HOW MUCH TEXT SHOULD THERE BE ON A SLIDE?

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WHAT'S THE POINT?

This newsletter:
- ✓ gives practical insights into the amount of text that should be used on different types of slide; and
- ✓ is designed to debunk some of the myths propagated about this topic.

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Introduction

There is considerable debate about how much text should be used on PowerPoint® slides. This newsletter aims to help separate some of the key facts from the myths that are often cited in this debate. So let's begin by looking at the range of options that are available for using text on slides.

The Range of Options

Some PowerPoint® presentations include little or no text content. For example, the so-called Lessig[1] or Takahashi[2] methods have been applied widely, and have been popularised in books such as Reynolds (2010, 2012) and Duarte (2008). Figure 1 illustrates examples of these two methods.

LESSIG METHOD
Very short pithy text elements (e.g. a single word, or a few words), often overlaid on a metaphorical or elucidating picture. In some cases just the picture is provided.

TAKAHASHI METHOD
Very short text elements (e.g. a single word or no more than a few words), which are typically overlaid on a stark high contrast background (e.g. white on black).

Figure 1: Examples of the Lessig and Takahashi methods

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1. The 'Lessig Method' was originally pioneered by the Stanford University law Professor Lawrence Lessig, who developed the concept to enhance the visual support for his teaching (Dimov, 2005; Reynolds, 2005a).

2. The 'Takahashi Method' is named after Masayoshi Takahashi, who is credited with the development of this approach.

In these approaches very little text is used, and the Lessig method also depends heavily on using metaphorical or clarifying pictures to explain the concepts (Reynolds, 2005a, 2005b). These methods are therefore focussed on using a small amount of text content to prime[3] the audience (Schwartz, 2012), for the verbal material that is to be provided by the presenter (Abe, 2008; Hogan, 2009).

At the other end of the range of options for using text, some presenters literally fill the slide with text and then use this as a form of script (Apperson, Laws, & Scepansky, 2008; Doumont, 2005). Figure 2 provides examples of this type of approach.

Figure 2: Examples with too much text on slides

I am sure that we have all seen slides like the one on the left of Figure 2. This is virtually the same as giving the audience a document to read. Even the example on the right of Figure 2 appears crowded. Although this second example may be better than the one on the left, it is still likely to be too busy if the slide is static, so all of the information is provided at once *(as discussed below)*.

This gives us a range of options, which covers situations that use almost no text and extends right up to a slide full of text. This begs the question as to how much text is actually required to communicate information successfully.

How Much Text is Appropriate?

Let's start by discussing the extremes within this range, and there is no better place to begin than assessing the effectiveness of the types of slide illustrated in Figure 2.

Using Large Amounts of Text

In most cases, slideware such as PowerPoint® is applied to support a speaker, so they can communicate information more effectively. However, it is precisely these circumstances where the presentation of large amounts of text is most counterproductive.

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3. Priming is an unconscious process, which creates perceptual associations that facilitate cognition (Schacter, Dobbins, & Schnyer, 2004). The concept of priming and its importance in cognition is explained in more detail in Section 1.2.3.1.6 in the file at this web location: http://www.seahorses-consulting.com/DownloadableFiles/Appendix1.pdf

Research within the field of Cognitive Load Theory (CLT)[4] illustrates the first problem created by situations where a speaker is talking, while large amounts of text covering the same content is shown on the screen. This problem stems from a concept known as redundancy. Redundancy occurs when more than one source of information is providing the same content, and each source can be understood in isolation (Schnotz & Kurschner, 2007). An example of this occurs when the full text is shown on the screen, and then the presenter just reads the material. Using this type of redundant information can have a negative impact on learning outcomes (Sweller et al., 1998), because it can add extraneous cognitive load (Brünken, Plass, & Leutner, 2004; de Jong, 2010). Extraneous cognitive load is a term that describes the additional cognitive effort that would be required to handle non-intrinsic[5] information (Kirschner, 2002; Moreno, 2010). It is important to remember that this non-essential cognitive load can directly detract from the effective communication of information, and impede understanding and learning (Schnotz & Kurschner, 2007; Schnotz & Rasch, 2005). Extraneous cognitive load should therefore be minimised as much as possible (Chandler & Sweller, 1991; Sweller et al., 1998; Toh, 2005). Consequently, you should avoid large amounts of completely redundant text on a slide (e.g. avoid having the full text on the slide and the presenter reading the material).

