

Top 10 Evidence-Based, Best Practices for PowerPoint® in the Classroom

**Ronald A. Berk, PhD, Professor Emeritus
The Johns Hopkins University**

Author's Contact Information

Ronald A. Berk
10971 Swansfield Rd.
Columbia, MD 21044
410-940-7118
email: rberk1@jhu.edu

Abstract:

PowerPoint® presentations in academia have a reputation for being less than engaging in this era of learner-centered teaching. The Net Generation of students also presents a formidable challenge to using PowerPoint®. The problem is that the traditional PowerPoint® in the classroom resembles static electronic overheads that tend to decrease learning and retention of the content presented. With more than 80 studies on the topic and a solid foundation of cognitive psychology, learning theory, and physiological research and experience with “rich media,” current practices need to be aligned with the research evidence. This article synthesizes the PowerPoint® literature and translates the research findings into a state-of-the-art, concise top-10 list of evidence-based, best practices for teaching. The first five are basic design options (background, font, color, headings, text) and the last five pertain to engagement and multimedia (images, movement, music, video). Hopefully, those practices will propel faculty to upgrade their PowerPoint® presentations consistent with the evidence.

Key Words:

PowerPoint, PowerPoint research, PowerPoint teaching, multimedia in teaching, PowerPoint engagement, death by PowerPoint, PowerPoint best practices.

“Professor, We Have a Problem!”

“Death by PowerPoint®” is an international epidemic with too much text and boring graphics topping the list of frustrating and uninspired features. That was the major conclusion from a June 2011 survey of the U.S. adult population (3.2% error) by IBOPE Zogby International (Allen, 2011). Can you relate to those findings? PowerPoint® ranks as one of the most dreaded presentation platforms, with respondents claiming they would rather forego sex tonight (24%), do their taxes (21%), go to the dentist (20%), or work on Saturday (18%) than have a close encounter of the PowerPoint® kind.

College students have also expressed comparable negative reactions (Mann & Robinson, 2009) towards traditional PowerPoint® presentations in their classes. So where does the revolution begin to change this reputation of PowerPoint®? Let’s start in the classroom.

Ingredients in a Lethal Dose of PowerPoint®

Based on the preceding survey results and more than 80 research studies (Berk, 2011b), what exactly are the active ingredients in a lethal dose of PowerPoint®? There seem to be three primary elements:

1. Dead words on the screen (white background and black font with lots of text and bullets)
2. Read most or all dead words to your students
3. Students are Net Geners (17–30 years old) who are easily bored and impatient

What’s Wrong with the Ingredients?

Elements 1 and 2 violate the principles of cognitive load theory. The research has shown that learning increases by decreasing extraneous information (or overload that exceeds one’s cognitive capacity) on each slide (Kalyuga, 2011; Kirschner, Kester, & Corbalan, 2011; Mayer, 2009). Too much text is an example of that overload. The “redundancy principle” indicates that reading text verbatim on a slide off of the screen decreases learning and retention (Mayer & Johnson, 2008).

When those first two elements are mixed together with a few of the characteristics of your Net Gener students (Berk, 2009), you have a formula for potential disaster in your classroom. How would you answer the following question?

How will your students most likely respond in class to a PowerPoint® with those elements?

- A. Walk out or not come to class
- B. Text, IM, surf, or do other work
- C. Fall asleep
- D. Get angry and frustrated
- E. Throw frozen vegetables at you and the screen
- F. All of the above

A Suggested Antidote

This traditional use of PowerPoint®, resembling static *electronic transparencies* with lecture notes on the screen, is antithetical to the practices of learner-centered teaching? I know what you're thinking: "We've come so far in the transition from teacher-centered to learner-centered environments over the past decade that PowerPoint® just doesn't seem to fit." WROOONG!

