Introduction to Information Systems

Data Science Education Program

Chapter #8

Collaborating with technology

Key Terms and Concepts

KEY TERMS AND CONCEPTS

SMTP server
IMAP (Internet mail access protocol)
microformats
instant messaging (IM)
presence awareness
war room
group decision support system (GDSS)
web conferencing
telepresence
shared workspace
blog
wiki
microblogging
hashtag
virtual world
virtual reality
unified communications (UC)
media richness

Overview

LEARNING OBJECTIVES

1. Describe the major collaborative technologies, and explain the features that each one offers for communications and productivity.
2. Identify and describe Web 2.0 technologies that facilitate collaboration.
3. Explain how unified communications contribute to collaboration.
4. Describe features of online environments that can affect human behavior and group dynamics, and identify strategies to make virtual teams more productive and successful.

An online, interactive decision-making simulation that reinforces chapter contents and uses key terms in context can be found in MyMISLab™.

On-Line Simulation Exercise

On-Line Simulation

- In the online decision-making simulation for this chapter called *Department of Social Services* you will:
  - Join the staff at the agency who want to take advantage of collaborative technologies for virtual teamwork
  - Help them put together a proposal that identifies benefits and possible drawbacks
  - As you work with the team, you'll be using those technologies on a simulated smartphone and laptop equipped with the features you need to make the project work
  - At one point, the team faces an emergency that needs virtual teamwork, and you can help if you're alert and fast enough with the new features of your smartphone

Introduction

Overview

- This focus of this chapter is:
  - The major technologies used for collaboration along with the human interactions supported
  - An exploration of why collaborative technologies affect human behaviors
  - How can collaborative technologies be used to their best advantage
- Many human relationships have some virtual component
  - This applies to people wo meet every day
  - Collaborative technologies support these interactions
  - Moreover: the interaction go well beyond email, text messages, and telephone conversations
  - Collaborative technologies offer opportunities for human interaction but human behaviour and group dynamics can be affected in unexpected ways

Chapter #8 Topics

- Collaborating with technology
  - Evolution of collaborative technologies
- Web 2.0 collaborative technologies
  - Blogs
  - Wikis
  - Social networking
  - Microblogging
  - Virtual worlds
- Unified communications
  - Capabilities for unified communications
  - Universal dashboards
- The human element and collaborative technologies
  - Physiological characteristics of on-line environments
  - Managing on-line impressions
  - Group dynamics in virtual teams
  - Making virtual teams
- The ethical factor

The evolution of collaborative technologies

Collaborative Technologies

- Email:
  - Address book, business cards, and contact management
  - Calendars and time management
- Discussion forums:
- Instant messaging (IM) and texting
  - IM and interoperability
  - Presence awareness
  - Text messaging (or) texting
- Group decision-support systems
- Web conferencing
  - Cisco Systems, HP, etc.
- Interactive video
  - Skype, FaceTime, and WeChat

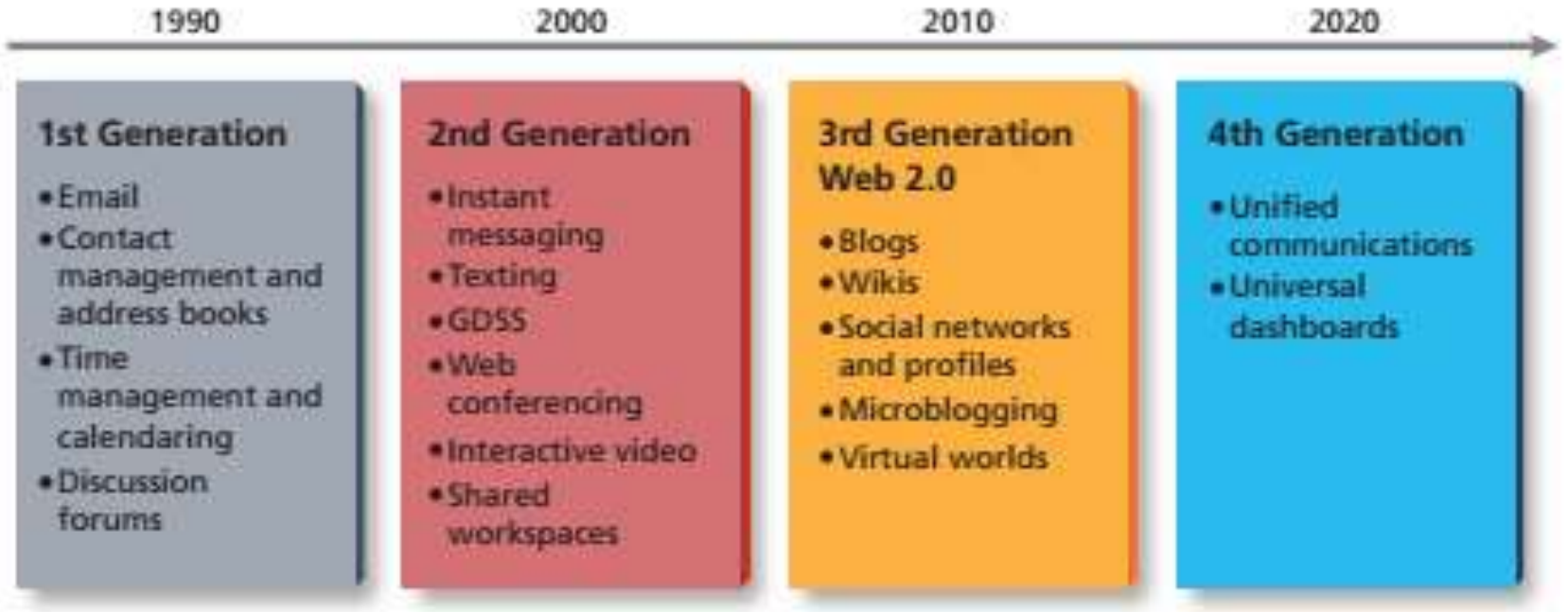
FIGURE 8-3

Example of plain text iCalendar event.

```
BEGIN:VCALENDAR
VERSION:2.0
PRODID://HongKongCorp//NONSGML//EN
BEGIN:VEVENT
DTSTART:20130709T170000Z
DTEND:20130709T190000Z
SUMMARY:Tiger Team Meeting
END:VEVENT
END:VCALENDAR
```

