Depending on the available budget and size of the organization, there may be only one person who both writes and edits a text. He or she alone is responsible for completing all stages of the process. In this case, there is no collaboration.

**Discussing the Process of Web 2.0-based Writing and Editing**

Web 2.0 offers technical writers and editors the potential to change all of this. It offers team members the opportunity to work simultaneously on the process of creating a text. It also offers users and other interested parties the opportunity to create and comment on the text (Stroupe, 2007).
In the Web 2.0 environment, the process is no longer linear. It takes place through the World Wide Web. Once started, the process may be asynchronous. It relies on an interconnected web of stakeholders. These stakeholders contribute and edit various elements of the text (Lundin, 2008).

Stakeholders collaborate in cyberspace, without regard to time zones or geographical space. In the Web 2.0 environment, the text project may have no end. The text may never be complete. It may become subject to perpetual revision by all stakeholders. There may be no final period.

Let us use the release of a new Web browser as an example of the Web 2.0 process. A Web browser is a piece of software used to access Hypertext Markup Language (HTML) code on the World Wide Web. With the browser’s release, its developers offer no manual for its use.

To create a manual, the developer instead allows stakeholders, meaning anyone using the browser, to collaboration. Any stakeholder may contribute perpetually to the manual’s text, shaping the understanding of fellow stakeholders. The developer opens this process through one of two tools: a wiki or a Weblog (commonly known as a blog).

Lundin defines wikis as “user-editable Web sites.” The process for creating a wiki is social, interactive, and complex. Probably the most important factor is that a wiki is never actually complete. Lundin writes that it reflects the evolving experiences of a “knowledge community.” Unless the originator officially ends participation in the wiki, stakeholders are free to continue making edits.

Lundin also writes that one principle benefit is a wiki’s ability to capture various historical versions of a text. No contribution is ever lost. The project manager, if there is one, can always restore an earlier version to the Website.

Lundin further writes that one principle detriment of a wiki is its susceptibility to arguments. Wikis are social environments. Sometimes, arguments turn into “flame wars.” A flame war is a verbal boxing match, in which stakeholders engage in vituperative attacks against each other. They often get ugly, and may compromise the wiki’s original intent.

Even when removed from the present version of a wiki, flame text always exists in earlier, viewable historical versions. It is always there, always available to complicate relationships.
Another detriment is a wiki’s susceptibility to “spam.” Spam messages are generally unsolicited advertisements from entrepreneurs. Project managers may battle spam in two ways. First, they may delete spam messages from newer versions of the wiki. Second, they may remove the spammer’s permission to participate in the wiki. As with flame wars, spam text always remains available in earlier versions.

Ko, Yin, and Kuo (2008) cite the definition of blogs offered by Herring and Wright. Blogs are “frequently modified Web pages in which dated entries were listed in reverse chronological sequence.” Ko, Yin, and Kuo also cite the content typology for blogs offered by Blood. This includes:

- filters
  - covering things and events external to the blogger’s (the author-editor’s) life, such as world events and online happenings

- personal journals
  - covering things and events internal and external to the blogger’s life, such as thoughts and internal workings

- notebooks
  - covering things and events both internal and external to the blogger’s life, such as essays about political and social events, intended to persuade and/or gain status and deference

Ko, Yin, and Kuo write that a blogger may grant permission to readers to contribute comments about the articles. As a result, a blog may become another interactive tool for disseminating technical information. It is also subject to the various benefits and detriments of any social system.

If stakeholders participate in the spirit of good will, they may benefit from the evolving base of knowledge captured in a blog. Unlike a wiki, there is no way to capture historical versions of text. If a flame war breaks out among stakeholders, the blogger may simply delete the offending comments. Once deleted, the comments are gone forever.
As with any social system, some stakeholders seem relatively more important to the process than others. Ko, Yin, and Kuo call these “opinion leaders.” Opinion leaders exert more influence than others do within the blogging community. They become the principle channels through which stakeholders obtain information. Stakeholders within the community defer to their judgment and skill.

