Developing a comprehensive formula to determine optimal font size for on-screen digital presentations

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Abstract- During the last couple of decades, there has been significant growth in multimedia digital content being delivered through large screens. These mediums allow presenters to cover a wider audience in the room to communicate the message. The most popular use cases of these on-screen presentations include classroom teaching, corporate meetings, seminars, conferences and industry events.

A significant challenge for the presenter is to ensure that the textual content is clearly legible to everyone in the room irrespective of where they are seated. This problem is complex because several factors govern the legibility and therefore the understanding and recall of the subject matter being presented.

This study is designed to first understand the factors that impact the readability of the text content by a variety of audiences in different rooms and screen settings. Further, this study employs a systematic approach to develop a simple formula for determining the optimal font size for on-screen presentations. The study included conducting extensive field tests involving a range of participants in a variety of scenarios.

I. Introduction

In the realm of presentations, the legibility and visual clarity of content play pivotal roles in facilitating effective communication and knowledge dissemination. However, the effectiveness of a presentation is not solely dependent on the content itself, but also on the size of the text used in presentation materials. The inadequacy or excessiveness of text size can adversely impact audience comprehension, retention, and overall engagement. A study of 33 classrooms in India highlights students' challenges in visually understanding the classroom discussion due to inappropriate distance and recommends the need to provide recommendations to school authorities for the proper placement of desks [1].

The choice of an appropriate minimum font size is essential for ensuring that the information is legible, comprehensible, and accessible to all members of the audience, regardless of their seating position or visual acuity. This paper seeks to address the critical issue of determining an optimal minimum font size for content delivered through an on-screen presentation.

II. Problem Statement

The variability in content types, presentation mediums, and audience demographics contributes to the complexity surrounding font size selection. Presenters across academic, corporate, and public speaking domains grapple with this ubiquitous issue, often confronted with the dilemma of choosing an appropriate font size that ensures readability without sacrificing visual appeal.

Consider a scenario where educators strive to create engaging lecture slides for a diverse classroom audience. The challenge lies in accommodating varying seating arrangements and viewing distances, demanding a font size that caters to both the front row and those positioned at the back of the lecture hall.

Moreover, in the context of public speaking engagements or conferences, speakers confront the challenge of ensuring their presentation materials are comprehensible to audiences with diverse age groups, visual capabilities, and cultural backgrounds. The impact of font size on accessibility and inclusivity becomes apparent, necessitating a guideline that addresses these multifaceted considerations.

Existing guidelines and recommendations for font size determination lack empirical evidence derived via controlled trials and simultaneously fail to account for these nuanced scenarios. The absence of a systematic approach tailored to diverse presentation contexts leaves presenters instinctively making a decision that lacks logical and scientific reasoning leading to a significant impact on the effectiveness of their communication. This inadequacy underscores the need for a comprehensive framework that integrates various factors such as viewing distance, content complexity, audience characteristics, and presentation

environment to derive a quantifiable guideline for establishing the minimum font size in presentations.

Therefore, the pressing issue emerges: How can presenters effectively determine an optimal minimum font size that ensures readability, accessibility, and visual impact across diverse presentation scenarios and audience demographics? Addressing this multifaceted problem requires a detailed study to be undertaken in a controlled environment to develop a pragmatic solution that accounts for the several intricate variables influencing font size selection in presentations.

III. Visual Perception & Font Sizes

A. Vision Acuity

One of the most commonly used tools in vision testing is the Snellen Chart (Figure 1) [2]. Even though more scientific testing methods like the ETDRS Chart and LogMAR Chart (Figure 2) have been developed, Snellen Charts remain the most popular for their simplicity and ease of use [3] [4].