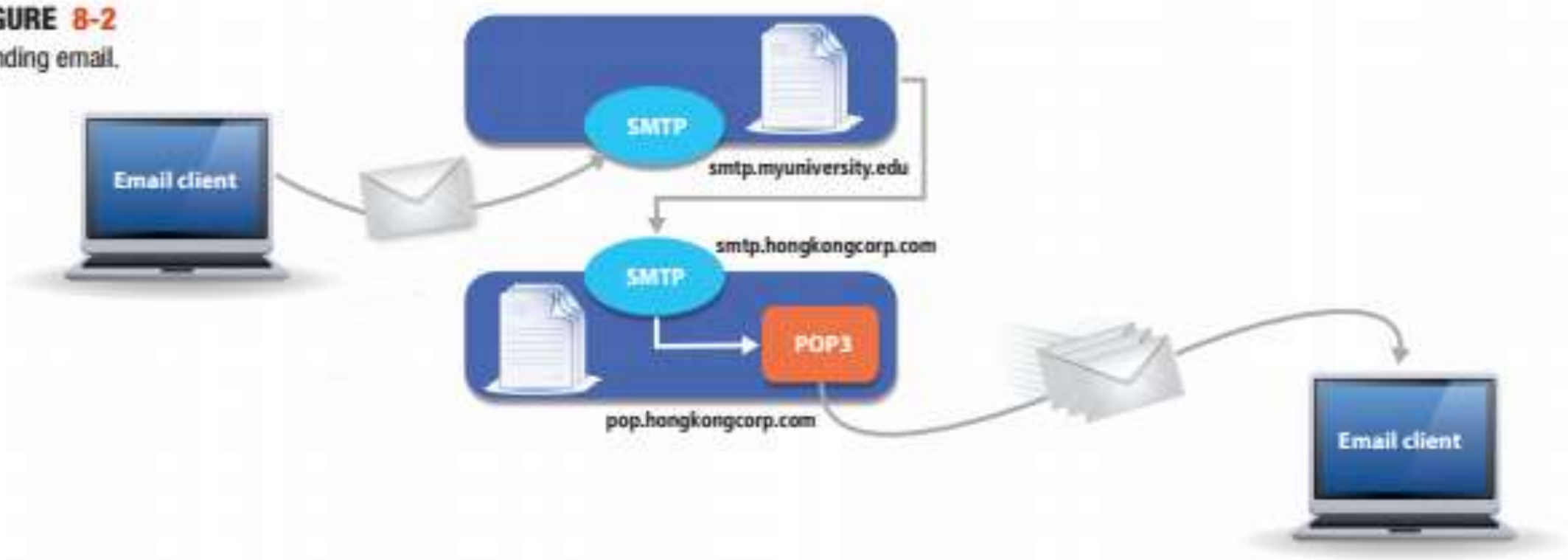
Generations of Technological Evolution

FIGURE 8-1
Evolution of collaborative technologies.



Sending Email

FIGURE 8-2
Sending email.



SMTP server
Mail server using the simple mail transfer protocol; handles outgoing email.

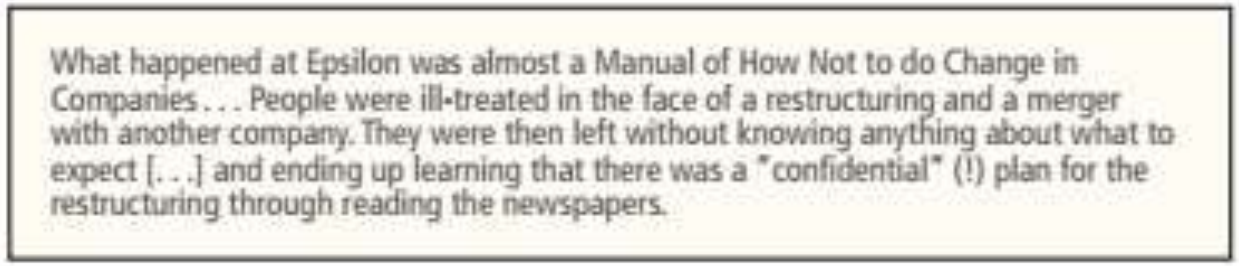
IMAP (Internet mail access protocol)
A protocol for handling incoming email.

microformats
A set of formats that rely on the XML family of standards to represent metadata in HTML code, and that support electronic exchange of business cards, calendar appointments, and other kinds of data.

Discussion Forums

- Used for both personal, academic, and business interactions
- Forums enable:
  - The sharing of information
  - Coordinating activities
  - Posters and interactive responses
- Forums need:
  - Moderating of user generated content
- Users can:
  - Read, see, and comment on posts
  - Initiate threads (posts)

FIGURE 8-4
Sample post from an employee discussion forum.



Shared Workspaces

- Shared workspaces and capabilities for teams
  - Discussion forums
  - Team calendars
  - Team announcements
  - Shared task lists with task status, due dates, priorities, and assignments
  - Email alerts to inform team members of updates to the shared workspace
  - Member lists with contract information
  - Search functionality
  - Content management capabilities with checkout and version control
  - Collaborative document editing
  - Workflow management

Instant Messaging

- Presence awareness
- Text messaging
- There are important considerations
- In traditional ‘face-to-face’ personal communication:
  - There are natural *inhibitions* in interactions
- In instant messaging and social media:
  - Inhibitions are reduced
  - *Disinhibition* is often a feature of instant messaging and social media
- Users also fail to meet legal and statutory requirements

A Time Comparison

- The figure sets out to demonstrate:
  - The relative time taken for telephone call and an instant messaging system
  - The time taken is 15 minutes for the telephone call and 15 seconds for the IM
  - The relative efficiency of the methods is clear

FIGURE 8-5
Comparison of time elapsed for a query handled by phone call or IM.

Phone Call	IM
Look up number.	
Dial number.	*Allen clicks on Tamara's icon and types into the chat box:*
Voicemail responds. Allen decides to try again in a few minutes rather than leave a message, not knowing how often Tamara checks her voicemail.	Allen: Tam, can you send me your copy of the August report?
Wait 10 minutes.	*Tamara is on the phone, but can easily multitask.*
Dial number.	Tamara: Sure.
Ring … ring …	*Wait 10 seconds.*
Tamara: Hello?	Tamara: AugustReport.xlsx
Allen: Hi, this is Allen, is this Tamara?	Allen: Got it, thanks.
Tamara: Hi, Allen. Yes, this is Tamara. How are you doing?	*Allen clicks on the file and opens the report.*
Allen: Good, and you?	
Tamara: Not too bad, though I'm glad it's Friday!	
Allen: I just had a quick question.	
Tamara: Shoot.	
Allen: I can't find my copy of the August report. Do you have one?	
Tamara: Yes, I'll email it to you.	
Allen: Thanks!	
Tamara: No problem. I'll do that now.	
Allen: That's great. OK, I'll see you later at the meeting.	
Tamara: Talk to you soon.	
Allen: Bye.	
Tamara composes a brief email message to Allen, attaches the report, and clicks send.	
Allen waits for the message to arrive, saves the attachment on his hard drive, and opens the report.	
Time elapsed: –15 minutes	**Time elapsed: –15 seconds**

Collaborative Technologies

- Group decision support systems
  - Possible anonymous contributions
- Web conferencing:
  - Live meetings via the Internet
  - Can include: real time video, chat rooms, presentations

group decision support system (GDSS)
Collaborative technology that helps groups brainstorm and make decisions in face-to-face meetings, led by facilitators. Participants can contribute anonymously via their computers.

web conferencing
Technology that supports online meetings or "webinars" via the Internet. Participants join the meeting from their own computers or smartphones.

Interactive Video Systems

- Real-time Interactive systems:
  - Chats for collaboration
  - Telepresence
- Examples include:
  - Simple systems for general use
  - Professional systems

FIGURE 8-6
High-end interactive video systems create a sense of telepresence.

Virtual Collaborative Working

- A virtual boardroom:
- Virtual meetings
- Interactive video
- Computer Supported Collaborative Working (CSCW)