It is clear from the study that, in South Korea, mass media, meaning radio and television, does a superior job compared to blogs of informing the public. If blogs first disseminate information, the messages have little impact on the blogging community at large. If, however, the mass media first disseminates the information, the social network of bloggers, called the blogosphere, accelerates its distribution.

The mass media may also launch a great deal of discussion within the blogosphere. No study exists to confirm whether this is true for wikis. There is also no reason to believe this distinction between mass media and blogs is different for the United States.

Figure 8 shows the Web 2.0 collaboration process for writing and editing technical text. The darker arrows denote the relatively more important contributions of opinion leaders.

Though Web 2.0 tools do not presently match the efficiency of the mass media for creating and disseminating information, this does not mean they will never do so. In the January 2009 edition of *intercom*, published by the Society for Technical Communication, Dr. Thomas Barker discusses the potential use of Web 2.0 tools in the event of a pandemic (2009).

During a pandemic, technical writers and editors likely will use Web 2.0 tools to deploy their professional skills. These include skills in:

- research
- information management
- usability testing
- document design
Barker writes that Gene Rowe, of the Institute of Food Research, identified three models of public engagement during a crisis. Technical writers and editors will use Web 2.0 tools to help facilitate each. These models include:

- the public communication model
• the public consultation model

• the public participation model

Three overarching processes take place within each model. These are preparedness, response, and recovery. Table 1 details the tools Barker theorizes that technical writers and editors will use to conduct these processes.

**Table 1. Emergency Activities Facilitated by Technical Writers and Editors with Web 2.0 Tools**

<table>
<thead>
<tr>
<th>Tools</th>
<th>Preparedness</th>
<th>Response</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web sites</td>
<td>Wikis</td>
<td>RSS feeds</td>
<td>Forums</td>
</tr>
<tr>
<td></td>
<td>Wikizines</td>
<td>Mobile Applications</td>
<td>Blogs</td>
</tr>
<tr>
<td></td>
<td>Bookmarking sites</td>
<td>Phones</td>
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<tr>
<td></td>
<td></td>
<td>Personal Data Assistants (PDAs)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Content Management Systems</td>
<td></td>
</tr>
</tbody>
</table>

Of note in the last several weeks, flooding developed along the Red River valley in North Dakota. Community members used Facebook and Twitter, Web 2.0-style social network Websites, to call for and coordinate help (Condon, 2009). An estimated 4,550 volunteers responded to these random appeals. One can only imagine the response to a formal, coordinated message.
**Discussing the Web 2.0-based Tools Currently Available for Writing and Editing**

There are several broad categories of Web 2.0 tools currently available for technical writers and editors. Table 1 listed some. This section includes a more comprehensive description for each. These tools include:

- **Blog**
  - This Website allows a writer to post articles on any topic imaginable. It also allows readers to contribute comments.

- **Bookmarking Websites**
  - This Website allows collaborators to submit and classify links to other Websites. Collaborators then classify the links by subject, called metadata tags. The tags are key words that allow users to quickly search for and identify appropriate links.

- **Content/Learning Management System (CMS/LMS)**
  - This database system allows for the archiving of any form of content, including text, images, video, sound files, etc. The authors discuss this tool at length in this report’s section entitled, “Interactive Media Production in eLearning."

- **Forum**
  - This Website serves as a communications hub for aggregating messages posted about a specific topic.

- **Mobile application**
  - This is a software application that allows mobile phones and personal data assistants (PDA) to receive specific types of information. An application may include a program for browsing the Web, receiving E-mail, sending text messages, etc.

- **RSS feed**
  - This is a software application instruction, written using Extensible Markup Language (XML). It allows for the delivery of news articles or comments to either an E-mail inbox or RSS newsreader. An RSS newsreader is an application in a Web browser or a piece of stand-alone software. RSS newsreaders receive XML-
encoded page elements uploaded from wikis, blogs, forums, wikizines, or Web sites.