"So, what is the antidote?" I'm glad you asked. After carefully reviewing all of the research related to basic features and multimedia in PowerPoint® (Berk, 2011b), specific applications of the findings (Berk, 2012), strategies to integrate engagement activities throughout a PowerPoint® presentation (Berk, 2011a), and the recommendations of several PowerPoint® gurus and graphic designers, I have extracted a set of 10 "evidence-based, best practices" for your classroom use, kind of a *CliffsNotes*® state of the art of PowerPoint®. (**WARNING:** These practices are intended solely for your use only as a trained professional professor; they should not be attempted at home by any rank amateurs.)

Before you design your slides, where is your content? It's probably floating somewhere in your head. It's best to map it out first on cards, paper, or a storyboard, not on slides. After mapping for a while, transfer that content to slide form. Here are a few thoughts on preparing your slides so they are really ready for the "best practices" that follow.

Slide Deck Preparation

What's the point? What's the point or bottom line of your slides? Your answer is the glue that holds all of the slides together. It should also be clear to your students, right from the get-go. They are thinking: "Get to the point. Don't waste my time. I have to do my laundry." If you adopt that *get-to-the-point* mindset throughout your presentation, you will eliminate a lot of the clutter, unnecessary words, noise, and "mumblers" that plague many slides

Slide sequence. Don't start with the evidence and globs of data in tables and charts. You'll lose your students. Opening slides should clearly convey the (1) main point and subpoints, (2) the reasons why they're important, and then (3) the supportive evidence for each point. Of course, these elements will vary depending on the type and content of the presentation.

Slide decks and handout. How much content should appear on your slides? The RULE OF THUMB is: "less is best." How much information on a single slide can any student possibly learn and remember? Consider your *slide deck* (aka *briefing deck*) as the "highlight film" with minimal text information, say, two or three words or phrases, and the *handout* (aka *reading deck*) as the detailed content summary with necessary text information your students can use during the presentation and read for further study later (Gabrielle, 2010). Although only a couple of studies have found no significant differences in performance on tests of PowerPoint® content when handouts containing the same slides as the presentation were given to students (Marsh & Sink, 2010; Noppe, Achterberg, Duquaine, Huebbe, & Williams, 2007), 75% of the students

indicated the handouts were generally helpful, useful in preparing for tests, and helpful with note-taking, and 50% said the handouts improved their listening to lectures.

No research has tested the impact of distributing handouts designed specifically to enhance learning from the PowerPoint® (Kinchin, 2006). At present, it seems prudent to provide handouts online or in class to encourage note-taking, engagement, and deep learning. Your slides on screen should NOT be the same as your handout. The handout may include all of those slides plus much more amplified or additional content, examples, exercises, study questions, and other material. Tailor each deck for its specific purpose. Prepare your handout deck first, copy it, and then review each slide to reduce the text and create a svelte slide deck for your presentation.

Point of each slide. As you prepare your titles, lists, and graphics, consider what you're going to do with them during your presentation, such as emphasize particular points, interpret or extend concepts, raise probing questions, or generate discussion. Those thoughts about the purpose and use of each slide may reduce the quantity and increase the quality of the slide material you present. Keep asking: "What's the point of this slide? How does it contribute to the learning outcomes?" Then make necessary adjustments in words. The practices that follow will address slide design and media alternatives to words.

Top-10 Best Practices

Beyond the basics you may already know as you prepare your slides, here is a top-10 summary of the practices that reflect the potential of the PowerPoint® technology for face-to-face classroom, distance/e-learning, and hybrid/blended learning:

1. **Slide Background:** Choose a simple template theme or solid color/gradient background that will *not distract* from word or image content; avoid logos and other irrelevant graphics, minimize their size, or place them on opening and closing slides only; simple and media-embedded, complex templates are available for free from Microsoft® and numerous software companies;
2. **Font:** Use a minimum of 30PT for text and larger for heads; pick Gill Sans MT, Microsoft Sans Serif, Arial, Verdana, or Lucinda Console (which has been described as "the most readable, mono-spaced font out there"), which are clear, interesting, attractive, professional, and without curly extensions; make sure every word can be *read easily* from the back of your classroom;
3. **Color:** Graphic designers recommend picking high-contrast colors with a *cool background* (blues or greens), which recede from your eyeballs, and *warm font* (yellow, orange, or red), to which your eyes are drawn and which commands attention; the combination should be *easy to read* (Note: Colors and resolution may vary with projectors, so adjust colors during rehearsal.);
4. **Titles and Headings:** Create a short *full-sentence heading* (written as an assertion) for each slide that briefly summarizes the content compared to a word or phrase; that heading will increase students' memory of the "point of the slide"; the Steve Jobs' single-word-on-a-slide approach may be appropriate for some content (especially if it's followed by a picture of the iPad4);

5. **Text or Bullet Points:** Apply “*less is best*” rule with minimal amount of text and number of bullet points, preferably not more than three; plus highlight key points and order with UPPER and lower cases, **bold**, *italics*, underline, numbers, blanks, larger fonts, and high-contrast colored words or phrases; students’ eyeballs should be drawn to the specific point of each slide;
6. **Engagement:** Virtually every active, cooperative, and collaborative learning activity or exercise, including improvisation, can be systematically integrated into your slide deck so *students are connected from beginning to end*; any spontaneous activity, such as Q & A, can occur by just clicking “b” for slide blackout; students should focus on you, the screen, or other students in teams, small groups, or a demonstration;
7. **Images:** Add bold, colorful, 2D (not 3D), high-impact, high-quality, strong, dynamic graphics (photos, charts, graphs, tables, diagrams) that make a specific point with no detail; visuals can stimulate emotional reactions and increase attention and retention of content more than words alone; *words should appear near images* and narration or dialogue should accompany images, where appropriate; animated visuals and infographics can enhance learning significantly more than static visuals; avoid irrelevant images that can distract;
8. **Movement:** Use slide transitions systematically throughout your presentation; letter, word, and graphic animation can be used to *illustrate concepts and processes*, especially when synchronized with familiar music or sound effects; outcome-based animation is the simplest technique to pump life into dead words; reveal bullets or words incrementally to maintain focus; animations can generate interest, motivation, and engagement, which can promote deep learning; avoid irrelevant movement that can distract;
9. **Music:** Synchronize music with which students are familiar to animated heads, text, lists, images, and demonstrations to *create emotional connections*; music can excite and snap your students to attention, while slipping the content into long-term memory; even background “passive” music can increase attention levels, improve retention and memory, extend focused learning time, and expand thinking skills; avoid irrelevant sounds that can distract, except for humor; and
10. **Videos:** Embed video clips from YouTube, TV, movies, or student projects into your slides or stream in clips for powerful, memorable learning experiences; edit clips to get to the specific point; multimedia auditory/verbal and visual/pictorial stimuli increase comprehension, understanding, memory, and deep learning more than any single stimulus by itself; *videos are learner-centered* when they are presented in ways consistent with how the human mind works and research-based principles.

Application of Top-10 Practices

As you consider these 10 practices to boost the impact of your PowerPoint® slides, think carefully how each element in your slide contributes (or distracts) to the “point of the slide” and outcome. Which elements bubble up to the surface to make your point the strongest? What unique contribution does the template, color background, font size, image, music, video, or any other element make to increase attention, emotional

connection, learning, and memory? Beyond traditional slides, these add-ons (aka PowerPoint® apps) can significantly heighten the emotional and cognitive effects of your slides.

However, be careful not to distract. Those apps can also be dangerous. Seductive details, such as movement, music, and sound effects, which can be embedded in any slide can also backfire by stimulating emotional arousal that is irrelevant to the topic, which can actually harm learning (Mayer, 2009). Ask a few colleagues to review your media apps to provide feedback on whether they can be interpreted as irrelevant or distracting.

