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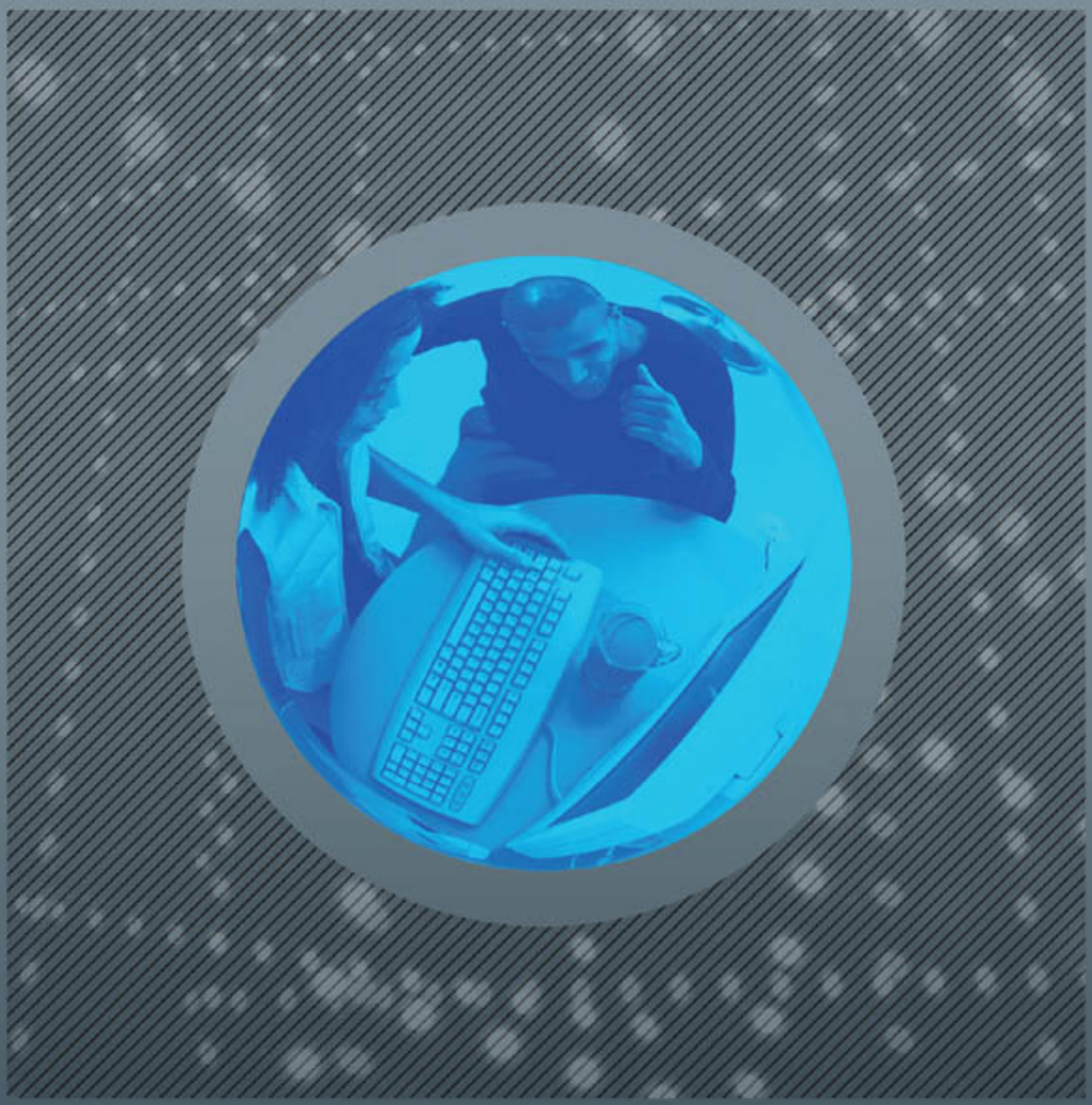

Integrating Educational Technology into Teaching

M. D. Roblyer Aaron H. Doering

Sixth Edition

ALWAYS LEARNING

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TABLE 7 Tips on Teaching Spreadsheets

(Also see links to Spreadsheet tutorials at: http://www.internet4classrooms.com/on-line.htm)

