

# Creating the Course *English for Scientific Writing and Presentations*: Making PowerPoint Work for You

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## 1. Introduction

English is the official or de facto language of 59 countries and 27 territories with a total population of over 2.4 billion (Wikipedia 2011). Also, more than 80% of technological information is written in English and almost 100% of software source coding is written in English (He 2010). In the scientific world, English has become the lingua franca of spoken and written communication. In the 1960s and 1970s, the percentage of scientific publications in English was 55.3% and 60% respectively of the total number (Baldauf & Jernudd 1983, cited in Fuertes *et al.* 2007). By 1995, English made up over 95% of publications in the Science Citation Index (Tardy 2004); the percentage remained steady through to 1997 (Garfield 1998) and then increased slightly to 96% in 2000 (Bordons 2004). Many scientists who publish their work in English are not native speakers of English, but they have read many papers in English and they have a very good idea of how a scientific paper should be written, even if their English needs some help (Körner 2008, p. 2).

The United Graduate School of Agricultural Sciences, Ehime University (UGAS-EU), is an independent institution that links the faculties of agriculture of Ehime University, Kagawa University and Kochi University. As at 1 April 2011, UGAS-EU, or Rendai as it is commonly known, had 129 students, 68 of whom were international students from China, India, South Korea, the Philippines, Thailand, Nepal, Indonesia, Vietnam, Bangladesh, Sri Lanka, Egypt, Laos, Papua New Guinea and Mali (Outline 2011). In general, the students' level of speaking and understanding English ranges from workable to good, but they need help with their English writing. Most students have had some training in English scientific writing at their home universities, but nothing in depth. In effect, they learned how to write scientific papers simply by having read many English-language papers as part of their own research.

In December 2008, the then Dean of Rendai, Professor Nobuo Ohbayashi, asked me to teach a course on scientific English to the graduate school's PhD candidates. The main aim of the course was (and still is) to help students improve their use of scientific English for writing documents (department papers, papers for publication in journals, dissertations, and correspondence) and giving presentations (at department meetings, conferences, and dissertation presentations). There was no existing course within the school on which to base the new course, so *English for Scientific Writing and Presentations* had to be created from scratch. Initially, it was a one semester course (fifteen 90-minute classes) to be taught twice a year to the April and October intake of students. After the first course (April-July 2009) had been completed, the students asked the new Dean, Professor Teruo Henmi, if the course could be expanded to a second semester. The Dean agreed and the first teaching of this expanded course ran from October 2009 to February 2010. These two courses became *English for Scientific Writing and Presentations I* and *English for Scientific Writing and Presentations II*.

The lectures at Rendai are given in the videoconference room to students present in the room, and are simultaneously broadcast via the videoconferencing system to Kochi and Kagawa universities (both audio and video). The camera orientation in the videoconference room is fixed, so the lecturer must remain in the same position throughout the lesson. For that reason, the lectures are given using Microsoft's PowerPoint presentation software. All students can see the PowerPoint slides and are also given copies of most of the slides which serve as a set of notes.

This article discusses the reasons why the initial set of PowerPoint slides were redesigned to make them more effective and useful, and in the process why the default settings of PowerPoint were ignored.

## 2. Using PowerPoint

I had no experience using PowerPoint, so learning the idiosyncrasies of this presentation software (called slideware) went hand-in-hand with creating the lecture content from scratch. Presentation slides created in PowerPoint or similar software all have basically the same format: a title slide followed by slides with a phrase headline (slide title) and bullet points (often with sub-bullets), which the speaker uses as talking points. This style of slide is the default format in PowerPoint (see Figure 1). Unsurprisingly, that format was used to create the lecture slides for the two Rendai courses. Some speakers use about six bullet points per slide and each bullet point consists of just a few words. The speaker then speaks in detail, hopefully, about each bullet point. Other speakers pack each slide with a lot of detail and then simply read what is on the slide. I attempted to create something in between as all the students are non-native speakers of English and it would be useful for them to have copies of the slides to be used as a reasonable reference.

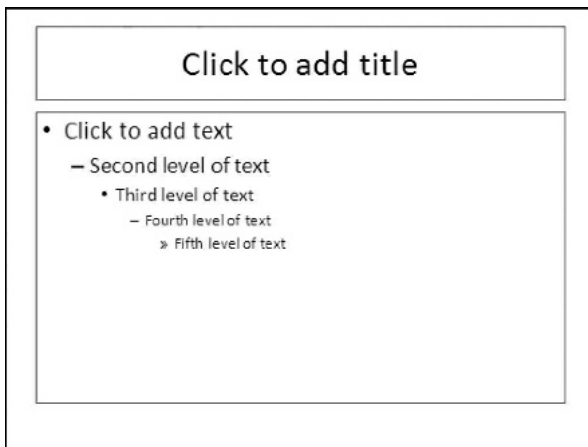


Figure 1. Default layout presented by PowerPoint.