Figure 1: Snellen Chart

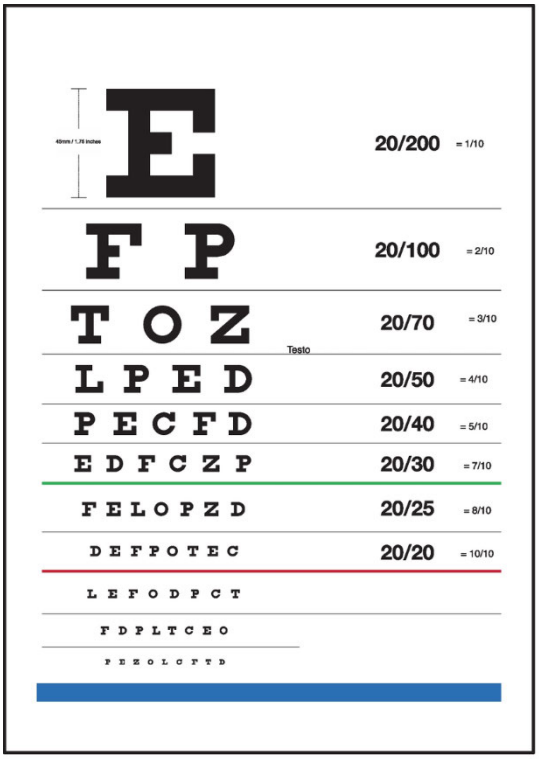
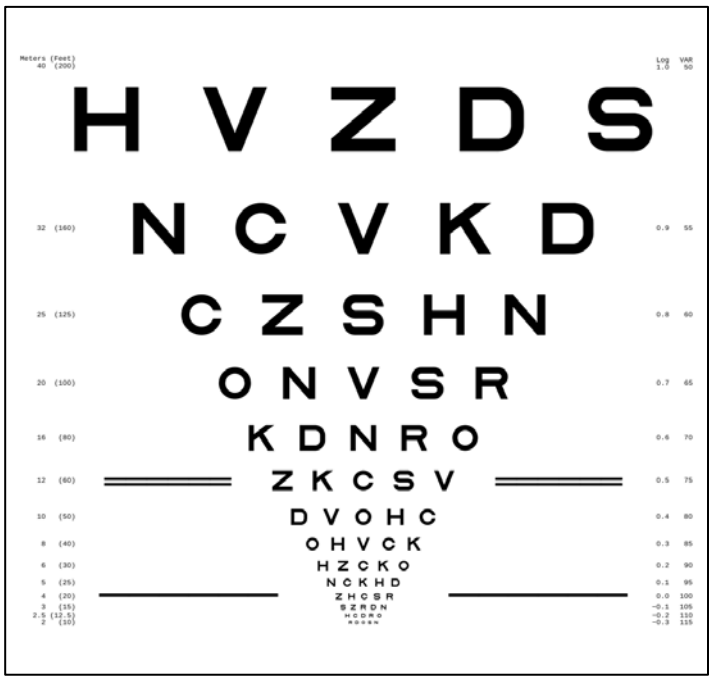


Figure 2: LogMAR Chart



The Snellen chart uses a fraction to describe visual acuity, such as 20/20. The first number (20) represents the distance in feet from which the test is conducted, and the second number (20) indicates the distance at which a person with normal vision can read the same line of letters [5].

Each line on the Snellen chart has letters of different sizes. The size of the letters is calculated to ensure that they subtend a specific angle at the eye. For example, letters on the 20/20 line are designed so that they appear to be a certain size when viewed from 20 feet away.

On a Snellen chart, the size of letters for the 20/20 vision line is approximately 8.75 mm in height when viewed from a distance of 20 feet. This size is specifically designed so that the letters subtend an angle of 5 arcminutes at that distance, which is the standard for measuring normal visual acuity.

While the Snellen Chart is simpler, the LogMAR (Logarithm of the Minimum Angle of Resolution) Chart provides a more precise measure of visual acuity. The chart is made up of rows of letters, and each row has letters that are the same size. The size of the letters changes from one row to the next in a predictable way [6].

The letters on the row that corresponds to 20/20 vision are sized so that they can be read clearly from a distance of 6 meters (approximately 20 feet). This is

represented as a LogMAR score of 0.00. In this row, the height of each letter is approximately 8.87mm.

While the two charts follow a different approach, the height of the letters in the 20/20 vision row is approximately the same (8.75mm in the Snellen Chart and 8.87mm in the LogMAR Chart).

B. Typography & Font Point Size

The relationship between letter height and point size in typography is an important concept that affects how text is perceived and read. While there is a general correlation, the actual visual appearance can vary significantly based on the specific font design.

Point size is a unit of measurement used in typography to indicate the size of text. One point is equal to 1/72 of an inch, approximately 0.353 mm.

For example, a 12-point font is about 4.23 mm in height, but this measurement refers to the overall height of the font, including any ascenders (the parts of letters that extend above the x-height, like the top of a "b") and descenders (the parts that extend below the baseline, like the tail of a "g").

Cap Height: This is the height of capital letters, typically around 70% of the point size. For instance, in a 12-point font, the cap height would be approximately 8.5 mm.

