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2012

Dostupný z http://www.nusl.cz/ntk/nusl-124108

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Datum stažení: 25.04.2024

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DISSERTATION

TRADITIONAL TYPE IN THE DIGITAL ERA

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ACKNOWLEDGEMENTS

Special thanks to Simon Gray for guidance and advice, Stefano Cavagnetto for valuable help with the research matierals, and Gavin Bird for advice and discussions on the topic.

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INTRODUCTION

The rapid transformation of print to digital media has been triggered by the technological development of past few decades. With the invention of personal computers and graphical user interface (GUI) to make interaction between the user and the machine possible, typography for UI has become one of the most challenging parts of user experience development.

Nowadays, the statistics show that the modern society is about to reach yet another significant milestone – a full switch towards mobile technology. Smartphones, iPhones, and tablets have been dominating the market for the past few years. However, the predictions show that in the next years, sales of such devices are going in any other direction but upwards.

This paper explores the predestination of traditional typefaces nowadays, in the era of digital technology. The author argues that the traditional typefaces struggling to stay relevant in a world where most media is viewed on electronic screen devices. For the research, mostly secondary sources were used which may also pose a limitation to the study. Primary data would have been valuable especially in the area of semiotics, emotions, and subjective comprehension of typography and UI.

The first part of this paper briefly reviews the history of typography and the ways how the traditional typefaces had been modified in order to ensure high readability and legibility.

Semiotics of type, as well as the importance of positive emotional response to UI and UX, are discussed in the second part, highlighting the important patterns in the user's comprehension and emotional responses.

In the third place, the shift towards the "mobile first" approach is emphasized, and the importance of adopting the appropriate methods and techniques which would ensure the optimal representation on information on small screen handheld devices is justified; the problems caused by type scaling and reading patterns, screen resolution, pixel representation, and backlit environment are identified. Furthermore, the optimal characteristics of screen fonts are explained.

Last but not least, the present and future of typography on small screens is discussed.

1. BRIEF HISTORY OF TYPOGRAPHY

While the individual symbols, glyphs, alphabets, words, and languages started to form thousands of years ago, it was not until the 15th century when European typography reached one of its most significant milestones. The first and supposedly the most notable step in development of the type was the invention of movable type, which is usually contributed to the German goldsmith and printer Johann Gutenberg, around mid-15th century. "The true origins of this lay much earlier though, with the forerunner of Gutenberg's revolutionary system being invented by Bi Sheng in China between 1041 and 1048. Further refinements were made during the Goryeo Dynasty of Korea by ChweYun-Ui in about 1234, where metal was first used instead of brittle clay or easily damaged wood" (Ambrose & Harris, 2006: 12).

Initially, the first type of text to be reproduced by the movable type printing press was laid out in Blackletter, the style of type also known as Gothic or Old English, which is characterized by complex, ornate quality to its thick to thin strokes. However, due to its decorative nature and limited readability, Blackletter was soon substituted by a different class of type.

Figure 1: Gutenberg's Bible.

After the invention of metal movable type, France, Italy, Great Britain and Holland became the centers of constant typographic progress. Thus, it is hardly surprising that the first independent type foundry was founded in Paris, France, in 1530. Claude Garamond, the founder of the aforementioned type foundry, quickly popularized the so-called Old Style typefaces, the lighter and more legible versions of the ones classified as Humanist (Fig. 2).

Figure 2: Visual comparison of Humanist and Old Style typefaces.

Figure 3: Visual comparison of three different versions of Garamond , (from top to bottom) .Adobe Garamond, Garamond Premier and Original Garamond.

Throughout the centuries, the original Garamond typeface became a foundation stone to number of versions – some of which were based solely on Claude Garamond design, the others on Jean Jannon's and inevitably, new revival versions like Adobe Garamond and ITC Garamond came to existence. ITC Garamond "was designed in 1977 by Tony Stan for ITC. Very loosely based on the forms of the original sixteenth-century Garamond-era work, this version has a taller x-height and tighter letterspacing, two elements that were very popular in New York advertising design during the 1970s" (Linotype GmbH, no date).