The two semester course (thirty 90-minute classes) consisting of 1,247 PowerPoint slides seemed quite good with a suitable balance of lectures and in-class exercises.

## 3. Criticism of PowerPoint

Keller (2003) describes PowerPoint as one of the most pervasive and ubiquitous technological tools ever concocted and has revolutionized the worlds of business, education, science and communications, swiftly becoming the standard for just about anybody who wants to explain just about anything to just about anybody else.

She goes on to state that PowerPoint has more than 300 million users worldwide and a 95% share of the presentation software market. Thomson (2003) quotes an even higher number of users at 400 million. Whatever the actual number, most people would agree that PowerPoint has more than the lion's share of the slideware market.

Despite the ubiquity of the program, it has been the subject of much criticism. Simply looking at the titles of some articles written about PowerPoint provides a good idea of how Microsoft's slideware program is regarded: *PowerPoint is evil* (Tufte 2003), *The Cognitive Style of PowerPoint: Pitching Out Corrupts Within* (Tufte 2006), *Is PowerPoint the devil?* (Keller 2003), *PowerPoint Makes You Dumb* (Thomson 2003), *Does PowerPoint make you stupid?* (Simons 2004), *The Level of Discourse Continues to Slide* (Schwartz 2003), *PowerPoint, No! Cyberspace, Yes* (Creed 1997), and *Ban It Now! Friends Don't Let Friends Use PowerPoint* (Stewart 2001).

The authors of the above articles were not restrained in their criticism of PowerPoint. Keller (2003) says that PowerPoint has a dark side. It squeezes ideas into a preconceived format, organizing and condensing not only your material but your way of thinking about and looking at that material. Thomson (2003) says it forces people to mutilate data beyond comprehension. Simons (2004) states that it encourages over-simplification by asking presenters to summarize key concepts in as few words as possible (e. g., bullet points), which can lead to gross generalizations, imprecise logic, superficial reasoning and misleading conclusions. He points out that Tufte uses words such as *stupid*, *smarmy*, *incoherent*, *witless*, *medieval* and *dementia* to describe the trivializing effect of PowerPoint slides on data. Parker (2001) characterizes PowerPoint as software you impose on other people.

The military are not immune from criticism about their use of PowerPoint. Thomas E. Ricks, in his book *Fiasco – The American Military Adventure in Iraq* (2007), notes that “the thirty-two slides in the JTF-IV summary of planning for postwar Iraq are extreme in their incoherence” (p.79). And again later in the book: “McMaster also challenged U.S. military culture, all but banning the use of PowerPoint briefings by his officers. The Army loves these bulleted briefings, but McMaster had come to believe that the ubiquitous software inhibits clarity in thinking, expression, and planning” (p.421). Parker (2001) draws attention to the large file sizes of

PowerPoint presentations: “Enormously elaborate PowerPoint files (generated by presentation-obsessives – so-called PowerPoint Rangers) were said to be clogging up the military’s bandwidth. Last year, to the delight of many under his command, General Henry H. Shelton, the chairman of the Joint Chiefs of Staff, issued an order to U.S. bases around the world insisting on simpler presentations.”

In investigating the crash of the space shuttle Columbia in 2003, the Columbia Accident Investigation Board criticised the use of PowerPoint by NASA engineers in a presentation on assessing possible wing damage during the mission. This is a point echoed by Tufte (2006), perhaps the harshest critic of the slideware program, who severely criticised that PowerPoint presentation. Thomson (2003) succinctly summarized the problem, stating that the engineers “presented the findings in a confusing PowerPoint slide – so crammed with nested bullet points and irregular short forms that it was nearly impossible to untangle.” Tufte (2006) proclaimed that a crucial piece of information was hidden as the last point on a key slide. The Board noted that NASA had become too dependent on presenting complex and intricate information in presentation software that simplifies and outlines (Kjeldsen 2006). “The presentation had the usual PowerPoint problems: detailed bullet points, separation of words and figures, confusing typography, unclear hierarchies and data locked away in illegible tables” (2006).