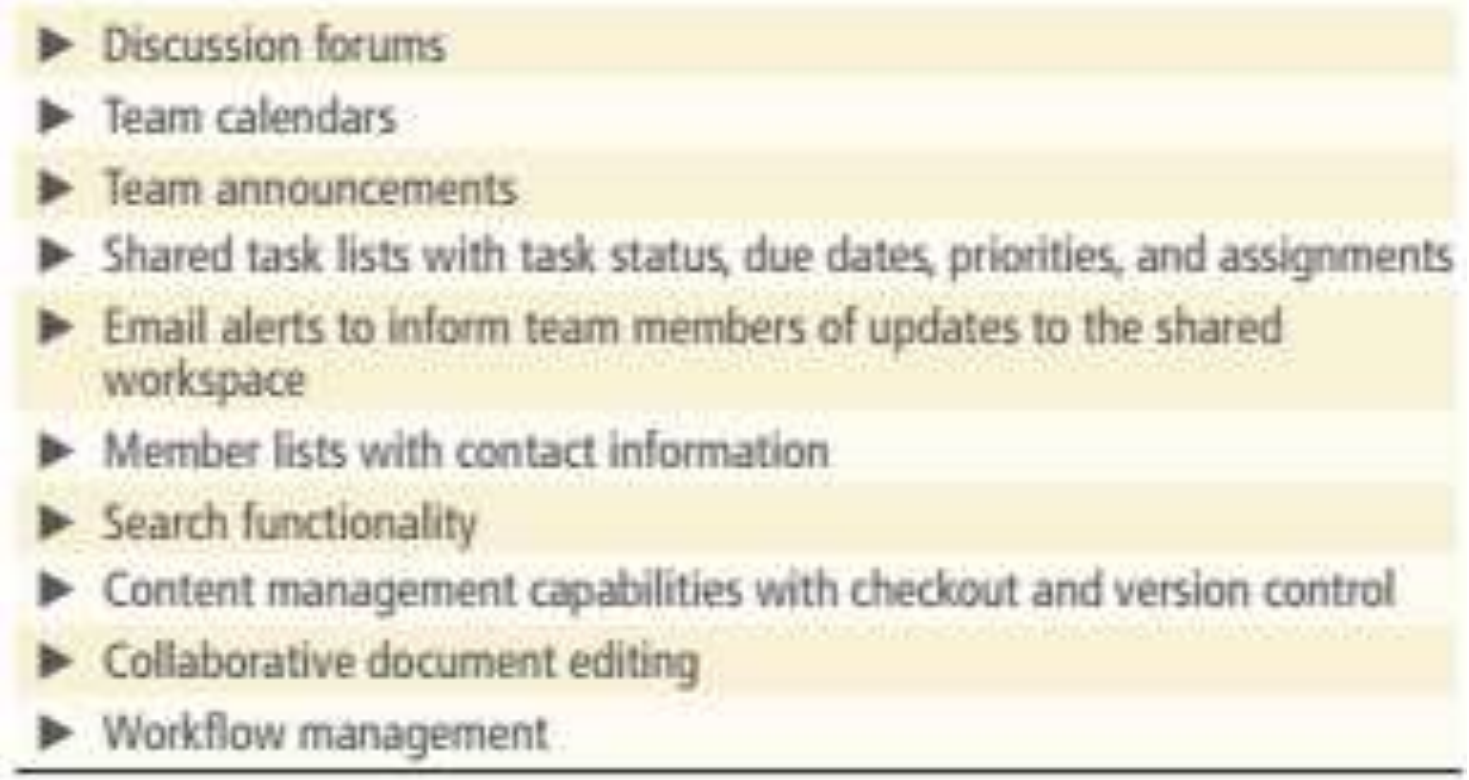
FIGURE 8-7
Interactive video for meeting rooms.

Shared Workspaces

- A shared workspace is a virtual partition on a server
- A Shared workspace enables:
  - Documents, lists, and information storage (for example)
  - Microsoft *Sharepoint*, *OneDrive*, Google Drive, Dropbox, etc.
- Document library

FIGURE 8-7

Shared workspace capabilities for teams.



Improving Productivity

Enter monthly reports, bills, birthdays, and any other recurring events into your calendar software so you'll always get reminders of them in advance.

Use proper spelling and grammar in your communications at work, at least until you're sure you have a clear understanding of the corporate culture. Also, avoid "textisms," such as "cul8tr" (see you later).

instant messaging (IM)
Also called "chat." IM consists of real-time text-based interactions over a network.

presence awareness
IM software feature that allows users to display their current status to their contacts, colleagues, or buddy list.

war room
A large area in which team members on the same project work closely together, surrounded by whiteboards, large digital displays, and other tools to facilitate impromptu meetings and smooth collaboration.

Email Considerations

When you delete email, remember that copies are stored elsewhere, such as on the server's backup media. Legal authorities can retrieve it, and so can employers if it is company email.

Start building your contacts database in a structured format early. In some email systems, you can add a contact by right clicking or scrolling over the person's email address. Most email clients also include tools to create your own vCard, which will help friends and colleagues add you as a contact. Free websites help you build your own vCard or hCard, such as http://microformats.org/code/hcard/creator.

Web 2.0 collaborative technologies

Blogs

- Blogs (short for *web log*) is a website with:
  - An ongoing commentary
  - Images
  - Links
- Some blogs are personal hobbies, and others are online magazines
- Organizations use blogs:
  - To build knowledge
  - For marketing and communications

telepresence
The impression created when remote participants in an interactive video meeting are almost life-sized and vividly clear; useful for sensitive negotiations.

shared workspace
An area on a server in which team members can post documents, maintain membership lists, feature news and announcements, and collaborate on edits and updates.

blog
Short for "web log," and used to facilitate collaboration and knowledge sharing. Posts are displayed in reverse chronological order so that the most recent appears on top.

Wikis

- Wikis can be found in a range of applications which include:
  - Encyclopedia publications (e.g., Wikipedia)
  - Websites designed to provide information
- Wikis provide a basis for interactivity including:
  - Users *adding*, *editing*, and *commenting* on interlinked pages
- Organizations use wikis: to centralize documents and store knowledge

wiki
Web software frequently used to build knowledge bases that allows users to add and edit interlinked web pages.

Wikis


Angry Birds is a puzzle video game developed by Finland-based Rovio Mobile. Inspired primarily by a sketch of stylized wingless birds, the game was first released for Apple's iOS in December 2009. Since that time, over 12 million copies of the game have been purchased from Apple's App Store, which has prompted the company to design versions for other touchscreen-based smartphones, such as those using the Android operating system, among others.

FIGURE 8-9
WikiTrust color-codes segments of text in Wikipedia articles that have been recently edited, suggesting they may not be as reliable as uncolored text.

PRODUCTIVITY TIP

You can download an add-on for Firefox that adds a link to Wikipedia pages called "WikiTrust." Clicking on the link displays the color coding, with orange highlights to indicate which sentences were recently changed.

Social Networking

- Social networking is made possible by Web 2.0 technologies
- Recognised an *platforms* there are many social networking applications with a global reach
- The first social network was arguably Facebook but many have started and closed over time
- The primary purpose of social networks was personal communication and knowledge sharing between individuals and groups
- However: social network platforms have evolved into:
  - Marketing pages
  - Fund-raising pages
  - Social program pages including non-profit promotional activities