Suggested Steps	Tasks Under Each Step
Step 1—Prepare for teaching.	**Arrange for:** • A big screen or projection system • A disc or flash drive for each student • Copying sample file(s) onto student media • One computer per student • Alternative keyboards or other adaptive devices for students with disabilities **Create or obtain:** • Handouts or wall posters on spreadsheet features and common errors>
Step 2—Demonstrate the basics.	**Using a big screen or projection system, show how to:** • Open a spreadsheet file from a disc or flash drive • Select a worksheet to work on in the file by clicking a tab at the bottom • Select any given cell location by row–column position. **Then demonstrate:** • Spreadsheet "magic": Show how it recalculates automatically when a number is changed **Finally, show how to:** • Enter new information into a cell • Format given cells for appearance and as various kinds of numbers • Change column width • Copy information in a cell down the column or across a row **Point out a common error:** • Forgetting to highlight cells to be formatted before selecting a format option
Step3—Assign individual practice.	**Give students a sample spreadsheet file on disc and have them:** • Insert the disc and open the file • Do a list of changes to the file (e.g., insert new data, copy down a column or across a row, format cells) • Name, save, and close the document
Step 4—Demonstrate formatting features.	**Using a big screen or projection system, show how to:** • Create a formula to add numbers in a column • Copy a formula across the row to add numbers in other columns • **Optional:** Functions such as SUM and AVERAGE • **Optional:** Charting functions • **Optional:** Adding graphics and URLs **Point out common errors with formulas:** • Forgetting to place the cursor in the cell where you want the formula • Pressing the Right Arrow key (instead of the Return or Enter Key) to leave the cell while creating a formula (Show that this action adds something to the formula, rather than exiting the cell.) • Including the formula cell itself in the formula's calculation (i.e., circular reference error)
Step 5—Assign more individual practice.	**Have students open their sample spreadsheet file from Step 3 and do the following:** • Enter and format various new formulas • **Optional:** Create a chart based on the data • **Optional:** Add a graphic and/or a URL • Monitor students as they work, and give individual help as needed

USING PRESENTATION SOFTWARE IN TEACHING AND LEARNING

Presentation software is designed to display information, including text, images, audio, and video, in a slideshow format. It took the place of photo slides presented in a slide projector and, like the technology it replaced, was originally designed to accompany and support marketing presentations and business training and reports. But like word processing and spreadsheet software, it quickly made the transition from business to education and home use. Though Microsoft *PowerPoint* was not the first such software, and though there are many other packages available for sale and as open-source options, the name "PowerPoint" is often used interchangeably with presentation software, much as the brand name Kleenex® is often used instead of "facial issue."

Slides or frames created in this software are usually presented in the order in which they appear in the slideshow product. However, recently added features allow hypermedia capabilities, permitting the display of frames in any order by clicking on links or "buttons." Since those capabilities are best discussed with other hypermedia software, this chapter will focus only on the design and use of the set-sequence presentations. However, all presentation software features are listed in Table 8.

The Impact of Presentation Software in Education

Why teachers use presentation software. Though presentation software is generally used in the same way in education as it is in business, to support speakers (teachers and students) as they present information to listeners, it has evolved additional uses in education that make it a more complex, multi-purpose classroom tool. Current uses are described later in this chapter. Presentation software offers educators the following benefits:

- **Helps organize thinking about a topic**—When teachers or students create a presentation with this software, it helps them think through what they will say and in what order they should present information. Though using presentation software does not assure an organized, coherent talk, its emphasis on sequencing and breaking information into component parts can promote a more organized approach. Use of presentation software can allow a teacher to illustrate and provide students with practice in information organization skills.
- **Enhances the impact of spoken information**—When a presentation product is well-designed, it supports and supplements what the speaker says, using graphics and multimedia to give illustrations and drive home points with images and sound.
- **Allows collaboration on presentations**—Working together on presentations of project work or research results gives students important practice in collaborative skills. It also allows students to contribute in a variety of ways to the product, rather than just in writing; for example, some may focus on text message design and some on selecting and creating appropriate graphics.

