

Attending to Web Pages

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ABSTRACT

The paper explores how visual information is organized in a web page based on an eye tracking study.

INTRODUCTION

What makes some web pages easy to understand, while others appear as a complex jumble? Tufte [1] proposes that 'contrasts of elements will produce a visual hierarchy, with layers of background, against notable content' We wanted to answer which variable is more important:

- Size : Does a larger image or text dominate over smaller elements? Eg in figure 1 will the 'Product' be dominant, or the business name?
- Scanning : Does proximity, reading order or common background color determine the viewing sequence?
- Images : If images and text are of similar size, are images dominant?
- Position : Will the page top dominate over the bottom?

EYE TRACKING STUDY

Seven subjects were shown a series of ten web pages based on common templates for a company home page. They were designed to have a similar complexity and content; but varied by visual variables, such as position and size.

An ASL E4000 eye tracker was used to record the position of the subject's pupil every 1/50th second. The data was analyzed into a sequence of fixations; eg in table 1 subject S1 first fixated on 'Your Business', then 'Web Page Title'.

Results

To test the size variable, figure 1 compared a similar sized image against title text. Table 1 gives the text title 'Your Business' as the most popular entry point, with 4 out of 7 initial fixations. The leaf image gained 2 / 7 fixations. This provides evidence that if size of text and image is roughly equal, then text will be preferred.

The bold text and hyperlinks did not gain the initial fixations, and were fixated later in the sequence as part of the normal reading order. However, timing data showed that they were fixated for longer than plain text. This places text style as secondary variable after size and image: thus the larger text dominates over smaller text or hyperlinks.

There was some evidence for area scanning on background color: 5 of the subjects went between either the title 'Your Business' and the Leaf image in the subsequent fixation. Our prediction here would be that the red background color causes these elements to be grouped.

Evidence of scanning based on reading order is that 5 subjects went from the 'Web Page Title' text to the

paragraph; and all 7 subjects went from the paragraph to the bullets. The downward scan of the text was enclosed by the white background color: note that no subjects continued down to 'Jobs' & 'New' in figure 1.

Also of interest is the smaller text 'Company Name' was fixated later; and that 5/7 subjects ignored the bottom links 'Jobs' and 'New'. Smaller: this peripheral text is secondary.



Figure 1 : Static web page with similar sized image

Page Element	Subject fixation order (1 is initial fixation..n)						
	S1	S2	S3	S4	S5	S6	S7
Web Page Title..	2,7	5	3,8	1,5	6	4	4
Your Business	1	1,3	5	7,9	5	2	1
Leaf Image		2	4	8	1	1	2,8
Product			7		2		3
Paragraph	3,6	7	1	2	7	5	5
Bullets	4	8	2	3	8	6	6
Company Name	5	6	9	4	3	7	7
Links		4	6	6	4	3	
New / Jobs Links		9	10				

Table 1 Fixation order for figure 1

To test if a larger image would guarantee an entry point, in figure 2 the size of the image was increased. Table 2 shows that the image gained the initial fixation for 4 out of 7 subjects, and for the second fixation of another 2 subjects. The larger title 'Your Company' was the second most popular entry point, with 3 subjects. These results indicate that size may be vital for defining the entry point; and that the image needs to be considerably larger to be dominant.

Given the image as an entry point, we would then predict clustering on the white background color. However the results here are mixed: only two subjects (S2, S5) went from the sun image to 'Web Page Title'; another two (S4, S6) went from the sun image to the paragraph text. This

suggests that reading order may be less strong for inline images within text, than eg between paragraphs or bullets.

The smaller 'contact details' text was again fixated last; and the 'New' & 'Search' text at the bottom were ignored by 5/7 subjects. This is evidence that small text will be fixated later, and that the bottom of the page may be ignored.



Figure 2: Static web page with large image

Page Element	Subject fixation order (1 is initial fixation..n)						
	S1	S2	S3	S4	S5	S6	S7
Web Page Title..	3,6	4			2		3
Your Company	2	1	2			1	1,6
Sun Image	1	3	1,3	1	1	2	2
Paragraph	4	6	5	2		3	5
Bullets		7	7	3	3	4	
Contact Details	5	5	6	4	4	5	4
Index Links		2	4				
New / Search Links	7	8					

Table 2 Fixation order for figure 2

To explore how text behaves without images, figure 3 is a non-image page. The fixation results in table 3 show that the 5 out of 7 of the subjects initially fixated on the 'Web Page Title' region. This is the largest text : size dominates.



Figure 3 : web page with large title

The text for 'Email' was made larger in this web page than that used in this area for the other templates. The subjects

fixated in the 'Email' area much earlier for this page than the others. Again, the larger size of text seems to draw subjects. However, in no cases did it act as an entry point, suggesting that between titles size is an important arbitrator.

Following the previous results, the top of the page dominates over the bottom; the links at the top of the page are fixated earlier in the sequence; whereas the 'Jobs' and 'Home' links at the bottom are fixated last, or never at all.

Page Element	Subject fixation order (1 is initial fixation..n)						
	S1	S2	S3	S4	S5	S6	S7
Web Page Title.	1	1	6,8	2,6	1,4	1	1,7
Your Business	2	4	5	5		4	3,5
Paragraph	3,6	5	7,9	7	2	5	6
Bullets	5,7	6	1,10	1		6	9
Email	4	2	3,11	3	3	3	8
Index Links		3	2,4	4		2	2,4
Home / Search Links	8	7,8	12	8			

Table 3 Fixation order for figure 3

CONCLUSIONS

We compared a total of ten slides for visual variables :

Size

- Larger text dominates over smaller; and act as successful entry points.
- Images must be much larger than text to act as an entry point. Don't rely on users looking at images first.

Scanning

- Left-right, top-bottom reading order was found for text & bullets, but not between images, titles or links.
- Discontiguous areas of common background color did not cause sequencing eg subjects did not shift between the left & bottom regions, even if they share a background color. Use a contiguous, same colored region if content is to be related.

Images

- If text and images are of similar size then text is more likely to be an entry point. One caveat here is image content : logos may not work well. However, [2] also found titles preferred as entry points over images.

Text style

- Text style is secondary to size : normal sized text rarely acted as entry point, even if bold or a hyperlink. Use a larger font for important details.
- Bold and Hyperlink text were looked at for longer than normal text. Use text style to draw out content

Position

- The middle / top of the page seems to be dominant ; the left hand column and bottom are secondary.
- Beware that text at bottom of the screen is rarely seen. Place important content at the top of the page.

REFERENCES

1. Tufte, E. Visual Explanations. Graphics Press, 1997
2. Poynter Institute. <http://www.poynter.org/eyetrack2000/>