- Web site
  - This is a conventional World Wide Web site. It allows individuals to post any number of personally created articles. There is generally no restriction on content.

- Wiki
  - This Website allows collaborators to write and edit texts.

- Wikizine
  - This is a Web-based magazine, created from collections of articles submitted by collaborators.

**Discussing the Effects of Web 2.0 on Writing and Editing**

The ultimate effect of Web 2.0 is that technical writers and editors may now easily collaborate, in every sense of the word, to create technical texts. The positive effects of collaboration appear to be the ability to bring together people of different backgrounds to solve a user’s puzzle of needs. The negative effects appear to result from a lack of professional education in technical writing and editing. These negative effects may trump any benefits.

To meet the needs of an audience, professional technical writers and editors, who are indeed experts, research the subject matter, hardware, and software on which they elaborate. They consult with other experts on issues ranging from safety to the daily use of a product. They factor into their work knowledge of the standards required by various government and trade organizations. They then create and test a design of textual and visual elements that best inform users.

Non-professional stakeholders do not likely understand or appreciate the issues confronting professionals. Among others, these include user safety and document usability.

For user safety, professionals include in a text a multitude of required use and safety standards. Professionals know that an alphabet soup of organizations around the world creates, advocates, and enforces these standards (Robinson & Etter, 2000).
Here is an example of a safety issue that might arise in the Web 2.0 environment. A company wishes to ship a hair dryer to countries in the European Union (EU). To do so, the EU requires that the user manual conform to its standards. The manual should also conform to standards set by sanctioning bodies within the EU’s individual countries.

Non-professional stakeholders likely do not know about these standards. Professional technical writers and editors do. As a result, a non-standards-based manual may result in injury to the user.

What happens in a Web 2.0 environment if a text does not conform to these standards? Who is responsible for monitoring conformity? Who ensures the safety of a user when the manual is the product of a wiki or blog? To whom does liability affix for death or injuries? If Johnny241, a wiki stakeholder who signs his entries with a pseudonym, is responsible, how do we find him? We probably cannot.

Here is another safety issue that might arise. Even in the non-Web 2.0 world of technical writers and editors, there is an abundance of problems. One concerns the issue called “localization.” To prepare a text properly for a non-domestic audience, professionals must consider and research a range of cultural variables. Some variables include differences in politics, social norms and deviance, linguistics, and technology (Hoft, 1995).

Simply by going through any number of user manuals, it is easy to see the localization errors made by professionals. One can only imagine the errors made by non-professional wiki and blog stakeholders. These errors could seriously injure a user or a user’s child.

Figure 9 gives a good example of an error in localization (St. Germain-Madison, 2006). The English version on the left includes a warning against draping an electrical cord into a freezer chest. The Spanish version on the right does not include this warning. This creates the potential for electrical malfunction by both devices. It may also result in fire.
As a final example of a safety issue, professional technical writers and editors conduct usability tests for their work. They do so to ensure that a text furnishes the knowledge and safety required by the user. They also do so to ensure the text yields accurate, consistent results whenever used.

In the Web 2.0 environment of wikis and blogs, who is responsible for usability testing? Will Johnny241 test it? He probably will not. Consequently, it is easy to see that the same significant issues plaguing safety standards in a Web 2.0 world also plague usability testing.

There are many potential benefits to using the Web 2.0 environment to create technical texts. The interactive nature of Web 2.0 can significantly aid all stakeholders to create safe, localized, tested, and usable texts.

The potential risks are significant, however. The risks are indeed potentially deadly when non-professional stakeholders enter the process. Consequently, professionals must tightly control the nature of collaboration. To do so, professionals must fully ground themselves in the theory and technologies of Web 2.0 and collaboration.