The negative impacts of too much redundant text may also be exacerbated by the prioritisation of visual sensory information over hearing (Laird, 1985), and this is particularly important for people from western cultures (Keating & Hadder, 2010). This problem is best explained by research conducted by Bucher and Niemann (2012), who identified that whilst viewing static text based slides in a speaker-delivered presentation, the audience members typically read all of the text first, and only then turn their full attention to the speaker. In this situation the viewer is likely to be reading the visible text at around 250 words per minute (Smith & Morris, 2012), but the speaker is probably covering the same content at between 100 and 150 words per minute (Wong, 2014). It therefore does not take long before the information provided through the visual and auditory communications channels becomes unrelated (e.g. what the audience are hearing is different from what they are reading). When this happens the information in at least one of these channels will be suppressed (Navarra, Alsius, Soto-Faraco, & Spence, 2010). Because most people will tend to prioritise the visual information (Laird, 1985), the audience will simply not be listening intently to the speaker most of the time. In other words, the provision of large amounts of text all at once on a slide can literally stop the audience hearing what the speaker has to say!

You should therefore avoid showing large amounts of redundant text on slides that are being used to support presenters or narrations. However, if the intent is for the audience to read the material without a supporting narration, then large amounts of text can be included on slides. For example, this can work well for a stand-alone information carousel, or any form of presentation that is just meant to be read without narration of any kind. When this approach is being applied, the provision of detailed explanatory text on the slide can be advantageous

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4. CLT aims 'to provide guidelines intended to assist in the presentation of information in a manner that encourages… intellectual performance' (Sweller, van Merrienboer, & Paas, 1998, p. 251). A key premise of CLT is that the type, amount, and complexity of the information being provided should not exceed the limitations of working memory (Moreno, 2010). The concept of working memory is explained in Section 1.4.4.2 in the file at: http://www.seahorses-consulting.com/DownloadableFiles/Appendix1.pdf .

5. Intrinsic information relates to the core material being delivered in the presentation (Schnotz & Kurschner, 2007).

(Hegarty, Quilici, Narayanan, Holmquist, & Moreno, 1999). In other words, you can treat this type of read-only presentation like a book or web page, because there is little risk of:

✓ channel suppression, because the reader is only bringing in information through viewing the text, without also having to cope with an incongruent and concurrent second channel of information; or

✓ creating unnecessary cognitive load, because of information redundancy.

The bottom line is therefore:

Do not show large amounts of text all at once, if your intent is to have a speaker/narrator talking at the same time.

Using very small amounts of text

Minimalist approaches such as the Lessig or Takahashi methods are very popular, and when used appropriately, they can be very effective. However, they rely very heavily on the quality of the speaker to impart the information effectively. Consequently, if you are intending to use these types of minimalist text approach, it is imperative that you apply the following rules:

✓ the text on the screen must be patently clear, concise, and easily readable[6];

✓ the text on the screen must be highly focussed on the topic being covered, so the words provide effective cognitive priming for the following narration;

✓ the presentation must create salience that draws the audience's attention from the presenter to the screen, so the priming affects can work effectively[7];

✓ the presenter should give the audience enough time to digest the visual text before beginning the associated narration *(to avoid the possible effects of channel suppression)*[8]; and

✓ the narration must clearly expand on the priming word/s shown on the screen, to generate the appropriate cognitive benefit (e.g. showing a priming word and then the narration going off at a tangent can be counterproductive).

However, it is noteworthy that recent research conducted by Yue, Bjork, and Bjork (2013) has identified that really short textual content may be less effective than the utilisation of short understandable sentences, when text is used to support speaker presentations. This research is discussed in more detail below.

The moderate approach

Therefore, the two extremes may be less effective than a more moderate approach to the utilisation of text on slides. Many researchers and experts support this type of moderate

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6. See the document at the following web address for more information on the concept of legibility and readability:
   http://www.seahorses-consulting.com/DownloadableFiles/ColourPsychology-Backgrounds.pdf

7. This is typically achieved with animation, which will be discussed in a later newsletter.

8. If there are only a few words, and the readability of the text is good, this may only require about a second. Obviously, for longer or more complex texts more time must be allowed.

approach.   For example, Mackiewicz (2008) identified that larger amounts of text (within limits) can be applied successfully to communicate information.   This approach is also reflected by many other PowerPoint® development specialists, who recommend limiting the amount of text used on any given slide, without necessarily applying the minimalist approaches exemplified by the Lessig and Takahashi methods (e.g. Garber (2001); Russell (2010); Vickers (2011), Durso, Pop, Burnett, and Stearman (2011)).