#### 4. Is criticism of PowerPoint misdirected ?

Tad Simons, in his article *Does PowerPoint make you stupid?* (2004), quotes Don Norman, a professor of art and design at Northwestern University and a frequent user of PowerPoint who disagrees with most of Tufte’s assertions: “Tufte is correct in that most talks are horrible and most PowerPoint slides are bad – but that’s not PowerPoint’s fault. Most writing is awful, too, but I don’t go railing against pencils or chalk.” Norman says that PowerPoint is not primarily a textual medium, like a newspaper or magazine – PowerPoint is a visual medium. He points out, “Text is the last thing people should put on a PowerPoint slide. In fact, I would argue that supporting visuals – charts, diagrams, illustrations, photos and video – are the only things that should appear on a slide.”

Communications consultants Karl Keller and Barbara Shwom, in their article *The great man has spoken. Now what do I do? A Response to Edward R. Tufte’s “The Cognitive Style of PowerPoint”* (2003), argue that PowerPoint should not be blamed when presenters use the program poorly. Further, they say that bullet points in themselves are not the problem; it is the excessive and unthinking use of them which destroys communication.

Peter Norvig of Google Inc. (creator of the PowerPoint parody, Abraham Lincoln’s Gettysburg Address) believes that “PowerPoint doesn’t kill meetings. People kill meetings. But using PowerPoint is like having a loaded AK-47 on the table: You can do very bad things with it” (quoted in Konrad 2003).

#### 5. Making PowerPoint work for you

Despite the criticism, none of the critics actually calls for abandoning PowerPoint. Supporters of the program generally agree with the criticisms, but assert that the program is not being used intelligently. Rocklin (1997) calls PowerPoint “pedagogically useful technology”. Shwom and Keller (2003) declare that PowerPoint is not the cause of poorly planned, disorganized presentations; instead, a bad PowerPoint presentation is a symptom of the writer’s failure to employ simple slide design principles, basic communication skills, and fundamental rhetorical techniques. Further, they state that presenters who opt for PowerPoint’s default designs and wizard graphics, or who use bullet points with no rhetorical or logical structure, or who fail to keep their purpose, audience, and message in mind, are not oppressed by PowerPoint: they are at worst lazy, and at best naïve.

Even artist and singer David Byrne (lead singer of the group Talking Heads), in an article for *Wired* magazine (2003), sings the praises of PowerPoint, even though he found it “limiting, inflexible, and biased” and “makes hilariously bad-looking visuals.” However, he adds, “It was, for my purposes, perfect.”

Well-designed slides help audiences to quickly and easily grasp key points and understand complex ideas through well-chosen images, and show audiences the structure and organisation of a presentation (see Figure 2). The defaults of PowerPoint (phrase headline, bullet lists, typography, and layout) do not lend themselves to creating such well-designed slides. Alley (2003) and his

colleagues (Alley & Neeley 2005a, 2005b; Alley *et al.* 2006) advocate an alternative design (called “assertion-evidence”) that relies on a succinct sentence headline (the assertion), instead of a phrase headline (or worse, no headline at all), supported by visual evidence, instead of a bullet list.

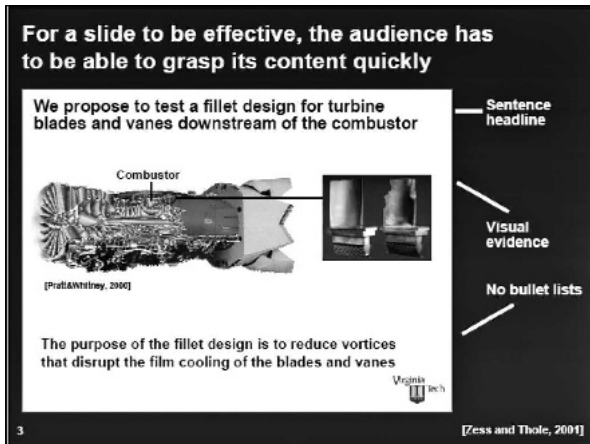


Figure 2. Example of an effective slide that quickly orients an audience.<sup>1)</sup>

The sentence assertion headline states the main point of the slide and is supported in the main body of the slide by images and short groupings of words rather than full sentence bullet points (Alley 2003, pp.113-114). Slides are boring if they do not include images and are overwhelming if they include too many details (p.97).

A sentence headline orients the audience much more effectively to the topic and purpose of a slide than a phrase headline or no headline. This effective audience orientation applies during the presentation as well as later when the slides are used as a set of notes. Contrast the weak phrase headline in the top slide in Figure 3 with the stronger sentence headline in the bottom slide.