Professionals must ensure that non-professional stakeholders follow established safety standards. If not, they should remove permission from those stakeholders to participate in the wiki or blog. They should also remove the contributions of those stakeholders.

Professionals must ensure that non-professionals properly localize texts for use by non-domestic audiences. They may do so by offering wikis or blogs localized specifically for that
audience’s market. For example, if Madrid, Spain is a market for the product or software, specifically offer a wiki or blog for that market. Include a trusted, professional colleague from Madrid to monitor contributions. The International Society for Technical Communication could offer a list of colleagues willing to help.

Finally, professionals must test the text elements of a non-professional stakeholder for usability. If a contribution proves unusable, professionals should attempt to instruct stakeholders on proper usability testing techniques. If the stakeholder will not yield or accept instruction, or if the situation turns into a flame war, the professional must limit or terminate further contributions by that stakeholder.
Conclusions

The concept of Web 2.0 holds that a new group of computerized, network-based tools will allow people to associate in cyberspace to any end they can conceive. This includes collaborating interactively to create technical communication texts, without the traditional restrictions of time zone, geographical space, and, in some cases, knowledge.

The authors began this study by asking two questions. First, how will Web 2.0 and its successor technologies affect technical communication? Second, what major challenges will professionals face to remain effective in the profession?

The authors then answered these questions for three of the profession’s concentrations. These concentrations include corporate communication, interactive media production, and technical writing and editing.

Web 2.0 profoundly changes technical communication and its concentrations. It shifts the profession from solitary practices to collaborative, interactive efforts.

Web 2.0 changes who may participate in the process. It transforms the process from one of received knowledge, passed from creator to user, to one of collaborated knowledge, potentially created through a cooperative, interactive, leaderless network of stakeholders. Based on their immediate or future needs, these stakeholders may use Web 2.0 to build a potentially endless base of knowledge that trains, informs, motivates, and educates.

The major challenge faced by professionals with Web 2.0 is social, not technological. There is no dearth of instruction materials or classes for learning software. For Web 2.0, however, professionals must master the techniques of collaboration. They must learn to manage personalities even more than tools or processes. They must know how to define and negotiate roles, avoid or mediate conflicts, and prevent or cure alienation and social pathologies.

In addition to teaching media theory and software applications, researchers and educators in higher academia must also emphasize social theory. Without understanding group dynamics or being sensitive to the cultural differences of global stakeholders, both group members and the work products may suffer.
Corporate Communication

Corporate communicators use Web 2.0 tools to collaborate and neutralize the challenges presented by previous hierarchical communication patterns. Before Web 2.0, internal organizational communication (IOC) was an underdeveloped expression. Messages passed from managers to subordinates (vertical communication), or from one employee to others (horizontal communication). These methods were limiting, lengthy, muddled, and inefficient.

Web 2.0-based IOC makes communication more dynamic. It may no longer be solely internal. Stakeholders may now collaborate through a range of tools, including blogs and social networks, to create continuous dialogue and pools of common knowledge. This allows stakeholders to benefit from the diversity of roles, education, and perspectives present within and potentially outside the corporation. Web 2.0 stimulates stakeholder thought, as it allows them communally to develop new ideas.

Collaborative communication also encourages cultural awareness and assimilation. Stakeholders become either decision makers or members of the decision-making process. Web 2.0 transfers the role of author/creator from the corporation’s leaders to all of its members, to its stakeholders. These stakeholders may be within and/or outside of the corporation. This promotes pride of ownership for a text among stakeholders. Ultimately, that pride may extend to the corporation itself.

While there are many positives to using Web 2.0-based IOC, it has the potential to create challenges. Chaos may result. Conflict-based, negative communication may result.

Consequently, companies must decide whether they are ready to make the changes necessary to assimilate Web 2.0 practices and tools. If so, they must train associates to use the tools properly with a minimum of social upheaval.