Social Networking

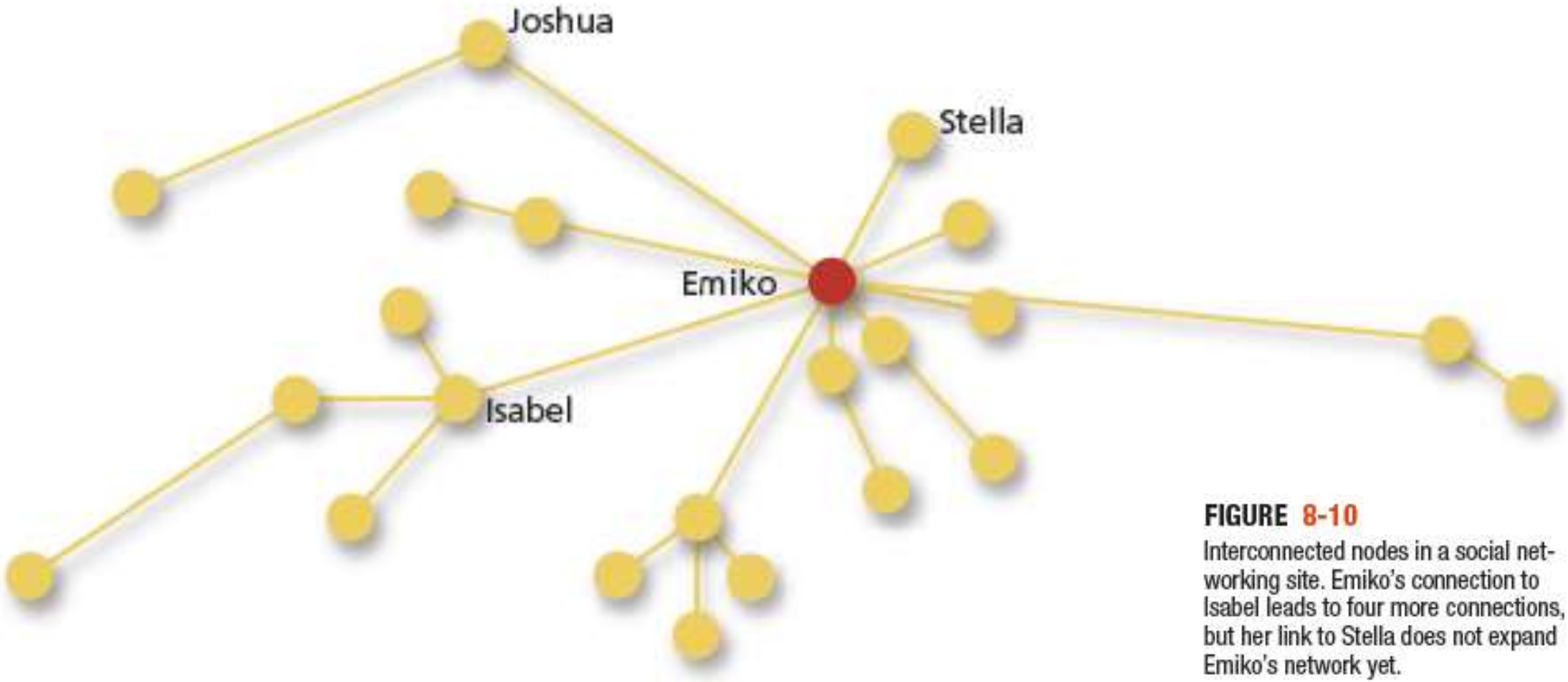


FIGURE 8-10
Interconnected nodes in a social networking site. Emiko's connection to Isabel leads to four more connections, but her link to Stella does not expand Emiko's network yet.

Facebook

FIGURE 8-11

Top reasons for taking a break from Facebook.

Was too busy/Didn't have time for it	21%
Just wasn't interested/Just didn't like it	10%
Waste of time/Content was not relevant	10%
Too much drama/gossip/negativity/ conflict	9%

Source: Rainie, L., Smith, A., & Duggan, M. (2013). Coming and going on Facebook. Pew Research Center's Internet & American Life Project, http://www.pewinternet.org/~/media//Files/Reports/2013/PIP_Coming_and_going_on_facebook.pdf, accessed February 20, 2013.

Microblogging

- Microblogging is a form of blogging in which:
  - The posts are quite short, containing a brief sentence fragment and perhaps a link to another web resource or video
  - A typical application is *Twitter* with links using *hashtags* (a *keyword* with *#*)
  - Twitter is used for personal uses and for marketing etc.
- As in a blog:
  - Entries appear in reverse chronological order
  - Topics range widely, from simple personal updates to headlines from the New York Times or announcements from General Motors
  - The social media aspect exists because users are able to *follow* other users, whose posts constantly appear on followers' computer screens or mobile devices
  - Followers can reply to posts or repeat them for the benefit of their own followers

Typical Corporate Blogs

Patagonia	Outdoor clothing	"The Cleanest Line" has the feel of a travel guide, with off-beat stories such as "Skateboarding in Tibet"
Zillow	Real estate infomediary	This site offers useful tips and advice for prospective home buyers.
GE Reports	Electric appliances	General Electric's no frills blog features storytelling to inform the public.
IBM Software Blog	Computer services	Discussions are provided about how software is changing people's lives.
Disney Parks Blog	Amusement parks	The site takes visitors behind the scenes to share what makes the parks successful.

FIGURE 8-8
Examples of top corporate blogs.

Doritos launched a very successful "name that tune" ad campaign with 6-second Vines featuring their Mariachi band and prizes for people who correctly tweeted the song's name. Marketers find that Twitter Vines offer a very promising advertising strategy for company brands. People share company branded Vines four times more often than branded Internet videos.[17]

Overview

microblogging
A form of blogging in which the posts are quite short, and especially suitable for mobile devices. As in a blog, the entries appear in reverse chronological order.

hashtag
Microblogging tool invented by web users in which posts on a similar topic all include a keyword prefixed by a #.

virtual world
A graphical, often 3D environment in which users can immerse themselves, interacting with virtual objects and one another using avatars.

virtual reality
Describes what people experience when some of their sensory input is not from the real world, but from a computer-generated one. Technologies such as stereoscopic goggles and specially wired gloves enhance the illusion of physical immersion.

Virtual worlds

What is a Virtual World

- A virtual world is essentially a:
  - Graphical (generally a 3D) immersive environment where users can interact with virtual objects and with one another using avatars
- Originally developed for computerised systems:
  - Virtual world applications were controlled with a keyboard, mouse, joysticks, console, steering wheels, or foot pedals, etc.
  - Users can explore digitally constructed worlds or pilot vehicles through realistic terrain
  - Users can also change the camera perspective to see their own avatar, a virtual representation of themselves that could be fantastical or quite lifelike

Virtual Reality

- Virtual world environments have developed into what has been termed *virtual reality* (VR) where:
  - Virtual worlds are viewed using VR headsets
  - Such systems are being developed by all the major payers in the field
  - The image shows the Microsoft VR headset for the XBox

Virtual World Example

- Graphical environment
- Typical applications:
  - Training
  - Education
  - Second Life
  - Business conferences and meetings

FIGURE 8-13
Virtual worlds can be used to train workers who fight fires or tackle other problems in dangerous environments.

Virtual Worlds

- Virtual world applications are data intensive systems and can require significant investment in systems and training (but):
  - Virtual worlds present opportunities for interactive collaboration
  - Business users who want to hold meetings are attracted to them as a way to simulate a live conference with speakers, breakout rooms, and small-group sessions
- . ProtonMedia (for example) use the *Microsoft Lync platform* to provide:
  - Immersive, business-oriented worlds
  - Additionally: the integration of other Microsoft products (e.g., *Sharepoint* and MS Office 365 (see Figure 8-14) is an option

Virtual World Example

FIGURE 8-14
Business meeting in a virtual world.
Source: Courtesy of Designing Digitally, Inc. http://www.designingdigitally.com/

Unified communications

Capabilities for Unified Communications

- Voice calls
- Conferencing (audio / video / Internet-based systems)
- Messaging (email / voicemail)
- Instant messaging
- Presence awareness
- Context-awareness and situational awareness:
  - Location awareness with the current *context* (or *state*)
- Universal dashboards
  - Help users manage and access communication technologies

The human element and collaborative technologies

People and Collaborative Technologies

- Psychological characteristics and online environments:
  - Unfamiliar tools and systems
  - Media richness
  - Physical distance
  - Anonymity
  - Audience
- Managing on-line impressions
- Group dynamics in virtual teams
  - Developing group norms
  - Disinhibition
  - Status equalisation
  - Trust
- Making virtual teams work

media richness
A measure of how well a communication medium can reproduce all the nuances and subtleties of the messages it transmits.

unified communications (UC)
Technology that integrates multiple communications channels and applications into a single interface, which is accessible from many different devices.

FIGURE 8-17
Managing impressions with introductory emails.


1 February 2014

Dear Mr. Allen Barron,

It is with great honour that we join you in this important project to develop a marketing campaign for clients. Please be kindly aware of the large difference in time zones so we hope to agree on acceptable meeting times to create the programme.

