

## Verbal versus Visual: An Analysis of High School Edublogs

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**Abstract**— High-speed networks and low-cost yet high-resolution cameras on smart phones are making the interactions of the virtual world increasingly visual. Options for expressing individualistic opinion and approach towards presentation of one's thoughts are the hallmark features of new media. Among the numerous new media tools, blogs are increasingly being used in academic environments for their ease in use, publication and administration. Their ease in access anytime, anywhere make them ideal for asynchronous training and learning purposes as the blogs are being written by the students, teachers and other educational stakeholders, as an individual and also as a group. For the research, High School based educational blogs, i.e., edublogs, were investigated in context of their host websites. To narrow the scope, Science edublogs were selected as this subject requires a great deal of visual presentation for improving comprehension of various concepts, experiments, complex phenomenon through diagrams, photographs, simulations, and other multimedia tools and techniques. The current research optimum usage of the features it has to offer, especially when analyzed in terms of visual representation of content and typographical expressions studied in context with their host websites.

**Keywords**— Visual Communication, Visual Representations, Visual Design, Typographical Expressions, Educational Blogs, Weblogs, Edublogs, Visual Literacy.

### I. INTRODUCTION

Modern day education system has undergone a sea change. The gadgets and technology that were earlier banned from usage in schools, are now finding enhanced utilization in the teaching and learning processes. Students are now being practically equipped and empowered to master the new media applications and technologies. Blogs, written by an individual and as a group, are being made use for doing class projects, homework assignments and showcasing the school's activities.

As compared to other new media applications, blogs find more acceptances in the academic environment for the features they offer – easy to use, free uploading platform, reverse chronological updation making the latest update the foremost available for view, template based layouts, and yet, with a lot left at the bloggers' discretion to customize them. Blogs used in the academia, also known as edublogs, are suitable for self-directed learning and can virtually be used anytime,

anywhere. Many educationists are, therefore, using them to extend their classrooms beyond the confines of a schoolyard.

The relative anonymity, openness, and sharing features offered by the blogs stimulate desire to express one's thoughts [1], [2] in even those who are otherwise reserved in their real life [3]. Blogs allow users the freedom to voice their ideas in their own virtual space accessible to public, to construct new knowledge as well as apply and analyze existing knowledge by sharing their own knowledge with other users.

It has been observed that weblogs carry some of the best features offered among various social media applications that promote usage of visual communication elements in order to put across one's opinion about a topic in a visually appealing manner. Tougher the topic, better it is to represent it visually for easier reckoning.

Science and visual communication are positively connected. Stav and Tsalapatas [4] state that even though visual communication might be used in a range of applications in higher education, engineering, natural science and technical education seem to offer the most demanding user environments. Lev Vygotsky [5] mentions that "... science, like art, permits application of the creative imagination. [...] Children who attempt to master the process of scientific and technological creativity are relying on the creative imagination to the same extent as in the area of artistic creation."

As science education involves a lot of research and experimentation, user-generated blogs on this subject are ideal to study as they offer interesting and innovative use of visual communication elements to make the subject more engaging and comprehensible. Demonstrations that cannot be done in lab, for example, for concepts like nuclear fission, circulatory system, or formation of mountains, can be explained through multimedia simulations and animations.

While pantheon of research has been conducted on the textual or linguistic aspects of the Weblogs, research studies on visual elements are still essentially limited to Web 1.0, that is, limited to the websites. Literature supports that visuals have an edge over words, but the most compelling communication combines both in order to have a lasting impact. Even though visuals are more suitable for globalization of communication, typography is an integral part of visual communication. In fact, visuals and typography have a symbiotic relationship. Many visuals can convey a powerful message using typographical expressions alone. Strong typographical forms can have an evocative experience. Studying the use of typographical expressions was thus segregated from visual representations for the research study.

Each variable for both the dimensions was selected keeping in mind the parameters common to blogs as well as websites, but at the same time, addressing the dimensions succinctly yet inclusively. Industry standards and prominent research studies were referred to for extracting the variables for this research.

## II. RESEARCH APPROACH

The research study aims to explore whether the educational blogs utilize the capabilities of the medium to make them more visually communicative, when studied in context with the websites of their origin. For this purpose, science edublogs belonging to the High School (Grades IX to XII) environment were selected. At high school level (i.e., around ages 13 to 18), it is assumed that the level of exploration of technology as an aid in learning is more and the interaction with its users regarding its utility would be more forthcoming. High School Science was chosen for the scope it offers to make the complex and daunting concepts and theories easily comprehensible with the help of graphics, animations, and interactive multimedia applications.