X-Height: This is the height of lowercase letters, which can vary widely across fonts. It often influences how readable the text appears [7], [8].

Different fonts can have different proportions, leading to variations in how tall the letters appear even when set at the same point size. Here are some examples:

Arial: A 12-point Arial font may have a cap height of about 8.5 mm and an x-height of around 5.5 mm. The letters are relatively tall and narrow, making them easy to read.

Times New Roman: A 12-point Times New Roman font may have a cap height of approximately 9 mm and an x-height of around 4.5 mm. This font has a more traditional serif style, which can affect readability at smaller sizes.

Comic Sans: A 12-point Comic Sans font might have a cap height of about 8 mm and a larger x-height of approximately 6 mm. The rounded shapes and larger x-height can make this font appear larger and more readable, even at the same point size.

Helvetica: A 12-point Helvetica font has a cap height of about 9 mm and an x-height of approximately 5.5 mm. The letters are more uniform and have consistent stroke widths, contributing to a clean look.

In summary, while there is a general correlation between the height of letters and point size (with the cap height being about 70% of the point size), the actual visual appearance can vary significantly based on the specific font design. As depicted in Table 1, this variability means that not all fonts of the same point size will have the same letter height or visual impact, emphasizing the importance of font choice in design and communication.

Table 1: Height of letters in different fonts

Font Name	Cap Height (mm)	X-Height (mm)	Cap Height (% of em)	X-Height (% of em)
Helvetica	9.0	5.5	70%	44%
Times New Roman	9.5	4.5	72%	42%
Arial	8.8	5.2	68%	40%
Verdana	9.2	5.8	71%	45%
Futura	8.5	4.9	67%	41%
Georgia	9.3	5.3	73%	43%
Garamond	9.0	4.7	70%	39%

Optical Size Perception: Different fonts can appear larger or smaller at the same point size due to their design features. Fonts with larger x-heights relative to their cap heights may appear larger and more legible, especially at smaller sizes. Conversely, fonts with lower x-height may look smaller even at the same point size.

Readability: Fonts with larger x-heights are generally easier to read at smaller sizes, making them suitable for body text and labels. In contrast, fonts with low x-height can appear more elegant but may sacrifice readability, especially in small sizes.

When choosing fonts for specific display applications, presenters must consider the correlation between point size and letter height to ensure optimal legibility and aesthetic appeal. For instance, a font with a high x-height may be preferred for titles, while a font with a low x-height might be chosen for more long sentences.

IV. LITERATURE REVIEW

The literature review of existing sources regarding font size selection in presentations highlights that there are a multitude of generic guidelines and expert opinions. While these sources provide valuable insights, a comprehensive review uncovers certain limitations and gaps that warrant further investigation and the development of a more nuanced approach.

A. Empirical Studies on Font Size Perception

Numerous empirical studies have explored font size perception and readability in various contexts. These studies often emphasize the relationship between font size, legibility, and reading comprehension. However, many of these studies focus on printed materials rather than presentations.

A recent research [9] evaluated font size perception in printed materials and found a positive correlation between larger font sizes and increased reading comprehension. However, this study primarily focused on printed text and did not address the specific considerations for font size in projected presentations.

Researchers have also studied the impact of font size on readability in small screens like mobile phones and e-book readers [10] [11].

The translation of findings from printed text and hand-held devices to projected presentations necessitates consideration of additional factors such as viewing distance, screen resolution, and audience attention dynamics, which are often underrepresented in existing research [12].

B. Guidelines and Recommendations

Established organizations and experts in design and communication have provided guidelines and recommendations for font size in presentations. However, these guidelines tend to be broad and lack specificity regarding the interplay between content complexity, audience demographics, and viewing environments. As a result, they may not adequately address the nuanced requirements of diverse presentation scenarios, leading to suboptimal font size choices.

The American Psychological Association (APA) (*American Psychological Association Style: Font*, 2011 [13] and Modern Language Association (MLA) (*Modern Language Association Style Handbook*, 2021) [14] offer guidelines for font size in academic papers. However, these guidelines, though helpful, lack specificity regarding font size selection in presentation contexts. For instance, while APA[2] suggests a minimum font size for academic papers, it does not account for the nuances of presentation settings, where readability factors differ due to audience engagement dynamics and varied presentation mediums.