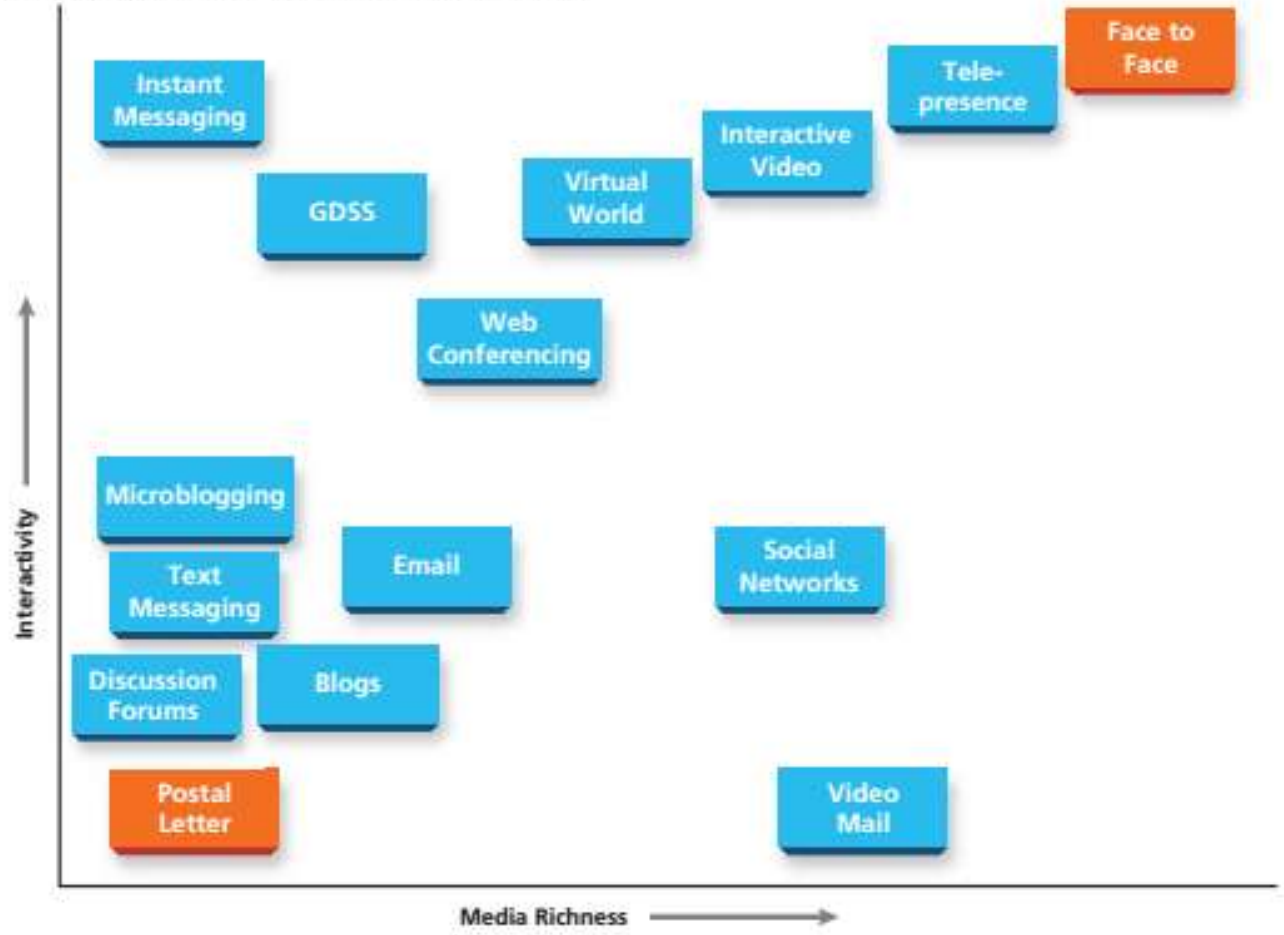
Yours faithfully,
Jun Chang

Environment Characteristics

FIGURE 8-15
Characteristics of online environments that distinguish them from face-to-face settings.

Media Richness and Interactivity

FIGURE 8-16
Interactivity and media richness in different collaborative technologies.



Managing On-Line Impressions

- This aspect of unified communications has taken on an important role in a world where:
  - People are increasingly working from home or are using interactive systems (e.g., VooV Meeting)
  - People are ‘dressing’ their home office environment where a ‘suitable background’ is important
  - Similarly: office environments are being ‘dressed’
  - People are using ‘introductory’ emails and other ways to build relationships
- People form impressions using social categories
- Miscalculations are common online
- Social media provide photos and the ability to view networks

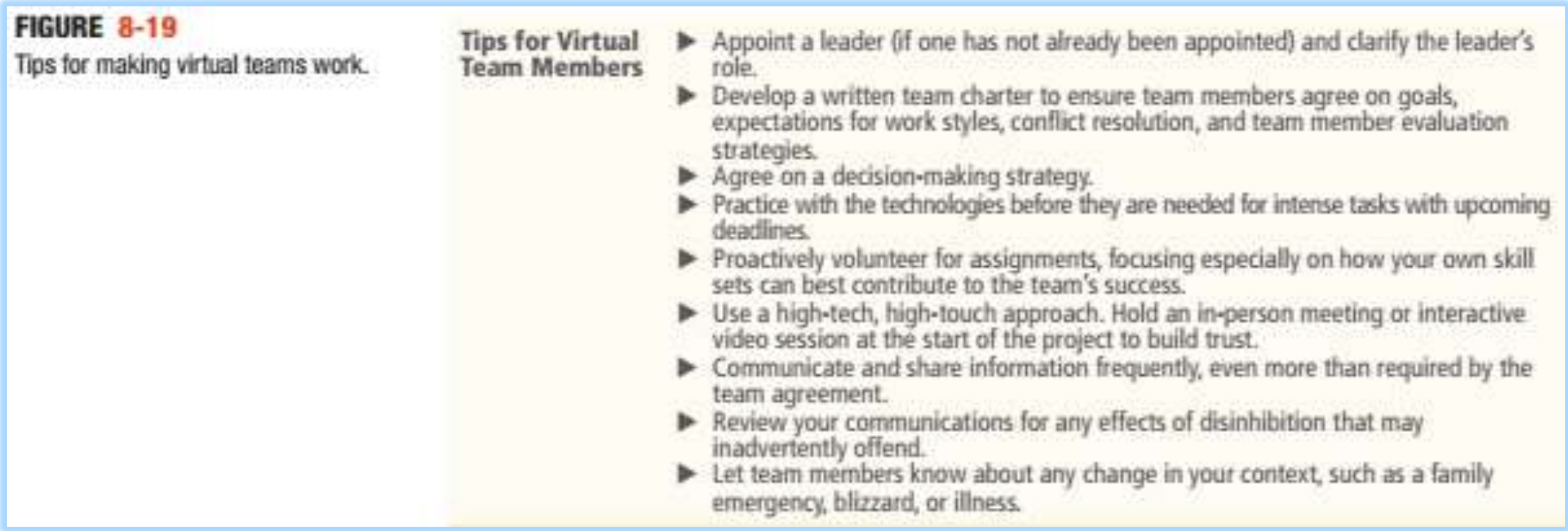
Group Dynamics in Virtual Teams

FIGURE 8-18
Tips for developing a team charter.

Elements of a Team Charter	Sample Questions to Answer
Leadership	What role does the leader play? How is the leader chosen? What happens when the leader is unavailable?
Meeting Protocols	How often will the group meet using synchronous technologies, and how will meeting times be decided? Will meetings start on time?
Communication	How will the group interact, and what collaborative technologies will it use? How often should each member check email or team workspaces? How quickly are members expected to respond to email? Is it OK for team members to IM each other during meetings? What information is considered confidential, for team members only?
Conflict Resolution	How will the team members resolve disagreements among members? How will members communicate dissatisfaction with the performance of other team members?
Decision Making	How will the team members come to decisions?
Task Definition, Work Allocations, and Deadlines	How will the team define the task, and what constitutes a successful outcome? How will the team allocate work and determine deadlines?
Team Member Evaluation	How will team leaders and members evaluate the performance of each team member? What significance will evaluations have in terms of grade or other outcome?

Forming Virtual Teams

FIGURE 8-19
Tips for making virtual teams work.