### A. Sampling

Data collected from the content analysis on blogs and websites was analysed keeping in view the dimensions under consideration. Pilot testing was also done to refine the variable definitions and to

avoid any incongruity. Using definitions of each variable, the data was filtered during data collection stage. All collected data was recorded and organized using MS Word and MS Excel. Frequencies and percentages were obtained for the quantitative data using MS Excel. Data tables and figures were developed based on the results of the analysed data.

Selection of websites and blogs was done using the purposive method of non-probability sampling. Purposive sampling is “the process of selecting a sample that is believed to be representative of a given population” [6]. It includes elements selected for specific characteristics or qualities and eliminates those who fail to meet these criteria [7], [8].

Based on the search results of five most popular search engines, five websites with blogs were selected. Further, ten blogs each from these five websites were selected. Content analysis was conducted for these fifty blogs and five websites. The pages selected from the website included the home page, the landing pages of global navigation links, the section for students of grades 9-12, i.e., the section for high school students, and three levels of navigation in that section.

### B. Limitations in Sampling

There were two major limitations in finding the required sample. One, even when the common search result was found, either it did not have a website related to high school science, or it did not have blogs. Second, most of the high school websites did not have blogs. Even if they had, those were password protected and inaccessible to public. Those blogs that were public, did not reflect educational or science related blogging.

## III. RESEARCH FINDINGS AND DISCUSSION

The blogs and websites were checked for their title relevance, visual-verbal ratio, colour schemes, icons, images, advertisements, audio-visuals, sound, various content related parameters, visuals with typographical elements, heading-body copy ratio, and similar variables that account for visual representation and typographical expressions.

With regard to the overall look and feel of blogs and websites, it was found that there was congruity

in the overall identity of the blog/website. The titles of the pages were in context with the theme of the blog/website. In line with the current trend of accessing the Internet from smart phones or handheld devices or very large monitors, it was found that layouts of all the blogs and websites were resizeable and could be accessed, without compromising on their proportions or presentation, with different screen resolutions.

TABLE I  
SCREEN AREA UNDER NAVIGATION AND MAIN CONTENT

	Average for blogs	Average for websites
Screen area covered by navigation	32.48%	37.81%
Screen area covered by main content	32.13%	25.97%

It was observed that the screen area under navigation and main content was almost the same for the blogs, as shown in Table 1. The difference was more for the websites, in which the screen area under main content was much lesser than screen area under navigation. The reason could be that websites are usually written by trained content writers, who are able to succinctly present information for the web. Average length of content in blogs was 6.16 screenfulls, compared to 1.85 screenfulls of content in websites. With the standard body copy size and average of 75-85 characters per line for 2000 words, it is around 5 screenfulls of content; which means that the blogs under study are written in sync with the current recommended length.

The color scheme choices were also distinct among the analyzed blogs and websites, with prominence of soft and subtle colors in the blogs, and bright and bold colors in the websites.

*A. Verbal Display*

In terms of making use of the digital real estate, the blogs could have utilized the space better. Average line length for this study is on the higher side for the average body copy font size of 12-13px for the blogs and websites, when compared to those suggested by other researchers like 538.64px for body copy font size of 12- 13px and 420px line length for fonts set to around 14-16px [9]. Average

line length of the blogs was 606.22px, while that of the websites was 626.8px for the internal pages. The characters per line and words per sentence were, therefore, lesser for blogs.

There is a wide variation in the number of characters per line suggested by other researchers. Martin’s study [9] shows that average number of characters per line should be between 75 to 85. Friedman [10] suggests between 85 to 94 characters per line. Follett and Holmes [11] recommend using around 85 characters per line. Stratford [12] suggests using 90 to 100 characters per line. French [13] give a different range, between 60 to 80 characters. Result of this study shows that the average number of characters per line is 81.74, that is, between 72 to 99 characters per line.

To keep the code clean and for separating document content from document presentation, Cascading Style Sheets (CSS) were used in all the blogs and websites. A larger number of CSS options, perhaps to aid personalization, were available for the blogs, which account for the variation in font face, style and colour despite the same layout. As per standard convention [9], [10], body copy of the blogs was found to be left aligned. However, among the analysed websites, four out of five had left aligned body copy, while one of them had justified content.