Among the 10 practices, the first five are basic design options and the last four pertain to multimedia. Based on the research review, the evidence that undergirds 7–10 is the most important to learning. There is a solid foundation of cognitive psychology, learning theory, and physiological research and experience with “rich media” (see Berk, 2011b). In fact, there is more research on the use of videos than all of the preceding 9 elements combined. Videos contain visual images, movement, dialogue or narration, and, maybe, music; that’s at least 3 of the other elements.

When you insert media into your PowerPoint®, specify the purpose or outcome: (1) to grab and maintain attention, (2) to create an emotional connection, (3) to improve learning, and/or (3) to increase retention or the transfer of information. Including animations, especially in graphics, and media systematically in your slides with specific learning outcomes will positively affect just about every aspect of your teaching. Your students will not easily forget the images, music, and videos.

What’s Next?

So, what is the status of your use of PowerPoint® right now? Can it be improved with any of the practices described previously? After you have assembled a draft of your slide deck, take each of the first five basic elements and start incorporating those practices into your slides. Then add the other practices in the bottom five as you become more comfortable with the changes. The media apps will unleash the potential of PowerPoint® in your classroom. Your students’ responses and achievement should be the pay-offs for your efforts.

The foregoing recommendations were intended to be an E-ZPass ride at “twitch” speed through the research findings on PowerPoint® translated into “best practices.” I hope that those practices will propel you to embark on a new journey to upgrade your PowerPoint® presentations consistent with the research evidence. If you do your part, perhaps, we can stop the spread of “death by PowerPoint®” in academia, one classroom at a time.

References

- Allen, M. (2011, June 21). *Death by PowerPoint? SlideRocket saves presentations!* Retrieved July 7, 2011 from <http://www.sliderocket.com/blog/2011/06/death-by-powerpoint/>
- Berk, R. A. (2009). Teaching strategies for the net generation. *Transformative Dialogues: Teaching & Learning Journal*, 3(2), 1–23.
- Berk, R. A. (2011a). “PowerPoint engagement” techniques to foster deep learning. *Journal of Faculty Development*, 25(2), 45–48.
- Berk, R. A. (2011b). Research on PowerPoint®: From basic features to multimedia. *International Journal of Technology in Teaching and Learning*, 7(1), 24–35.
- Berk, R. A. (2012). How to create “Thriller” PowerPoints® in the classroom! *Innovative Higher Education*, 37(2), 141–152.
- Gabrielle, B. (2010). *Speaking PowerPoint: The new language of business*. Kirkland, WA: Insights Publishing.
- Kalyuga, S. (2011). Cognitive load theory: How many types of load does it really need? *Educational Psychology Review*, 23(1), 1–19.
- Kinchin, I. (2006). Developing PowerPoint handouts to support meaningful learning. *British Journal of Educational Technology*, 37, 647–650.
- Kirschner, F., Kester, L., & Corbalan, G. (2011). Cognitive load theory and multimedia learning, task characteristics and learning engagement: The current state of the art. *Computers in Human Behavior*, 27(1), 1–4.
- Mann, S., & Robinson, A. (2009). Boredom in the lecture theatre: An investigation into the contributors, moderators, and outcomes of boredom amongst university students. *British Educational Research Journal*, 35(2), 243–258.
- Marsh, E., & Sink, H. (2010). Access to handouts of presentation slides during lecture: Consequences for learning. *Applied Cognitive Psychology*, 24(5), 691–706.
- Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). New York, NY: Cambridge University Press.
- Mayer, R. E., & Johnson, C.I. (2008). Revising the redundancy principle in multimedia learning. *Journal of Educational Psychology*, 100(2), 380–386.
- Noppe, I., Achterberg, J., Duquaine, L., Huebbe, M., & Williams, C. (2007). PowerPoint presentation handouts and college student learning outcomes. *International Journal for the Scholarship of Teaching and Learning*, 1(1), 1–13.