Tips for Virtual Team Members

- Appoint a leader (if one has not already been appointed) and clarify the leader's role.
- Develop a written team charter to ensure team members agree on goals, expectations for work styles, conflict resolution, and team member evaluation strategies.
- Agree on a decision-making strategy.
- Practice with the technologies before they are needed for intense tasks with upcoming deadlines.
- Proactively volunteer for assignments, focusing especially on how your own skill sets can best contribute to the team's success.
- Use a high-tech, high-touch approach. Hold an in-person meeting or interactive video session at the start of the project to build trust.
- Communicate and share information frequently, even more than required by the team agreement.
- Review your communications for any effects of disinhibition that may inadvertently offend.
- Let team members know about any change in your context, such as a family emergency, blizzard, or illness.

Forming Virtual Teams

FIGURE 8-19
Tips for making virtual teams work.

Tips for Virtual Team Leaders	
	▶ Get to know each team member, both to build trust and to understand how each person can best contribute. ▶ Arrange a synchronous session and invite members to introduce themselves to kick off the project, using interactive video, in-person meetings, conference call, or chat. ▶ Use the kick-off meeting to raise awareness of any differences in culture or working styles. ▶ Use a relatively structured leadership style, with clearly documented assignments, deadlines, and expectations. ▶ Enhance group cohesiveness and team identity through team-building exercises, team charter, and other means. ▶ Choose collaborative technologies wisely and arrange training to ensure team members know how to use them. Use synchronous collaborative tools, preferably with video, to discuss sensitive topics. ▶ Encourage participation by all members, contacting any who have contributed little to learn why. ▶ Send out frequent reminders about upcoming events and deadlines. ▶ Use encouragement and praise publicly, but convey constructive criticism privately.

Ethical Considerations

THE ETHICAL FACTOR

Flash Mobs and Free Speech: Should Police Block Mobile Messaging Services?

Flash mobs, whether they erupt for a celebration or riot, are difficult to stop. Concerns about the violent variety are mounting, particularly when the rioters smash store windows, loot shops, and attack bystanders. Government officials are struggling to find ways to counter these spontaneous eruptions.

In certain cases, the participants use mobile group messaging services such as Twitter to organize. The nature of text-based communications promotes a certain amount of disinhibition, and people feel less accountable for their actions.

Some authorities advocate cutting off mobile services in danger zones. Addressing the problem of violent flash mobs in London, British Prime Minister David Cameron once proposed imposing limits on communications channels that the rioters were thought to be using to organize—in this case, Blackberry Messenger services. In San Francisco, the Bay Area Rapid Transit system shut off cellular signals at some stations, hoping to block riders from using group messaging to organize a protest. Cleveland's City Council voted unanimously to criminalize the use of social media tools to organize unruly flash mobs.

The ethical implications of such measures, and their constitutionality with respect to free speech, are under scrutiny. Cutting off mobile service to certain areas is a drastic move that would also hinder normal communications and 911 emergency calls.. Shutting down the Blackberry service in parts of London, for instance, would prevent innocent people from warning their families to stay away. Cleveland mayor Frank Jackson vetoed his Council's proposal, saying, "To make a criminal activity of just having a conversation, whether some acts of criminal activity are associated with it or not, it goes beyond reason." When the Council voted again, most took a second look and agreed with the mayor.

Police departments are learning how to monitor group messaging and other social media for signs of criminal activity, and these strategies may be more effective than trying to block the services when the flash mob appears. Philadelphia's Police Commissioner stressed that, "Social networking is not the issue. It's how people are misusing it to gather and then commit a crime."[19,20]

Practical Advice

When you use a webcam or smartphone camcorder for interactive video sessions, consider the position of the lens. A little below eye level will enhance height without creating an eerie, threatening look. You should also look directly into the lens to simulate eye contact.

Employers often visit a candidate's social networking site as a screening tool before making a hiring decision. To manage your online persona, take into account the impression it makes on different audiences and carefully review your privacy settings.

Choose your communication channel wisely. If the discussion is sensitive, or when it must be completely confidential, text-based communication is a poor choice. Also, quickly switch to the phone, interactive video, or face-to-face if text is confusing or tense.

Student project teams usually conduct a great deal of their work online, through email, text messages, and shared workspaces, for instance. A team charter that includes elements such as those listed in Figure 8-18 will help establish norms that build productive and trusting relationships and avoid misunderstandings.

Summary

Chapter #8 Review

- Collaborating with technology
- Web 2.0 collaborative technologies
- Unified communications
- The human element and collaborative technologies
- The ethical factor

Reading and coursework

Chapter #8 Reading and Coursework

- Read and understand the key terms and concepts on page 281
- Work through the:
  - Chapter review questions (page 281-282)
  - Projects and discussion questions (page 282)
  - Application exercises (283)
- Apply the concepts introduced to the *Department of Social Services*
- *Simulation* exercise
- Read and consider the (two) case studies (pages 283-285) and answer the related discussion questions
- Review the (two) e-projects on page 286

CHAPTER 8

Chapter Summary

LEARNING OBJECTIVES

1. Collaborative technologies have evolved rapidly, beginning with email and its enhanced features that support contact management with address books, and time management with calendaring. Discussion forums, instant messaging, and texting provide support for text-based collaboration, and each technology adds slightly different features to support human interaction. IM, for instance, adds presence awareness, so colleagues can see one another's current status. Texting is widely used for mobile communications and emergency alerts. Collaborative technologies designed for groups include group decision support systems (GDSS), web conferencing, and shared workspaces. GDSS is usually used for face-to-face group meetings, in an attempt to promote brainstorming by allowing members to make contributions anonymously via their computers. Web conferencing supports synchronous online meetings for people at different locations using webcams, audio, interactive whiteboards, desktop application sharing, and other features. Shared workspaces provide teams with server space to support information resource libraries and asynchronous interactions. Interactive video is included in many of these technologies. High-end systems can create a sense of telepresence.

2. Web 2.0 and more advanced technologies provide extensive collaborative support, with blogs, wikis, social networking, microblogging, and virtual worlds. Organizations are using these tools to support their own collaborative efforts, but also to reach out to customers and suppliers. Social networking sites, for example, offer endless possibilities for targeted marketing based on users' profiles.

3. Unified communications bring together multiple collaborative technologies and applications, simplifying the interfaces and making them accessible through many different devices. With context indicators, users can signal the best way to communicate with them at particular times. Universal dashboards aggregate the collaborative services into a single customizable interface.

4. Key characteristics of online environments that affect human behavior include the unfamiliar tools used to communicate, reduced media richness, greater physical distance, heightened perceptions of anonymity, and unclear audience. Managing impressions can be challenging because of these characteristics. Virtual teams may experience more difficulty developing group norms and building trust, and their members may show more disinhibition. However, online groups tend to show more status equalization. Strategies for making virtual teams work more effectively stress the need to take into account the way online environments affect human behavior.

KEY TERMS AND CONCEPTS

SMTP server
IMAP (Internet mail access protocol)
microformats
instant messaging (IM)
presence awareness
war room
group decision support system (GDSS)
web conferencing
telepresence
shared workspace
blog
wiki
microblogging
hashtag
virtual world
virtual reality
unified communications (UC)
media richness

CHAPTER REVIEW QUESTIONS

8-1. What are the seven major collaborative technologies? What feature or features does each technology offer for communication and productivity?

8-2. What are the five Web 2.0 technologies that facilitate collaboration? What features does each technology provide?

8-3. What is presence awareness? How does it add value to instant messaging? What are examples of ways that presence awareness facilitates collaboration?

8-4. What are unified communications? What are examples of integrated features of unified communications? How do unified communications contribute to collaboration?

8-5. What characteristics of online environments distinguish them from face-to-face settings?

8-6. What are group norms? How does the online environment affect group norms? What is disinhibition? What are other ways in which the online environment influences group dynamics?

8-7. What can diminish the chances of success of a virtual team, such as a group of students working on a project or employees working at different locations?