The National Center on Disability and Access to Education (NCDAE) (*Creating Accessible Microsoft Word 2016 Documents (Windows)*, 2016) [15] offers accessibility guidelines recommending a minimum font size for web content to ensure readability for users with disabilities. Nevertheless, these guidelines do not specifically address font size recommendations for presentations, which may require distinct considerations [16].

C. Accessibility and Inclusivity Considerations

Font size plays a crucial role in ensuring accessibility and inclusivity in presentations. Existing literature acknowledges the importance of accommodating diverse audience needs, including individuals with visual impairments or those viewing presentations in less-than-ideal conditions [17]. Nonetheless, a comprehensive integration of accessibility principles and their direct implications on font size selection within the context of presentations remains relatively scarce in current literature.

D. Technological Advancements and Medium-specific Considerations

With advancements in display technologies and the proliferation of various presentation mediums (e.g., projectors, tablets, virtual platforms), the dynamics of font size optimization have evolved [18] [19]. However, literature addressing font size adaptability across these mediums and the influence of technological variations on perceived font legibility and visual impact requires further exploration.

E. Cognitive and Psychological Factors

Psychological aspects related to perception, attention, and cognitive load are pivotal in determining optimal font sizes for presentations. While some literature touches upon these factors, there exists an opportunity to delve deeper into how cognitive psychology principles can inform font size selection, particularly concerning audience engagement, information retention, and the reduction of cognitive overload in presentations.

V. FACTORS CONSIDERED FOR EVALUATION

At the outset, it is important to develop a comprehensive list of all the factors that impact readability and audience engagement. The following methods were used to develop a long list of factors.

Interviews: In-depth interviews with communication experts, ophthalmologists and vision experts were conducted to identify the factors that have an impact on people's ability to read, comprehend and understand content displayed over electronic displays.

User Testing and Observations: Conducting usability tests with representative audience groups helped in determining the most suitable font sizes. Feedback gathered from these tests assisted in refining font size choices for enhanced readability.

Iterative Design Approach: Iterative adjustments based on user feedback allowed for continuous improvements in font sizes, ensuring that the content remains comprehensible and engaging for the intended audience.

Using the techniques described above, a long list of factors was developed for further evaluation.

A. Display Screen

Screen Size: Larger screens permit smaller font sizes to maintain readability across the viewing audience. Smaller screens, conversely, require larger font sizes for adequate visibility.

Aspect Ratio and Viewing Experience: Wider aspect ratios might necessitate larger font sizes at the sides of the screen due to reduced height, impacting readability for viewers positioned off-center.

Multiple Display Screens: Presentations using multiple screens may require consistent font sizing across screens to ensure coherence and readability for all viewers regardless of the screen they are focused on.

Screen Resolution/Pixel Density and Clarity: Higher pixel densities allow for sharper rendering of text, enabling smaller font sizes without sacrificing clarity. Lower resolutions may demand larger font sizes to maintain readability and avoid pixelation.

Scaling and Compatibility: Compatibility across various devices with different resolutions requires consideration. Font sizes should adapt to maintain readability across devices with varying pixel densities.

B. Font Type

Serif vs. Sans-serif: Serif fonts have decorative lines or strokes (serifs) at the ends of their letters, while sans-serif fonts lack these embellishments, resulting in a cleaner, more modern appearance. Serif fonts, such as Times New Roman, may exhibit readability advantages in print but could be less legible in projected presentations due to pixelation. Sans-serif fonts like Arial or Helvetica are often preferred for their clarity and readability on screens.

Font Weight and Style: Bold or heavier font weights might enhance visibility and legibility, especially in larger venues or situations with less controlled lighting. Lighter weights might require larger sizes for clear readability.

C. Font Case and Purpose

Slide Title vs. Bullet/Body Text: Headers or titles require larger font sizes due to their shorter length and intended emphasis.

Uppercase vs. Lowercase: Lowercase text typically aids in faster recognition and readability due to familiar word shapes. Uppercase text, especially in longer sentences, may require larger sizes for comparable readability.

D. Distance from the Screen:

Distance between the farthest viewer and the screen As the distance between the screen's centre and the farthest viewer increases, the readability reduces. Further, the viewing angle also widens. Smaller font sizes might become illegible within wider viewing angles due to reduced angular resolution, necessitating larger fonts for clarity.

Audience Seating Arrangement: Variations in audience seating arrangements affect the distance from the screen. In scenarios with theatre-style seating or larger venues, individuals seated farther away might require larger font sizes compared to smaller meeting rooms with closer seating arrangements.