Research on the instructional uses of presentation software. This software is a much-studied technology, and researchers have looked at its impact on both educational processes and outcomes. In their review of research on *PowerPoint* uses, Craig and Amernic (2006) analyzed its effects on learning and its impact on classroom dynamics. They found little evidence of any consistent impact on better achievement, but did note strong, positive student reactions to presentation-enhanced instruction. However, they felt that since most of the studies they reviewed were in the early days of this technology, these perceptions could be the result of a novelty effect. They also found a common perception that presentation software had observable effects on classroom dynamics, tending to focus attention on the teacher and discourage student contributions. Craig and Amernic advocate that teachers become more aware of the way they are using presentation software. The emphasis should be on making presentations more dynamic and engaging to students.

Several studies have looked at the impact on exam grades and attendance of making *PowerPoint* slides available to students outside the classroom (e.g., Babb & Ross, 2009; Bowman, 2009; Cramer, Collins, Snider, & Fawcett, 2007). Findings usually show no impact on achievement and inconsistent impact on attendance. Hardin (2007) studied the impact of *PowerPoint* on student learning, satisfaction, and engagement and found that impact depended more on instructor variables than on whether *PowerPoint* was used. These results seem to confirm that presentation slides provide yet another avenue to enhance student learning, but their impact depends largely on how teachers use them and how much time students spend with the material.

Issues in using presentation software. Use of presentation software has produced strong reactions by several observers. Issues related to presentation software use include:

- **Impact of presentation software on information presented**—Tufte (2003) is an acknowledged critic, famously saying that "Power corrupts; PowerPoint corrupts absolutely." He is among those who feel that

TABLE 8 A Summary of Presentation Software Features

Feature Categories/ General Benefits	Presentation Software Features	Description of Features
Basic features allow display of frames of information in a set sequence.	• Create a slideshow made of separate frames.	• Frame-by-frame organization breaks up information into logical units that can be presented one at a time.
	• Add frames with various formats.	• Frame styles can be different on each page; styles can range from a blank frame to one with locations marked for where text and graphics should be inserted.
	• Copy and paste slides.	• Slides can be added by duplicating other slides.
	• Add speaker notes to slides.	• Helps users plan what to say as each frame is presented.
	• Search and replace.	• One command allows all occurrences of a specified word or phrase to be changed as specified.
Display features allow various ways to view slideshows.	• Display in various ways as single frame.	• Displays a slide that either: allows changes to be made on it before presentation, or a full-screen display during a presentation.
	• Display as storyboard.	• Shows all frames at once for review and/or changing frame sequence.
Formatting features allow variation in text spacing and frame appearance.	• Format font size and type.	• Allows text variety to enhance frame appearance.
	• Format background color.	• Allows each frame to have different background color to better highlight information and focus viewers' attention.
Graphics and interactive features make frames have more impact and utility.	• Insert images.	• Allows adding: clip art from a library that comes with the software and includes photos and animations; or images from other sources.
	• Insert drawn figures.	• Allows inserting shapes, callouts, lines, or other figures to enhance frame appearance or to help illustrate concepts.
	• Insert movies.	• Allows inserting short videos to supplement slide information from text and images.
	• Insert charts and graphs.	• Allows creation of charts or graphs to insert on frames to illustrate concepts.
	• Insert products created in other software.	• Allows word-processed text or spreadsheet products, including charts and graphs, to be added to frames.
	• Interactive buttons or "hotspots."	• Links can be inserted to allow users to "jump" to other parts of the presentation out of the order in which slides are stored in presentation.
Web features allow teachers and students to connect frames to Internet resources	• Insert "live" URLS.	• Allows person displaying the presentation to click on text or images and go automatically to a website. (*Note:* Web browser must be active.)

Continued

TABLE 8 A Summary of Presentation Software Features (continued)

Feature Categories/ General Benefits	Presentation Software Features	Description of Features
	• Save presentations as web pages.	• Allows presentations to be accessed and displayed online.
Support features make using the program easier and more flexible.	• Use templates.	• Users can add information to already formatted files that come with themed graphics already on each slide.
	• Save to other formats.	• Presentations can be saved as PDFs to allow use as documents or as read-only presentations for sharing with others.
	• Print as handouts.	• Presentations can be printed with varying numbers of slides per page and given to listeners for following and note-taking.
	• Use timed presentations.	• Presentations can be set up to display frames automatically using timing settings or to play narration or music during the show.

presentation software makes people focus on the slides, rather than the message, saying that "rather than supplementing a presentation, [PowerPoint] has become a substitute for it" (p. 3). (See Hot Topic Debate.)