PROJECTS AND DISCUSSION QUESTIONS

8-8. Email: Do you love it or hate it? How much time do you spend processing your email every day—deciding what it is, deleting it, filing it, answering it, or deferring it for later action? Are there occasions when you would prefer to use instant messaging? Describe the basic functionality of email and instant messaging and discuss the primary uses/purposes of each. What are the advantages of email? Of instant messaging? What are the disadvantages of each? Prepare a 5-minute presentation of your findings.

8-9. The first GDSS was developed in the early 1980s, but not by a business; the first GDSS was developed by a university. What is a GDSS? What are the advantages of using a GDSS? Are there disadvantages of using a GDSS? Can you think of specific problems with meetings that cause groups to function poorly that may be overcome by using a GDSS?

8-10. Draw a square and divide it into four equal sections. Label the horizontal axis "Interactivity" and the vertical axis "Media Richness." Label the first column "Low" and the second column "High." Label the first row "Low" and the second row "High." Use this 2 by 2 grid to group the different collaborative technologies into four categories: (1) low interactivity, low media richness; (2) high interactivity, low media richness; (3) low interactivity, high media richness; (4) high interactivity, high media richness. Can you think of a specific organizational communication task that is best suited to the type of technology in each category?

8-11. Social networking sites are fast becoming corporate resources. Consider how Facebook may be used by an organization. Can you think of different ways in which organizations such as Coca-Cola, KFC, or Bank of America can use social networking? What are network effects? Search your favorite social networking site to learn how organizations are using the site and prepare a 5-minute presentation of your findings.

8-12. Visit YouTube.com and search for "What is Sharepoint?" View one or more of the videos you find and prepare a summary that describes how Microsoft® SharePoint is used by organizations. What are the key features of SharePoint? What are "tags" and how are they used? What is version control? What are the advantages of using SharePoint rather than a shared network drive?

8-13. Sorority meetings. Basketball practice. Your part-time job. Your social life. Is it challenging to find time in your schedule for a group project meeting? Work in a small group with classmates to implement shared calendars. Visit calendar.google.com and click on "Sign Up" to get started, or sign in with your Google account. Add your classmates' calendars by entering their contact email addresses. Create a calendar for one full month by adding events for future dates (i.e., classes, work schedule, social events) by using the various options for adding events, and then schedule a group study meeting at a time that is convenient for everyone in your group. Prepare a 5-minute presentation of your group's experience with Google Calendar that includes a list of specific features that are available. What are the advantages of shared calendars? How do they facilitate collaboration?

8-14. Online communication has evolved from newsgroups and listservs to the discussion boards of today where people post and reply to posted messages. Consider the many discussion boards that are available. Search the Internet for "music discussion board" or "movie discussion board" to locate sites such as musicboards.com, a site for musicians and music fans, and chasingthefrog.com, a site with movie games as well as discussion boards. Or visit www.big-boards.com to see a list of the most active discussion boards on the web today. Work in a small group with classmates to consider the use of discussion boards and how they may be used effectively by businesses, nonprofits, and governments. Discuss different ways in which discussion forums may be used internally and externally. Does your university use online discussion boards? If so, how are they used?

APPLICATION EXERCISES

8-15. EXCEL APPLICATION: Going Green!

Everybody talks Green . . . but some really do it. Marie Chong is a Green home designer and builder who is producing a webinar to share her knowledge of Green building. She learned that web conferencing requires only a PC and an Internet connection; however, audio conferencing capability is required if she wants to chat with attendees by telephone. Marie is working with a webinar hosting company that charges 10 cents per participant/per minute (ppm) for web conferencing, 15 cents ppm for audio conferencing, and $175 for online registration support. Although Marie will present some content herself, she will hire a professional speaker who is an expert on wind turbines for home use, and she will include audio conferencing so that attendees can interact with the speakers. The registration fee for a 60-minute webinar is $159. Create the Excel spreadsheet shown in Figure 8-20 to determine the number of attendees required for Marie to make a profit. How does that number change if Marie reduces the registration fee to $149? Use formulas for all calculations and Goal Seek to set profit to $1 by changing the number of attendees. If the registration fee is $159, how many attendees are required for Marie to make a profit of $10,000?

FIGURE 8-20
Going Green spreadsheet.

	A	B	C
1	Going Green!		
2			
3	**Revenue**		**Total**
4	**Number of Attendees**		
5	Registration Fee	$159.00	
6			
7	**Expenses**		
8	Speaker Fee		$1,500.00
9	Audio Conference Service Fee (ppm)*	$ 0.10	
10	Web Conference Service Fee (ppm)*	$ 0.15	
11	Online Registration Support Costs		$ 175.00
12	Webinar Length (minutes)	60	
13			
14			
15	**Profit**		
16			
17	*per participant/per minute		

8-16. ACCESS APPLICATION: Cloud 9

The ad campaign that Tamara and her team developed for the Cloud 9 chain of nightclubs was a smashing success! Club owners Sally and John Gilbert report membership has doubled and event bookings are sold out months in advance. The Gilberts have implemented an Access database to track membership and events at four nightclubs. Download the Cloud 9 database Ch08Ex02 and use the Report Wizard to create reports that identify which location has the most members and which has the most bookings. Review the structure of the Cloud 9 database. Can you suggest other reports that may be useful to Sally and John?

CASE STUDY #1

"Telepresence Robots" Support Remote Collaboration

When a robot resembling a vacuum cleaner topped with a computer monitor rolls by you at work, you might first think it is cleaning carpets. But if it stops to say hello, and you see a coworker's smiling face on the screen, the device is probably a "telepresence robot." Many organizations are experimenting with ways to improve collaboration for remote workers, and these robots are making a very positive contribution.

The remote worker can log in to one of several wifi-connected robots the company might own and control its movements and cameras with a laptop. At meetings, the pilot can swivel the camera around to see everyone present, and the other attendees can see and hear the remote worker's face on screen.

Several telepresence robots have entered the market, and more versions are expected from companies such as Vgo, Anybots, and MantaroBot. Prices are dropping, and basic models run less than $2,000. They typically have motorized wheels, a microphone, speakers, a camera that faces forward, and another camera that tilts downward so the pilot can avoid obstacles on the floor.

The key ingredient for success is to make the robots easy to drive and manipulate, and also ensure they have sufficient battery power so they don't strand the remote worker in a hallway just before an important meeting. The building layout is another consideration. The robot's wheels would get stuck if there are steps, and the robot would need assistance to unlock and open doors.

Reactions to Telepresence Robots

The telepresence robot is a significant improvement over the speakerphone and even over stationary videoconferencing facilities. One remote worker who tried out an experimental version recalled that at first, "The general response was that it was kind of creepy." But very soon colleagues were asking him to roll by their cubicles for a chat. He insists it is far better for collaboration than prearranged video calls. When he is rolling his robot through the halls, people can approach him to start a spontaneous conversation or ask a quick question. He could also move from floor to floor . . . if someone pressed the elevator buttons for him.

Scott Hassan, CEO of Suitable Technologies, a company that offers a telepresence robot called "Beam," thinks the devices should be simple to operate with a minimum of bells and whistles that might interfere with natural interactions. The goal is for them to lose their novelty quickly in the workplace, so coworkers can get back to work collaborating with one another.

Some workers raise concerns about privacy when they imagine camera-equipped devices creeping up behind them. The robot's design, however, can help mitigate such concerns. A large screen that clearly displays the remote operator's face will probably be perceived as telepresence, but a mobile device with just a tiny camera lens would be interpreted as surveillance. You would wonder who was viewing you, and why.

Human Resources Issues

Telepresence robots raise numerous questions that don't fit neatly into existing labor policies or laws. For example, if a remote worker lives in Texas but pilots a robot every day in California, where should the person pay taxes? If the remote worker is in another country, does the person need a visa to work? What happens if a poor driver sends his robot down the stairs, or causes an accident?