Combining colours, shapes and forms of different font faces can create a powerful visual impact. Arial turns out to be the most popular font with the blogs and websites, as shown in Table 2. Arial was found to be popular choice by other researchers as well [9], [10]. Used as bold in headings, its regular style is used for body copy.

TABLE III  
FONT FACES USED IN INVESTIGATED BLOGS AND WEBSITES

	Average for blogs	Average for websites
Heading	60% Arial, 20% Verdana, 20% Trebuchet MS	60% Arial, 20% Verdana, 20% Lucida Sans Unicode
Meta-information	54% Arial, 40% Helvetica, 4% Verdana, 2% Georgia	80% Arial, 20% Verdana
Body-copy	58% Arial, 36% Helvetica, 4% Verdana, 2% Calibri	80% Arial, 20% Verdana
Captions	56% Arial, 40% Helvetica, 2% Tahoma,	80% Arial, 20% Verdana

	2% Verdana	
Footer	76% Arial, 20% Helvetica, 4% Verdana	80% Arial, 20% Verdana

In terms of font size, there is a lot of variation in findings of other researchers [9]-[11]. Follett and Holmes suggest 20px for headings and 14px for body copy [11]. Friedman found 17-25px font size for headings. For body copy he found that 12px was used by 34% sites, 13px by 30%, and 14px by 14% [10]. Martin observes that 18-29px could be effective for headings, depending on font used in the design. For the body copy, between 12-14px is preferred. The most popular font size is 13px (38%), with 14px slightly more popular than 12px [9]. The results of this research are as shown in Table 3.

TABLE III  
FONT SIZES USED IN INVESTIGATED BLOGS AND WEBSITES

	Average for blogs	Average for websites
Heading	25.16px	22.6px
Meta-information	11.86px	13px
Body copy	12.78px	13.2px
Caption	14.9px	10px
Footer	11.24px	12px

The space between paragraphs was more in blogs (26.56px) than in websites (20.6px). Average space between paragraphs, according to Martin [9], is 14.47px. French [10] suggests a 20pt leading for a 14pt font size, which is equivalent to 26.67px leading for a 18.67px font size. The reason of such a difference in this study is that one of the blogs had the leading of 84px. The eye jumps distractedly over this page. Had it been normal, the average would have been 25.34px. Blogs of only two websites were close to the suggested space between the paragraphs.

The heading-body copy ratio for blogs is 1.98:1, while that for the websites is lesser at 1.69:1. Brown [14] mentions that the standard ratio between the body text and headline is usually two to three times larger. Martin [9] asserts that the ‘Rule of thumb’ for heading to body font-size ratio is 1.96:1. Going by these, the findings of this research complement the figures mentioned above.

In another variable with reference to making the content accessible for most, it was found that the text was easily readable against white and coloured

backgrounds for all the blogs as dark text was used against light background. Web Content Accessibility Guidelines (WCAG 2.0) require that the foreground and background colour have a 4.5:1 contrast ratio, and the link text colour and the surrounding non-link text colour have a 3:1 contrast ratio [15]. Fadeyev suggests that the links should stand out from colour of the rest of the text [16]. Color contrast between foreground and background, and between link and text was higher for websites (14.34:1 and 3.1:1 respectively) than for blogs (11.84:1 and 1.76:1 respectively). The low contrasts can be attributed to the color schemes or blog template options and the personal preferences of the bloggers.

As High School Science blogs and websites were being investigated, another variable was introduced – “Nex-gen lingo” – the language of the youth, in which slangs or short forms of words are used, or alphanumeric characters are used instead of words. Analysed blogs and websites did not suggest usage of nex-gen lingo and emoticons in the blog posts or the web pages, may be due to their formal academic intent. Only one such word was found in a content category of one of the websites - ‘Apps’ - short for Applications in this context.

#### B. Visual Display

It was noticed from results of the content analysis that there is a lot of preference for ‘content’ over graphics, photographs, and other visuals. The average verbal-visual ratio of the blogs was found to be 31.81:1 as compared to 1.56:1 for the websites. The number of visuals used in websites is much more than those used in blogs, be it for icons, decorative images, informative images, advertisements, audio-visuals, and sound files. Table 4 shows in a nutshell the number and file size of infographics, decorative and informative images used in the investigated blogs and websites.