Alley and his colleagues have suggested a specific set of typography guidelines for the sentence headline. First, the sentence headline should be no more than two lines, because blocks of text longer than two lines on a slide are often not read. Second, a bold sans serif typeface (such as Arial) should be used, because a boldface sans serif typeface is easier to read than either a normal (not bold) sans serif or a normal or boldface serif typeface (such as Times New Roman). A boldface sans serif typeface means a smaller type size can be used that takes up less space on a slide. Third, the headline should be left justified and begin in the upper left corner, to make it easier for the audience to read. A centered headline takes longer to read, particularly if

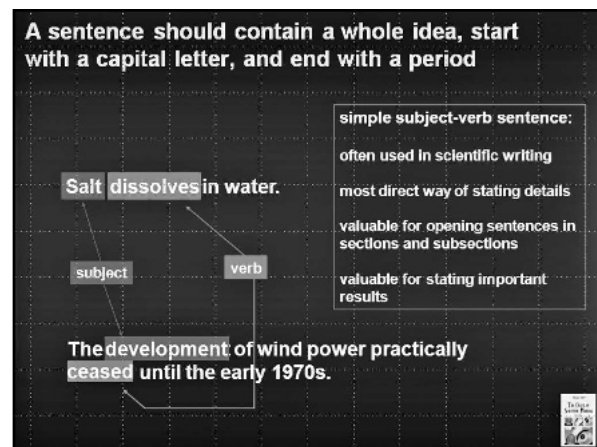
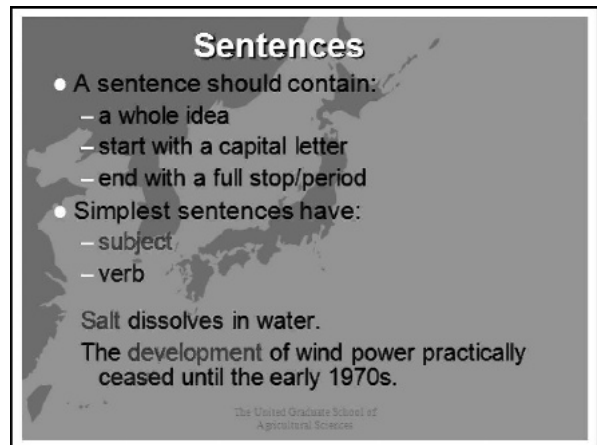


Figure 3. Comparison of weak phrase headline (top) with stronger sentence headline (bottom).

there is a second line. The defaults of PowerPoint use a normal serif typeface, larger type sizes and a centered phrase headline.

In the alternative “assertion-evidence” design, the sentence headline is supported by visual evidence rather than bullet points, which makes a slide more memorable. Contrast the quickly forgotten bullet list in the top slide of Figure 4 with the much more memorable visual representation in the bottom slide. According to Sadoski and Paivio (2001) and Mayer (2001) (both cited in Alley & Neeley 2005b), the audience’s retention increases significantly if the audience experiences the information in both verbal and visual ways. Note that the images in Figure 4 serve to represent the work rather than just decorate the slide (2005 b). Furthermore, according to Carney and Levin (2002) (cited in Alley & Neeley 2005b), decorative images actually reduce audience recall.

## 6. Does the alternative “assertion-evidence” design actually help audiences remember key details ?

Alley and Neeley (2005a) conducted a study on the effect of sentence headlines in four sections of a large geoscience course that had about 200 students per section. Slides with phrase headlines (and bullet lists) were used to teach the course to two sections of students, while slides with sentence headlines (supported by visual evidence) were used to teach the remaining two sections of students. All four sections took the same test at the end of the course. The average score for the students taught from the phrase headline slides was 69% correct, while the average score for the students taught from the sentence headline slides was 79% correct. Statistical analysis showed a statistically significant difference at the .001 significance level. Although no similar studies have been conducted on the effectiveness of using sentence headline slides in general presentations (at conferences, department meetings, and so on), based on the results gained by Alley and Neeley,

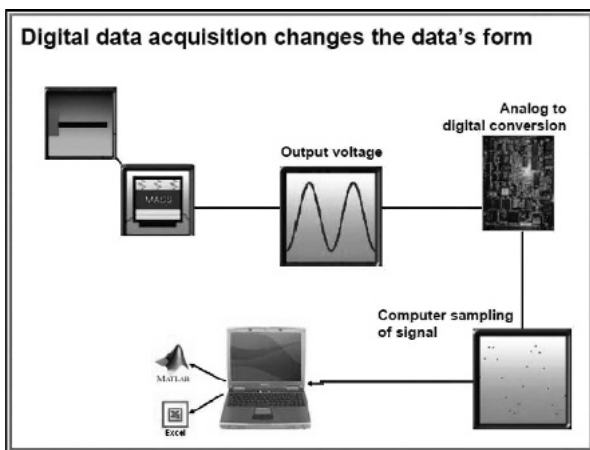
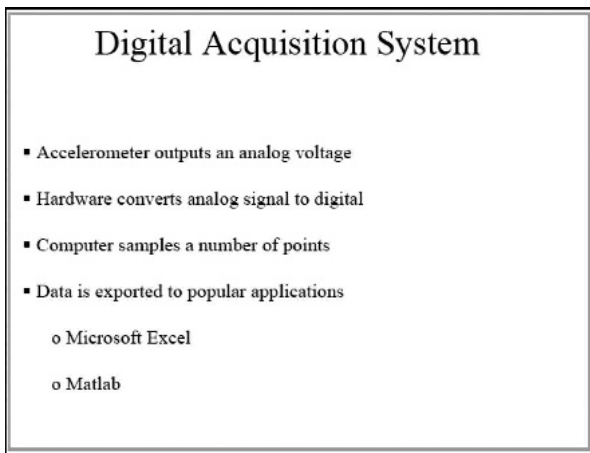