Interactive Media Production

Instructional designers, educators, and students use interactive media products, meaning Web 2.0 tools, to create eLearning experiences. This allows students to benefit from worldwide collaboration, as they exchange ideas, cultural perspectives, and role knowledge.
Students may also tailor learning to meet individual needs, creating a personally productive experience. With Web 2.0, instructors no longer feed facts to students; rather, students may take control of how they learn. Instructional designers and educators collaborate to facilitate these processes.

The Learning Management System (LMS) is the gateway to eLearning. Content pages and other Web 2.0 tools link to a course-specific shell within the LMS. Stakeholders use blogs, podcasts, podcatching, tagging, and XML to enhance the learning experience.

Web 2.0 technology, used in eLearning, continues to evolve. Presently, Web 2.0 limits stakeholders to using search engines to find information. Stakeholders must then manually process the resulting data.

Web 3.0, also known as the Semantic Web, will allow stakeholders to generate assigned value and establish relationships within and between content. This will allow stakeholders to diminish the time spent seeking and sorting through information. They may then spend that time conceptualizing, cultivating, and incorporating course content.

Ultimately, this eLearning-based experience allows students to grasp fully Web 2.0 concepts. They will develop the collaboration and technology skills needed for the globalized, virtual workplace.

Interactive media professionals, meaning instructional designers, and educators must adopt a positive philosophy about future changes in eLearning technology. These changes offer them the possibility of creating experiences tailored to benefit individual students. To remain effective in their professions, these stakeholders must become lifelong learners of Web 2.0 and successor concepts. To remain employable, their students must also adopt the same philosophy.

**Technical Writing and Editing**

Technical writing and editing was once a solitary activity. Technical writers worked individually to build documents in assembly line fashion. There was some collaboration, with members working on individual tasks; however, the process had a linear flow.
With Web 2.0, technical writing and editing has become an asynchronous, dynamic, collaborative activity. Here, stakeholders of various backgrounds may use a variety of tools to create a technical text. The text may continue to evolve and grow. It may have no ultimate end.

Web 2.0 poses several challenges for technical writers and editors. The users of technical texts seek accurate, usable information from technical texts. The information must be easy and quick to access. It must also be safe to use.

Anyone with access to the Internet may become a Web 2.0-based stakeholder in a technical text project. Stakeholders may include trained professionals, uneducated users, and other interested parties.

Without the proper guidance of a professional technical writer-editor, the resulting text may be inaccurate, unusable, and, worse, unsafe for a user. An inaccurate, unusable, unsafe text defeats the intended purpose of the profession. Finally, it defeats the technical writer-editor as a trained professional.

Because stakeholders may function anonymously in this environment, it may be impossible to affix liability. To a degree, Web 2.0 makes it impossible to shut amateurs out of the process. Consequently, professionals should work to control the process as best they can. They may use Web 2.0 as a training tool to inform and educate all stakeholders about accepted writing techniques, safety standards, and usability testing methods.

**Final Comments**

Finally, the authors wish to comment on the role of higher academia in educating technical communicators to work in the Web 2.0 environment. It is felt that, upon graduation from a technical communication program, students should know:

- the concepts, methods, and strategies of Web 2.0
- practical skills for implementing Web 2.0 and successor technologies
- social theories that facilitate collaboration across cultural boundaries
- methods for securing, storing, accessing, and administering data
Society expects technical communicators to be pioneers in new communication concepts, like Web 2.0. To meet this expectation, the authors suggest that professionals become stakeholders. As stakeholders, they should fully engage in creating and implementing Web 2.0 and its successor technologies. This should help prevent chaos and facilitate accuracy, usability, and safety.

Web 2.0 creates a revolution in how people communicate and collaborate. At its core, it creates a revolution in how people learn. Colleges and universities should adopt curriculums that reflect the reality of this revolutionary change. They should develop courses around its concepts, tools, trends, and social processes. This will help prepare graduates for the quandaries facing them in the future cyber workplace.