These issues become even more challenging when the robots do actual physical labor. Employees at Willow Garage were tired of doing the dishes, but the company manufactures a robot that could handle that task—if it had a driver. They advertised online through Amazon Mechanical Turk, and found an anonymous Internet worker who learned how to pilot the device. However, employees became uncomfortable with some unknown person rolling about the company's kitchen, listening to their conversations. They decided to wash their own dishes.

Telepresence robots are already making a major contribution in medicine, where specialists can conduct live, virtual consultations with patients. School children who can't get to school are also using the devices to "sit" in class, ask questions, and participate in discussions. As the technology improves and prices drop, expect to see these robots in many other places.

Discussion Questions

8-17. What are the benefits of telepresence robots for a company?

8-18. What are the limitations of telepresence robots?

8-19. Identify some ethical concerns which can arise from the use of telepresence robots.

8-20. In what other settings might telepresence robots be applicable?

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CASE STUDY #2

Yahoo! Bans Telecommuting: Was It the Right Move?

With gas prices soaring and traffic congestion stealing hours from every commuter's day, many companies around the world have eagerly embraced collaborative technologies and the virtual workplace. Researchers estimate that from 20 to 30 million people in the United States work at home at least one day a week, and the number continues to climb.

Bucking this trend, Yahoo! decided in 2013 that employees could no longer work from home, even if they had to wait for a repairman or care for sick children. Yahoo! CEO Marissa Mayer's decision was accidentally leaked out through a memo signed by Yahoo's human resources director. The memo stated, "Speed and quality are often sacrificed when we work from home. We need to be one Yahoo!, and that starts with physically being together. . . .To become the absolute best place to work, communication and collaboration will be important, so we need to be working side-by-side."

The policy change triggered howls of protest from employees, and a firestorm erupted on social media. Twitter lit up with comments such as, "Hey Marissa, 1980 just called, they want their work environment back!" and "#Yahoo kills work flexibility and #telework options for employees. CEO is convinced it is still 1994."

As the youngest woman to head a major company, and someone who was pregnant when she was appointed, Mayer became a role model to many working mothers. They found her ban on telecommuting especially irritating because she herself brought her baby to work, and installed a nursery for the infant. That perk would not be available to them, of course.

Telecommuting "Pros"

Employees overwhelming support telework for its flexibility, and studies often find that workers are more productive when they are allowed to work from home. The virtual workplace benefits the employee, company, and community as well. For example, employees save as much as $1,700 per year in gasoline and other car expenses, and they add many hours to their days by eliminating commutes. Expenses for clothing, restaurant lunches, parking fees, and tolls also drop. Virtual workers enjoy greater flexibility to balance work and personal lives, which appears to reduce both stress and health problems. Dealing with child and elder care responsibilities is simplified, and disabled workers also benefit.

The company benefits by reducing real estate costs. And with less traffic on the roads, communities benefit by reducing congestion, pollution, accidents, and highway maintenance expenses. Among Fortune magazine's best companies to work for, several in the top 10 feature generous telework policies, including Cisco and Intel. Telework is also a helpful policy to recruit and retain top talent.

Telecommuting "Cons"

Despite the many benefits, Mayer is not alone in believing that telecommuting brings along some serious disadvantages, particularly for high tech companies that rely on innovation and collaboration. Twitter and Google, for instance, have no specific policy about it, but senior administrators encourage people to work at the office as much as possible to promote face-to-face collaboration. Casual, unscheduled meetings take place more freely, involving people from different departments, and that can break down barriers and spur innovation.

More face-to-face contact can also increase the speed of decision making. When a drug company switched to an "open office" layout, many decisions were made much more quickly. Workers could just meet to work out the details, rather than waste time with voice mail or email.

Employees who telecommute may also suffer setbacks in their careers compared to those who work on-site. Some studies have found that telecommuters are less likely to be promoted, even if their productivity is high. Just being seen at work makes people think you're a hard worker.

Will Yahoo!'s telecommuting ban be a positive move for the company? Time will tell, but the decision certainly triggered heated debates about what it means to collaborate in a 21st century workplace.

Discussion Questions

8-21. What are the collaborative technologies that a company like Yahoo! would have to provide to create an effective telecommuting program? How would Yahoo! increase media richness using these technologies?

8-22. In spite of the controversy about CEO Mayer's decision to ban telecommuting, she raises valid points that might affect Yahoo!'s profitability. How could each of her concerns be overcome by providing improved collaborative technologies? Which of Mayer's issues would be insurmountable, if any?

8-23. Although telecommuting offers flexibility and increases employee productivity, it cannot replace physical presence. Can you think of scenarios where it is impossible to work without telecommuting?

8-24. Suppose that you become highly skilled with collaboration technologies and are a seasoned telecommuter, how would this impact your career? How would you represent these competencies and experiences to Yahoo!?

Sources: Chaey, C. (2013). Marissa Mayer, Yahoo, and the pros and cons of working from home. Fast Company, http://www.fastcompany.com/3006538/creative-conversations/marissa-mayer-yahoo-and-pros-and-cons-working-home, accessed April 13, 2013.
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E-PROJECT 1 Estimating Breakeven Pricing for Telepresence Robots Using a Spreadsheet

In this e-project, you will use a spreadsheet and goal seeking to estimate at what price telepresence robots will become affordable, meaning they generate enough savings to pay for themselves in 1 year. Download the Excel file called Ch08_Robots, which includes variables that affect how much in savings will be generated, including the number of employees who will use the systems, how many trips will be saved, and average travel expenses per trip. For costs, the spreadsheet shows the current cost for a robot, which is about $40,000 each. The spreadsheet also estimates that the organization will need one robot for every two employees who will be using them.

8-25. Use goal seeking (under Data/What If Analysis) to determine how much the company can pay for each robot and break even, so that savings minus costs = 0. You will set the cell containing the (Savings – Cost) as the Set Cell, and enter 0 in the To Value input box. The cell that can be changed is the one that represents the unit cost of a telepresence robot. How much can the company pay for each robot, using the assumptions in the spreadsheet?

8-26. If travel expenses increase to $4,000 per trip, what should the company be willing to pay for each robot and still break even? You can change the average travel expenses, and redo the goal seeking analysis.

8-27. To be conservative, the CEO insists that any project to implement robots should have a return on investment of at least $100,000. Assuming $4,000 per trip, 100 employees, and 10 trips per year per employee, how much should the company be willing to pay for each robot?

8-28. It is possible the robots will be so useful that the company needs to assign one for every employee, instead of sharing them. Change the number of robots required so that all 100 employees get their own robot. Then recompute the cost the company can pay per robot, still assuming $100,000 return on investment and $4,000 travel costs. Under these assumptions, how much should the company be willing to pay per robot?

E-PROJECT 2 Estimating Savings for Virtual Work Using an Excel Model

Calculating the effects of a virtual work program requires making many assumptions about gas prices, commuting distances, productivity gains or losses, and other factors. For this e-project, you will create an Excel spreadsheet that models the effects of implementing virtual work for a hypothetical organization.

Download the Excel file called Ch08_VirtualWorkSavings Model.

8-29. How does the model calculate the gasoline savings per virtual worker per year? Click on cell B21 and press F2 to display the variables used in the calculations.

8-30. Using the assumptions in the model, how much would each virtual worker save in gasoline each year?

8-31. If the leadership decides to implement a smaller pilot program in which those eligible work at home just 1 day every 2 weeks (0.5 day per week), what would be an employee's average savings on gas per year?

8-32. Add more variables to the model, to show:

a. Average cost per square foot per year ($200)
b. Average square foot per person in an office (80 square feet)

8-33. Add a conclusion, "Average cost per office per year," and enter the formula to compute this. What is the average cost per office per year?

8-34. Assume that the company can eliminate an office for every 200 virtual workdays per year (regardless of who is not there). Add another conclusion, "Savings in real estate costs per year," and enter the formula that will compute it.

a. How much could this organization save in real estate per year if they stick with one virtual workday per eligible employee per week?
b. How much could this organization save in real estate costs per year if the average number of days per week employees will work from home goes up to 3?