TABLE IV  
IMAGES USED IN INVESTIGATED BLOGS AND WEBSITES

	Average for blogs	Average for websites
No. of Decorative images	2.82	12.6
File size of Deco. Images	290.18 Kb	195.55 Kb
No. of Informative images	1.38	23.8
File size of Info. Images	109.24 Kb	2.43 Mb

<b>No. of Infographics</b>	7 were found in one blog	Only 1 was found in an internal page
<b>File size of Infographics</b>	727.44 Kb	1.29 Mb

Decorative images here are connotative of the images used for aesthetic appeal in the layout, like borders, background patterns, etc. Informative images serve to inform, provide or disclose some information, like graphs, relevant photographs or illustrations. Information graphics or infographics refers to the graphic representations of data in a nutshell, to present complex information, patterns and trends.

Icons are such elements of web design that are understood globally [17]. Number of icons used in websites was more than those used in blogs. The converse was true for the number of infographics. It was found that only 60% of the decorative and informative images were relevant to the content in blogs, although their number was much more in websites. Most of the images were photographs, with only 14% being graphics in blogs. Advertisements merge with content and graphics in two websites out of five. In the remaining three, there were no advertisements.

Audio-visuals (AVs), whether present as animations, multimedia, or slideshows, were essentially in the form of simple videos in blogs. In the websites, the AVs were available in the form of a combination of graphic animations and videos, using special effects. This again points to the websites being managed by professionally qualified teams. A number of audio files were also available as expert lectures and definition files in the websites. Blogs did not have any standalone sound files.

Absence of visuals with typographical expressions in the investigated blogs is also a manifestation of the fact that creation of such visuals require advanced designing skills. The websites usually have highly specialized creative teams managing them, and that could be reason why these contained a number of visuals with typographical expressions.

Lack of creativity is also evident in the bland presentation of the tag clouds, which were used in 48% blogs. Tag clouds are typical of Web 2.0 environment. With variation in colour and size of

the keywords, tag clouds can be made very appealing and interactive, but the analysed blogs showed lack of typographic creativity in their presentation.

Despite the professional teams managing the websites, in terms of making the non-textual elements accessible, websites were not consistent in providing sub-titles for icons and dimensions of the visuals, though they provided alt-tags for both, icons and informative images. The blogs, however, did not have icon subtitles, but had alt-tags for all icons and for around half the informative images.

It was anticipated that the bloggers would utilize the free publishing medium to demonstrate their learning and uniqueness in presentation. However, there was too much external linkage and limited or negligible self-generated content in the blogs.

#### IV. CONCLUSIONS

Despite the drift towards a visually oriented socially networked virtual world, verbal content rules over the visuals in the analyzed blogs and websites. Broadly, visuals get more weightage in websites as compared to blogs that originate from those websites. One of the main reasons for this could be that blogs were primarily used as personal diaries and websites as company's window to the world. Being free-of-cost medium of expression which is easy-to-use and administer, anyone can 'write' a blog, but it appears that 'designing' is a lesser found skill. This could also be the reason why visuals and AVs in educational blogs were essentially photographs and videos. Websites are usually maintained and managed by technically sound team of developers and designers, but very few blogs out of millions available in the blogosphere, are professionally managed by experts. Such blogs are bound to have more visual appeal as professionals are at work to create the social image. Educational blogs are yet to measure up with the 'social image' type of blogs.

The investigated edublogs appeared more run-of-the-mill outputs. It was found that minor changes in the available templates account for creative efforts on the part of most of the bloggers. It was observed that even though the presentation and interaction pattern is built on that of the websites, the content on blogs fails to measure up to the level at which

the interactive multimedia applications and quizzes in websites have come up. It was expected that the educational blogger would utilize the blog space optimally to provide a divergent viewpoint to promote constructivist style of learning. Optimum utilization of avenues for intuitive and explorative learning were found to be lacking in the investigated blogs. Building on the existing knowledge was amply evident from the blogs by teachers and other educational stakeholders, especially with their lengthy discussions and self created images, animations and videos on the experiments undertaken by them. These were visible in the students' blogs as well, though on a very limited scale.

The blogs on High School Science did not justify the potential of the medium. The overall look and feel of the blogs leaves much to be desired for.

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