Screen Elevation and Orientation: The height at which the screen is mounted or its orientation (horizontal or vertical) influences readability. Screens positioned at higher elevations or vertically oriented displays might demand larger font sizes to maintain readability from acute viewing angles.

E. Content Complexity and Density:

Information Density: Highly complex or dense information may necessitate larger font sizes to prevent information overload and facilitate comprehension. Font size variations in titles, subtitles, and bullet points help create a clear visual hierarchy, aiding audience understanding. Adjusting font sizes based on the importance of information improves readability.

Multimedia Integration: Integration of multimedia elements (images, graphs, videos) influences the space available for text, affecting font size choices for balanced content presentation.

F. Age of the viewers

Age-Related Visual Changes: Older individuals often experience astigmatism and presbyopia, a condition causing diminished near-vision acuity. Consideration of font size accounts for accommodating this age-related condition, ensuring readability for the entire audience [20].

Diverse Audience Demographics: Catering to diverse age groups, language proficiencies, or visual abilities in the audience requires font sizes that accommodate varied needs for readability and comprehension.

Contrast Sensitivity and Glare: Older adults might have reduced contrast sensitivity and increased sensitivity to glare. Thus, font sizes should factor in higher contrast and reduced glare for improved readability.

Potential Eye Health Conditions: Age-related eye conditions such as cataracts or macular degeneration affect visual perception. Larger font sizes cater to individuals with these conditions, facilitating clearer comprehension.

G. Lighting

Ambient Light Conditions: Lighting plays a key role in creating contrast for the text being presented. The more the contrast between the presented material and the ambient light, the more readable the text will be. Better contrast generally permits smaller font sizes due to reduced strain on the eyes.

Glare and Reflection: High brightness levels or glare can hinder readability. Adjusting font sizes to mitigate glare or reflections on the screen improves readability.

Dynamic Lighting Environments: Changes in lighting conditions during presentations (e.g., stage lighting, dimming) may impact font legibility, requiring adaptable font sizes for consistent visibility.

H. Presentation Environment and Context

Presentation Purpose and Format: The purpose (educational, informational, persuasive) and format (lecture, workshop, conference) influence font size choices to cater to specific audience needs and engagement levels.

Aesthetic Considerations: Balancing readability with design aesthetics requires font sizes that not only enable comprehension but also contribute to the visual appeal of the presentation.

I. Cultural and Linguistic Considerations

Language Characteristics: Different languages may have varying character shapes, impacting font size requirements for optimal readability. For example, languages with complex characters or scripts might require larger font sizes for clarity.

Cultural Reading Habits: Cultural differences in reading habits and preferences influence font size choices. Some cultures might prefer larger font sizes for enhanced readability, while others may be accustomed to smaller sizes.

J. Response Time, Attention Span and duration of the presentation

Engagement and Attention Span: Font sizes play a role in maintaining audience engagement. Larger sizes may aid in sustaining attention and comprehension, particularly in longer presentations. Font sizes impact the rate at which information is absorbed. Larger sizes facilitate quicker understanding, important for conveying key messages efficiently.

Visual Comfort and Fatigue: Font sizes influence visual comfort during prolonged viewing. Smaller font sizes might lead to viewer fatigue, impacting attention and comprehension, especially in extended presentations. Therefore, it stands to reason that the longer duration of a presentation necessitates a larger font size.

VI. FACTORS SHORTLISTED FOR FIELD STUDY

The formulation of an effective model for determining the minimum font size in presentations necessitated that the number of factors be reduced to just a few, which the presenter can easily manage. The approach

for developing a short list of significant factors included consultation with experts and iterative field study. To simplify the model, several factors, which had a limited impact or those, which could be easily compensated by other factors were eliminated. To develop a simple, yet pragmatic formula, the following factors were selected for the detailed field study.

A. Size of the Display Screen

This is one of the most significant factors as highlighted by the experiments. The size of the display screen directly influences font size preferences. Larger screens allow for smaller font sizes to maintain readability, while smaller screens demand larger font sizes for adequate visibility.

B. The Farthest Distance between the Centre of the Screen and the Viewer of the Presentation

Experts unanimously emphasized that font size in presentations significantly hinges upon the distance at which the farthest viewer is situated from the center of the screen. Greater distances necessitate larger font sizes to ensure legibility across the audience.