Figure 4. Comparison of quickly forgotten bullet list (top) with the more memorable visual representation (bottom).<sup>2)</sup>

it would be reasonable to assume that audiences would have a higher level of retention if they were presented with well-designed “assertion-evidence” slides.

## 7. Recreating the Rendai course slides

On reading Michael Alley’s *The craft of scientific presentations* (2003, Chapter 4 on the use of visual aids), in which he discusses creating effective slides and how the defaults of PowerPoint hinder the creation of effective slides, I realized that my slides were not effective: they were a series of long, mind-numbing lists and used slide phrase headlines (slide titles) that did not quickly orient students to the topic and purpose of each slide. In a seemingly contradictory statement, Alley and Neeley (2005a) declare that “PowerPoint is both the most professional and the most boring means of giving a presentation.” This certainly turned out to be true of the slides for the two Rendai courses. The content was both useful and interesting (well, at least the students were kind enough to say so), but the way the content was presented meant the slides were not memorable. Based on that, I decided to adopt Alley’s “assertion-evidence” design for presentation slides, and recreated the entire 1,247 slides in *English for Scientific Writing and Presentations I* and *English for Scientific Writing and Presentations II*.

There is no question that creating slides that use the “assertion-evidence” design takes far more thought, effort and time than traditional phrase headline slides with bullet points. Creating the original traditional slides for the two Rendai courses took about four months of research and making the slides. Converting those traditional slides into sentence headline slides took more than four months. (The content was already there; the redesign was time consuming.) Besides the time required to create visual evidence, more time is needed to create a succinct sentence headline that states the main assertion of the slide. Despite the amount of work involved, the effort is worthwhile if the end result is an effective, well-designed set of slides that help to quickly orient an audience to the key assertions and assumptions of a presentation and to understand the most important details.

## 8. Conclusion

Microsoft PowerPoint is, without question, the most pervasive and ubiquitous slideware program (computer presentation software) available, with reportedly in excess of 300 million users worldwide. It has also been the subject of more criticism than probably any other piece of software. Critics have been harsh and vitriolic in their complaints about PowerPoint, claiming that it obfuscates and conceals rather than clarifies and reveals. Supporters of PowerPoint generally agree with the criticisms, but declare that the end results are not the fault of PowerPoint; rather, the fault lies with users who do not know how to use PowerPoint intelligently or will not take the time to learn. Alley and his colleagues advocate discarding the defaults suggested by PowerPoint (phrase headline, bullet points, typography, and layout), and have created an alternative slide design they call "assertion-evidence" that has a sentence headline supported by visual evidence. Alley and Neeley (2005a) in their study showed that such an "assertion-evidence" design of slides helps students to remember more of the important points on a slide than the traditional phrase headline with bullet points. Creating slides using the alternative slide design certainly takes a lot more time and requires more thought to produce a succinct headline, but the extra effort inevitably makes presentations more memorable and persuasive.

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- 1) The slide in Figure 2 is combined from Zess, G & Thole, K 2001, 'Computational design and experimental evaluation of using a leading edge fillet on a gas turbine vane', paper no. 2001-GT-404, *ASME Turbo Exposition* (New Orleans: ASME, 5 June) in Alley, M 2003, *The craft of scientific presentations*, p.135, Springer-Verlag, New York, and <http://writing.eng.vt.edu/slides.html>.
  - 2) Alley, M 2009, 'Rethinking the design of presentation slides: The assertion-evidence structure', [http://www.writing.engr.psu.edu/slides\\_body.html](http://www.writing.engr.psu.edu/slides_body.html) from Robertshaw, H 2004, Class period 15: Signals and systems, presentation at Virginia Tech, Blacksburg, VA, 16 March.

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