» **Impact of presentation software on teaching style**—There are also complaints about the effects that using slide-based software has on teaching style and impact. Young (2009) cites a British study that reported students perceived use of *PowerPoint*-based lectures among the most boring they experience. Adams (2006) says that using *PowerPoint* "invites and seduces educators to reshape knowledge in particular ways and supports a cognitive and pedagogical style inconsistent with both the development of higher analytical thinking skills and the acquisition of rich narrative and interpretive understanding" (p. 389). On the other hand, Elliott and Gordon (2006) said that proper use of presentation software can support constructivist activities and promote "critical thinking, active learning, deep understanding, and engaging discussion" (p. 34).

Criticisms of this tool seem best addressed by teachers becoming more aware of the most effective uses of presentation software. Klemm (2007) offers several tips for avoiding uses of presentation software that make them a "trap for bad teaching" (p. 121). These include showing only a few slides at a time before having students apply the information, having some slides with no text (images or diagrams only), moving around the room while showing slides, taking the last slide off the screen when moving on to student work, and not giving out hard copies of slides.

Presentation Software in the Classroom: Productivity and Teaching Strategies

The benefits that presentation software offers are primarily to teaching practices. This section offers an overview of these strategies, as well as how to make time spent with presentations more productive.

Productivity strategies. Since presentation software is designed specifically for presenting information, it has no real productivity applications. However, *PowerPoint* impact can be maximized and time spent watching such presentations can be made more productive by following the design and use rules listed in Figure 1, as well as Klemm's (2007) guidelines.

Instructional integration strategies for presentation software. Since presentation software can support instruction in any content area, the literature reflects many examples of effective uses. Current integration strategies for presentation software include the following:

» **Presentation of information summaries**—By far the most popular use of these tools is for supporting and strengthening classroom presentations. Teachers use them to focus student attention and guide note-taking.

» **Demonstrations of materials for discussion**—In this strategy, the teacher displays a complex diagram such as an electrical circuit or light spectrum, or a series of examples such as works of art, types of animals, or instruments in an orchestra. This is an ideal way to focus

Hot Topic Debate

IS *POWERPOINT* REALLY EVIL?

Take a position for or against (based either on your own position or one assigned to you) on the following controversial statement. Discuss it in class or on an online discussion board, blog, or wiki, as assigned by your instructor. When the discussion is complete, write a summary of the main pros and cons that you and your classmates have stated, and put the summary document in your Teacher Portfolio.

In a 2003 article, "PowerPoint is Evil" (http://www.wired.com/wired/archive/11.09/ppt2.html), Edward Tufte says that "the PowerPoint style routinely disrupts, dominates, and trivializes content. Thus PowerPoint presentations too often resemble a school play—very loud, very slow, and very simple." The *New York Times* published an article entitled "We Have Met the Enemy and He Is PowerPoint" (http://www.nytimes.com/2010/04/27/world/27powerpoint.html). What characteristics serve to make presentations with *PowerPoint* or other software less than helpful? What guidelines can you cite to make sure such presentations are helpful?

FIGURE 1 A Summary of Presentation Software Design and Use Guidelines

All of the following are qualities that can greatly enhance readability, audience engagement, and/or communication of content during a *PowerPoint* or *Keynote* presentation.