C. Age of the Oldest Person in the Room

Acknowledging the age-related impact on visual acuity, the age of the oldest attendee emerged as a critical determinant in font size recommendations. Experts suggested accommodating potential age-related vision impairments by opting for larger font sizes.

Concurrently, comprehensive data collection and analysis indicated a correlation between age demographics and the minimum font sizes for optimal readability.

D. Font Type

The choice of font type emerged as a crucial factor impacting readability. Experts emphasized the significance of sans-serif fonts for clarity in projected presentations, influencing the determination of appropriate font sizes.

The key factor in determining font size is the height and width of the characters (known as em square). Incidentally, each font type has a different correlation between the size of the letters as shown on the screen or printed on paper. Therefore, to develop a universal model, the font type used for this study across all experiments was Helvetica.

VII. Reasons for Elimination

As indicated in the initial stage of the study, there are numerous factors that impact the visual perception and readability of on-screen textual presentation. However, many factors have relatively limited influence and presenter control. Therefore, to develop a simplistic model, several factors were excluded from the scope of the field study. These factors and the underlying reason for elimination are described in this section.

A. Screen Resolution

Insights derived from ophthalmologists and technical experts indicated that while screen resolution undoubtedly impacts visual clarity, its direct and standalone influence on font size determination in presentation scenarios would be less pronounced. Instead, ensuring an adequate font size regardless of resolution itself became a more crucial aspect for optimal readability across various devices and platforms.

B. Lighting

Recommendations from trainers and educators highlighted the crucial role of lighting conditions in presentation settings. However, the consensus among experts highlighted that as long as ambient light conditions were maintained within acceptable parameters, lighting's direct influence on font size determination was simply insignificant. Adequate ambient light allowed for clearer visibility and reduced the necessity for font size adjustments solely based on lighting conditions. The initial experiments proved this hypothesis that while lighting had an impact on readability, its effect could be easily overcome by choosing a lighter or darker slide background and by increasing contrast between the background and the text color.

C. Content Complexity and Density

Discussions with educators and content specialists emphasized that while content complexity influences font size preferences, optimizing other factors, such as standardizing font type and spacing, could compensate for variations in complexity.

D. Presentation Context

Experts highlighted that font sizes can adapt to various presentation contexts. While acknowledging contextual influence, there was an understanding that having a general guideline would cover different

contexts, reducing its overall importance in font size determination.

E. Cultural and Linguistic Considerations

Experts emphasized the relevance of minute linguistic variations and cultural nuances in font readability. However, localized, manageable alterations in font size requirements across cultures are recommended, reducing its standalone influence on font size determination.

F. Response Time and Attention Span

The impact of font sizes on attention span and response time was found to exist only in very specialized contexts. However, its direct significance in determining font sizes was considered relatively less important when compared to the optimization of other factors. Therefore, the model developed as a result of this study provides for a minimum font size for a presentation duration of two hours or less.

VIII. Experiment Set-Up

The key objective of the experiment was to simulate the ease of content understanding by viewers in different settings by changing the key variables.

A. Presentation Content

For this experiment, a presentation document containing 10 slides was prepared. The presentation slides contained three distinct text and image layouts. The text was written in shorter and longer bullet point style covering a range of font sizes. All the bullet points on a particular slide were of the same font size so that the study participants could rate the readability of each slide without confusion. The slide title was written in a larger font but that was not the basis of the readability assessment. The line spacing for each slide was kept consistent.

As highlighted earlier, since there are variations in the size of the letters as shown on the screen and the point size of different fonts, Helvetica was used as a font for all slides across all the experiments.

Figure 3 and Figure 4 illustrate the sample slides used for the study.

Figure 3: Sample Slide Used for Study (1)

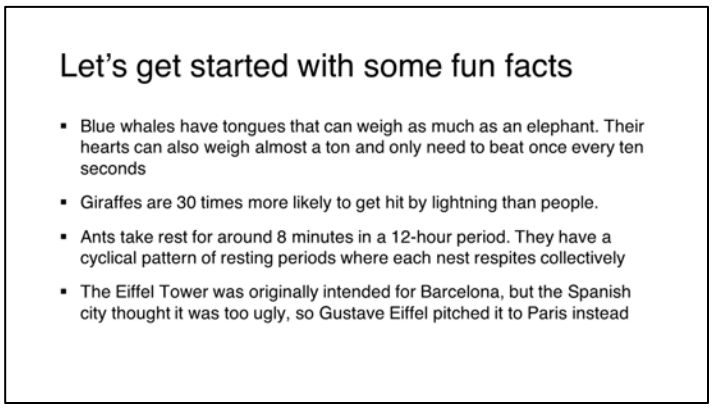


Figure 4: Sample Slide Used for Study (2)

B. Venues

The presentation was projected in eight different rooms with varying screen sizes and was delivered several times to a variety of audiences sitting at different distances and in different seating configurations.