A common guideline cites that the maximum amount of text on any slide should conform to the 'six by six' rule (e.g. a maximum of six lines of text, which contain a maximum of six words each) (Garber, 2001; Hoolihan, 2011; Vickers, 2011)[9].   In other words, in this model very simplistic bullet points should be utilised that strip the point back to its essential words (Kosslyn, Kievit, Russell, & Shepard, 2012).

However, this type of arbitrary rule for managing text content may be hiding a critical issue. Rather than focussing on the number of words in each point, it may be better just to use short and focussed sentences.   For instance:

✓   Moreno and Mayer (2002) found that viewers listening to spoken words were more likely to comprehend the information if similar words were also displayed on the screen at the same time.   However, the key to the success of this approach stems from ensuring that a small amount of text is shown at any time, and the concurrent narration is appropriately congruent.   In other words, the visual text on screen must be relatively short and the associated narration must be covering exactly the same content at the same time.   As the narration moves on to the next point, the next snippet of congruent text is shown on the screen.   By utilising this approach, dual-channel processing[10] can be leveraged to create enhanced multimodal[11] communication.   Because the amount of text shown at any time

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9.   There are variations of this 'six by six' rule, which are known as the 'five by five', and 'seven by seven' guidelines (Zimmer, 2010).   The concept is the same, it just changes the rule to five or seven words, in five or seven lines respectively (Zimmer, 2010).   Additionally, there are other versions, which refer to these guidelines as 1-5-5, 1-6-6, or 1-7-7, which represents the idea that there should be one (1) idea per slide, and then the 'five by five', 'six by six', or 'seven by seven' rules apply (Zimmer, 2010).

10.   Moreno and Mayer (2002) identified that the benefits shown in their experiments were likely to be generated because of the dual-processing concept for working memory.   This concept posits that there are different types of working memory available to different sources of sensory input (Moreno & Mayer, 1999) (the concept is discussed in more detail in Section 1.4.4.2 in Appendix 1 – See the link in Footnote 4).   Moreno and Mayer (2002, p. 162) theorised that when 'words are both presented visually and aurally, learners are able to select both pieces of information with no cognitive overload. [This is] because visual working memory and auditory working memory work as independent processors, [so] additional processing capacity is made available to the student when two modalities are used' (see Footnote 11 for information on the concept of modalities).   In practice, this means that the capacity of working memory is expanded significantly by using this type of multi-channel communication, which then helps to avoid cognitive overload.

11.   A modality refers to the handling of a source of information that can be integrated within a specific processing pathway in the brain to achieve comprehension (Schnotz & Kurschner, 2007). In some cases different modalities of information can be provided through two diverse channels at the same time (e.g. multimedia provides both visual and auditory input at the same time) (Brünken et al., 2004; Kirschner, 2002).   Alternatively, different modalities can be delivered through the same channel (Mayer, 2001).   For example, showing a picture and providing explanatory text can be considered multimodal, because it is stimulating different parts of the

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is very short, there is less risk of the suppression problems discussed earlier. An additional key finding from Moreno and Mayer's (2002) research indicated that this approach was only successful when other types of visual materials (e.g. pictures) were not present in the field of view at the same time, as these interfered with the reinforcement provided by the text[12].

✓ Yue et al. (2013) went further with their research. They found that the best results from showing text to reinforce the verbal delivery of information were achieved when:

  ➢ self explanatory sentences were used as the points;

  ➢ the sentences covered the same points as the narration; but

  ➢ the visually displayed sentences differed slightly from the information being spoken (e.g. slightly shorter content, which contained marginal differences in the content provided in the two channels)[13].