At its core, Web 2.0 is about people. It is a social concept made possible by a collection of tools. It is important, however, not to mistake the tools for the people using them.

Those who use Web 2.0, both for work and non-work activities, should be aware of its attendant social issues. Issues always develop around social statics, which are the structures that make up human environment. They also develop around statics dynamics, which are the changes to those structures. Graduates need to know minimally how to facilitate collaboration without conflict.

Within the Web 2.0 environment, stakeholders must continually negotiate their roles. They must learn to control, contain, and keep clear of conflicts. They must also manage alienation and the attendant pathologies that arise in any social environment.

The authors began this study convinced that Web 2.0 would transform technical communication and media production. At its conclusion, the authors stand even more convinced.
Recommendations

Web 2.0 has the potential to drive technical communication over the next five years. Technical communicators will collaborate across the Internet with other stakeholders to collectively author communication texts. Technical communicators must develop new skills to meet the professional challenges posed by integrating Web 2.0 into technical communication.

Educators in higher academia should also more fully incorporate Web 2.0 into the education experience. If graduates cannot meet the challenges of working with Web 2.0, they likely will lack the skills necessary to be effective professionals.

Professionals must reconsider many factors when implementing changes to communication styles and systems. They must ensure Web 2.0 texts:

- meet the needs of the audience
- meet the objectives of the task
- improve accessibility, usability, and safety for the user
- affect the audience in ways traditional texts cannot

If Web 2.0 does not improve communication, the authors question the need to change. Even so, the authors are equally concerned that stakeholders will use the tools regardless of any authoritative decisions to not. Consequently, professionals must get out in front of and guide use of this technology when it comes to the professional use of Web 2.0.

Professionals should reconsider how current communication systems, structures, practices work to train, instruct, motivate, and educate users. Before implementing Web 2.0 solutions, professionals should understand a whole slew of concerns:

- how will the concept and tools alter the learning process
- which new tools and concepts they must master to remain effective
- how might the tools enhance communication practices
- how might the tools create problems and impede objectives
- how might the tools create more static in rather than clear the communication channels
- how communication will flow through an organization
- how they will introduce the concept and tools
• how they and others will use the tools
• who should have permission to use the tools
• who and how to regulate the flow and content

Once better understood, professionals should propose new roadmaps for integrating Web 2.0 in each social or professional context. On a practical level, they should research today’s available Web 2.0 tools and decide which ones best fit their present needs.

After selecting the right Web 2.0 tools, professionals should champion and guide use of the concept and tools. They should become experts on both the tools and the managerial decisions made about those tools.

Again, we must remember at its heart that Web 2.0 is a social system. Professionals must learn to mitigate the chaos and conflicts possible when people collaborate. Professionals should increase their knowledge of group dynamics and, perhaps, general organizational psychology. They should both the social and emotional needs of stakeholders in a process. With this knowledge, they should develop positive, affirming policies for the process. There is no reason these policies cannot meet the needs of all stakeholders, whether social, emotional, or organizational.

Finally, professionals should continually evaluate the effectiveness of Web 2.0 and its decedent technologies. It is not possible to master fully the technology. It changes too fast. One tool that meets a communication need today may not in two months. Consequently, professionals should constantly benchmark the effects Web 2.0 has on stakeholders and technical texts. Based on these evaluations, professionals should modify, substitute, or eliminate the tools.

Web 2.0 will present technical communicators with tasks and challenges that were formerly foreign to the profession. Preparing professionals to perform and meet these new tasks and challenges is paramount. The authors hope that by considering and implementing these recommendations, professionals working in technical communication will remain relevant and employable in the professional.

The responsibility for preparing the graduates of technical communication programs for the future falls on the shoulders of higher academia. Researchers and instructors must incorporate
both theory and practical application for Web 2.0 into curriculum. The authors hope academic institutions consider and implement these recommendations. The future of the profession and the safety of the users of technical texts may depend on it.
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