The areas of the rooms used for the experiment ranged from 150 sq ft to 5,000 sq ft and the distance between the center of the screen and the farthest viewer ranged from 6 ft to 120 ft.

The study was conducted on screen size ranging from 40 inches to 960 inches. The aspect ratio in all the settings was kept constant at 16:9. Since the larger screens had a different aspect ratio (wider), the slides used for the study were of the 16:9 aspect ratio allowing for an effective screen size to be consistent across all settings.

C. Participants

To determine the impact of the age of viewers on the need for a different font size, the experiment included participants from the age group 15 years to 76 years.

D. Scoring Criteria

The participants were asked to rate their perception of the ease of readability of the content presented. The participants were asked to rate each slide on a 5-point scale as given in Table 2.

Table 2: Readability Perception Score

Readability Perception Score	Definition
1	Not possible to read or understand
2	Some of the words can be understood but most words are not legible
3	Most words are legible but require very careful focus on the display
4	Every word is legible but requires careful attention
5	Every word is clearly legible and is very easy to read

Participants were specifically instructed to rate the readability of a slide based on the body of the slide content (bullet points) and not based on the title text.

IX. Analysis & Result

The series of experiments led to a large data set (n=320) providing user perception of readability for different distances, screen sizes, and font point sizes.

This data set was tabulated and analyzed using statistical methods focusing on identifying a correlation between font size and readability perception.

The analysis revealed that there is a direct correlation between the size of the display screen and user perception of readability and an inverse correlation between distance from the screen and user perception.

The analysis led to the development of a model, which can help determine the minimum recommended font size for the body/bullet text of any content projected on an electronic display.

In its simplest form (eliminating the age factor of the viewers), the formula is as depicted below in Equation (1):

$$F = 10 + 3.5 \times \frac{D}{S} \qquad (1)$$

Wherein,

F = minimum recommended font size in points (for font type Helvetica or equivalent)

D = distance between the center of the screen and the farthest viewer

S = Size of the display screen (measured diagonally)

The unit of measure for D and S should be the same.

The research highlighted that age is a significant factor in determining the minimum recommended font size if the audience comprises people older than 40 years. Therefore, to determine the minimum recommended font size when the audience includes people older than 40 years, an additional Age Factor needs to be applied to the earlier formula as indicated in Equation *(2)*:

$$\mathrm{F_{old}} = \left[10 + 3.5 \times \frac{D}{S}\right] \times \mathrm{A} \qquad (2)$$

Wherein,

$\mathrm{F_{old}}$ is the minimum recommended font size when the audience comprises people older than 40 years of age.

A is an Age Factor multiplier, as provided in Equation *(3)*.

$$\mathrm{A} = 1 + 0.01 \times [\mathrm{Age} - 40] \qquad (3)$$

Wherein,

Age is the age of the oldest person in the audience in number of years. The age factor will be 1 (or can be ignored) if the oldest person in the audience is less than 40 years of age.

The comprehensive formula is depicted in Equation *(4)*.

$$F_{\mathrm{old}} = \left[10 + 3.5 \times \frac{D}{S}\right] \times [1 + 0.01 \times (\mathrm{Age} - 40)] \qquad (4)$$

X. Conclusion

The size of the text plays a key role in making the presentations easy to understand for the audience. The formula developed as a result of the research project can act as a good starting point for all types of presenters including teachers, business executives and other public presenters. Since the research was conducted in India with English language content using Helvetica font, the user may apply relevant adjustments when using this in different circumstances. The objective of this formula is to act as a starting point guide.

The formula provides for a minimum recommended size for the body text. The slide titles should be increased by a factor of at least 1.2 times and key headings should be increased by 1.1 times.

Each presenter has a unique style and approach to presenting content. Even to the most seasoned presenter, the formula will act as a useful guide to provide the minimum text size baseline to reduce the risk of the audience's inability to read and comprehend the subject matter.

XI. References

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