The most important findings from the research by Yue et al. (2013) were:

✓ if the text and narration was slightly different *(known as the 'abridged' version)*, the learning outcomes from this type of dual processing were significantly enhanced, because the audience member had to work cognitively to assimilate the minor differences, and this appeared to have generated learning benefits without creating cognitive overload;

✓ if the text and narration were completely redundant (e.g. exactly the the same) the learning outcomes were significantly poorer than the abridged version;

✓ if the visible text and narration were very different, the learning outcomes were much poorer than the abridged version (which may be due to the overburdening of working memory to assimilate the diverse sources); and

✓ not providing visible text to reinforce the narration provided poorer results than showing the the abridged version.

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brain (Mayer, 2001). In this case, the text could be stimulating Wernicke's area (see Section 1.4.1.2 in Appendix 1), and possibly Broca's area (see Section 1.4.1.3.6 in Appendix 1) and the insula (see Section 1.4.1.3.5 in Appendix 1), whereas the graphic could be processed within regions like the Parahippocampal Place Areas (PPA) (see Section 1.4.1.3.1 in Appendix 1), the insula, and some regions within the limbic system (see Section 1.4.1.3.4 in Appendix 1). Please note that some papers on this subject appear to utilise channel and modality almost interchangeably. For the sake of clarity, the key differentiator is as follows: (1) A channel reflects a sensory input, whereas (2) a modality reflects a different processing path within the brain. Therefore, each channel can provide information for a modality, or multiple modalities can be stimulated by one channel.

12. This aspect will be discussed in more detail in a later newsletter.

13. Yue et al. (2013) refer to this as the abridged version. An example of this approach is provided in Yue et al. (2013, p. 268): 'For example, the narration in the first segment was "Stars are born out of nebulae, which are clouds in space made up of dust and gas." In contrast, the corresponding abridged version of this information was "Stars begin in nebulae, which are clouds of dust and gas."' According to Yue et al. (2013) the key is to make the abridged version of the content very similar, but with enough differences to force the audience to conduct some assimilation between the narrated and visible sources of information. Yue et al. (2013) postulated that this type of simple assimilation did not overburden working memory, but provided deeper processing of the content, which enhanced learning.

Consequently, I recommend avoiding arbitrary rules (e.g. the 'six by six' rule, which may create conditions where the text and narration are too different), and suggest that you focus on providing relatively short sentences that are understandable in their own right, but are slightly different from the associated narration.

In terms of how many of these sentence-like points you can use on each slide, this will be highly dependant on the content. For instance Alley and Neeley (2005) and Alley, Schreiber, Ramsdell, and Muffo (2006) utilised just one sentence based text block per slide. They found that these significantly improved comprehension. Alternatively, research conducted by Wolfe, Alley, and Sheridan (2006) identified that more points can also be used successfully on slides.

Interestingly, the key to the success in these types of strategy appear to stem from the way in which the visual information is displayed. For example, as discussed above, presenting large amounts of text at the same time is counterproductive. However, as identified by Moreno and Mayer (2002) and Yue et al. (2013) the critical technique involves:

✓ providing single sentences at a time; and

✓ ensuring that these are congruent with the associated narrative (without being completely redundant), so the reader can readily achieve integration of the two sources (sight and hearing) (Adesope & Nesbit, 2012), and therefore accrue the benefits of dual-processing (Moreno & Mayer, 2002).

Summary

The answer to the original question is therefore, as follows:

✓ If the presentation material is only going to be read by the viewer, without the support of narration, you can put as much text on the slide as you need. The only real key is to ensure that the content is readable [14].

✓ Under no circumstances should you show a large amount of text on a slide and then follow this up with redundant narration of the content. You are wasting your time with this approach, as it is highly counterproductive.

✓ You can apply the so-called Lessig or Takahashi methods, and use minimal text, but this may not be as effective as the following strategy.

✓ If you are using text on screen to reinforce the narration:

➢ only present small amounts of understandable sentence-like text each time, and make sure that the associated narration is congruent with what is shown on the screen;

➢ do not make the text exactly the same as what is in the narration, so the audience must assimilate the content (but it cannot be too different, or this can be counterproductive); and

➢ utilise animation to introduce and remove the text as it is needed (this technique will be explained in more detail in the following newsletter).

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14. This issue will be discussed in more detail in later newsletters.

A General Note

This is one in a series of quarterly newsletters.   Should you or another person wish to receive future newsletters, or links to previous newsletters, please email the following information to info@seahorses-consulting.com:

- ✓ Your full name; and
- ✓ Your email address.

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