1. **Use large type**—Use at least a 32-point font; use a larger type size if the audience is large and a long distance away from the presenter. Smaller type (no less than a 20-point font) may be used to provide citations, references, and sources, which are typically positioned in the lower-left or -right corner of the appropriate slide.
2. **Contrast the text and background colors**—The audience cannot see text that is too similar in hue to the background on which it appears. Use text with high contrast to the background (e.g., dark text on light-colored backgrounds, white text on dark-colored backgrounds).
3. **Minimize the amount of text on each frame**—Use text to focus attention on main points, not to present large amounts of information. Summarize ideas in brief phrases and make sure that you, not the projection screen, are the focus of the presentation. In other words, use the presentation to enhance, strengthen, and expand upon points that are outlined briefly on each frame.
4. **Keep frames simple**—Frame designs should be simple, clear, and free of distractions. Too many items on one frame can interfere with reading, especially if some items are in motion. In addition, try to employ photographs and images in place of lengthy text when describing a context or event. Finally, try to minimize the number of bullet points (not to exceed three to five points) on each individual slide.
5. **Avoid using too many "fancy" fonts**—Many fonts are unreadable when projected on a screen. Use a plain sans serif (straight lines with no "hands" and "feet") font for titles and a plain serif font for other text. Avoid using more than three different fonts throughout the presentation to maintain consistency of headings, body text, and pull-out text.
6. **Avoid using gratuitous graphics and clip art**—Graphics interfere with communication when used solely for decoration. Use graphics to help communicate and expand upon the content, not for the sake of using graphics alone.
7. **Avoid using gratuitous sounds**—Sounds interfere with communication when used solely for effect. They should always help communicate the content and not be used as a transition effect.
8. **Use graphics, not just text**—Well-chosen graphics can help communicate messages. Text alone does not make the best use of the capabilities of presentation software. However, with the ever-increasing ease of finding and downloading photographs and images from online sources, it is important that you encourage students to document where images come from and to cite the proper sources in their presentations.
9. **Present in a dark room**—Frames can fade away if the room is too bright. Make sure to cover windows and turn off lights during a presentation.
10. **Avoid reading text aloud**—Do not read what the audience can read for themselves. Use text to guide the main points of discussion. This will help you focus on presenting to the audience as opposed to speaking at the screen. Remember, you—not the *PowerPoint*—are doing the presenting.

TECHNOLOGY INTEGRATION EXAMPLE 5

PRESENTATION SOFTWARE

TITLE: Cave Drawings

CONTENT AREA/TOPIC: Social studies (history), art

GRADE LEVEL: 6–8

NETS FOR STUDENTS: Standard 1—Creativity and Innovation; Standard 2—Communication and Collaboration

21ST CENTURY SKILLS: Core subjects: History and Arts; Creativity and Innovation-Think creatively; Critical Thinking and Problem Solving-Reason effectively; Communication and Collaboration-Communicate clearly

DESCRIPTION: Students learn about prehistoric man and the messages left in caves from that time. The teacher displays a presentation with example drawings. Students discuss the messages being communicated in pictures. Then, they try their hand at "drawing messages." The lesson wraps up with a discussion on similarities between cave drawings and television, magazines, or newspapers. Students can also create a newspaper advertisement using only pictures and/or symbols, then see if others can guess the topic of the advertisement.

Source: Based on a concept in Cave Drawing lesson plan at Teachnology website: http://www.teach-nology.com/teachers/lesson_plans/history/cavedrawings68.html

The most powerful strategy for integrating presentation software is for students to create individual or small-group presentations to document and display results of their research and/or to practice making persuasive presentations.
Photo by W. Wiencke.

student attention while explaining important concepts or pointing out essential features.

- **Presentation of illustrative problems and solutions**—Projection with presentation software is useful when the whole class needs to see example problems and how to solve them (e.g., in mathematics or chemistry) prior to doing their own problems.
- **Practice screens**—Many teachers set up presentations of spelling or vocabulary words or objects to identify (e.g., lab equipment, famous names or places) to run automatically in the classroom, knowing that students' eyes are drawn to the moving slides.
- **Assessment screens**—When teachers need students to identify pictures of items (e.g., lab equipment, famous people), presentation screens can enable visual assessment strategies.
- **Brief tutorials**—Teachers can create presentation software reviews of simple concepts (e.g., grammar rules)

TECHNOLOGY INTEGRATION EXAMPLE 6

PRESENTATION SOFTWARE

TITLE: Here's My Hero

CONTENT AREA/TOPIC: Language arts and technology

GRADE LEVELS: 4–5

NETS FOR STUDENTS: Standard 1—Creativity and Innovation; Standard 2—Communication and Collaboration; Standard 3—Research and Information Fluency; Standard 6—Technology Operations and Concepts

21ST CENTURY SKILLS: Core subject: Language arts; Communication and Collaboration—Communicate clearly; Information Literacy—Apply technology effectively

DESCRIPTION: Students identify a historical figure they regard as a hero and make a presentation about him/her to share with the class. They gather images and data from the Internet to add to their slides. They use *PowerPoint* features to format their slides, create a timeline of significant events in their hero's life (organizational chart), and insert a table comparing themselves to their hero. Before making their presentations, they learn how to organize speaker notes for their slides and re-arrange slides for maximum impact during the presentation.

Source: Based on a concept in a lesson plan at the TechnoKids website: http://www.technokids.com/computer-curriculum/junior/powerpoint-lesson-plans-technohero.aspx