While Garamond's popularity for print and other non-digital use might seem immense, especially thank to its optimal legibility and readability, traditional serif typefaces may appear to be scarcely used across the online media.

In 18th and 19th century, the rapid industrial growth resulted in Industrial Revolution, bringing "mechanisation that allowed printing to speed up, photo-engraving which replaced handmade printing plates and line-casting machines that revolutionised typesetting and allowed for ever-ever-increasing levels of detail and intricacy. The use of points as the measurement system was cemented during this period" (Ambrose & Harris, 2006: 34). 18th century was an era of stylistic innovation – in 1737, William Caslon established his type foundry and thank to his valuable contribution to development of typography in Britain he was regarded as the father of British typography since.

Later, the French and Italian contemporary typographers "refined and modernized typography as they stepped further from their calligraphic origins. While Baskerville was the pioneer of the neoclassical style letterform, the most extreme forms were developed by Firmin Didot and Giambattista Bodoni" (Design-history.org, 2000). Both Didot and Bodoni inclined towards high visual contrast within the glyphs, turned away from slanted serifs and preferred a vertical axis for their glyphs.

In 1884, Ottmar Mergenthaler introduced a revolutionary typesetting machine. "The linotype machine used a keyboard device to operate lines of cast type, which was then pressed into a mold and printed" (Independent Television Service, 2008). However, phototypesetting, a typesetting method using the photographic procedures in order to produce columns or scrolls of text, soon replaced the mechanical typesetting devices. Popularity of this method reached its peak in 1960s and became a standard in the industry.

With the blossom of the International Typographic Style in 1950s, the graphic designers focused on positioning the elements according to a grid system, use of very legible sans serif typefaces such as Akzidenz Grotesk, the forerunner of Helvetica. The type was usually the most prevalent and significant element of the design piece. Typefaces like Max Miedinger's Helvetica, Adrian Frutiger's Univers and Frutiger, and Eric Gill's Gill Sans all offered the same features – legibility and readability, cleaniness, rationality, minimalism, uniformity, and neutrality. With the arrival of computers, the highly legible and emotionally versatile typefaces became a cornerstone of the first screen fonts which are discussed on p. 15.

2. TYPE AS A SIGN

Arguably, type can be considered as an image on the premise that the text is a visual object. If the text is deconstructed into sentences, words or even individual glyphs, every such piece carries individual visual and semiotic characteristics.

The roots of semiotics, the study of signs used in differing environment and context, reach back to the ancient Greece and are most often linked with the philosophical work of Hippocrates, Plato, and Aristotle. However, only two major directions, one of the American philosopher Charles Sanders Peirce (1839 – 1914) and the other one Swiss linguist, Ferdinand de Saussure (1857 – 1913) will be discussed in this paper.

In regards to typography, Saussare's pragmatic concept is based on the assumption that type exists solely to represent vocal communication. According to his theory, a sign is a combination of two equal parts –„"the "signifier" (or "signal") and "signified" (or "signification"), where the "signifier" the signs physical presence, and the "signified" is the concept evoked in the mind of the receiver" (Brownie, 2009: 3). When this notion is applied to type, the visual aspect of a sign (a word) is inconsiderable. Thus, it can be said the visual appearance of the signs is completely overpowered by their meaning.

Peirce, on the other hand, argues that a sign is composed of three parts – " "representamen", "object" and "interpretant". In this model, the "representamen" is the representational object or form, equating to Saussure's signifier, the "object" is the thing to which is directly represented, and the "interpretant" is the meaning that is achieved once the sign has been "evaluated" by the audience" (Brownie, 2009: 4).

From a semiotic and linguistic point of view, any symbol, whether typographic or not, carry a certain value and meaning. Spitzmüller (2007) supports this notion by stating that typography "has the potential to refer to a specific value system and thus can be used to express values, attitudes, associations, etc. In other words: typographic elements might be used as signs". This claim is supported by Eco's (1979: 179) point that "signs [...] possess a certain quality of material uniqueness (eg. a word which someone speaks or which is handwritten)". In case of typography, the material value of a word is demonstrated not only by the physical features (such as colour of ink, size, and so on) but also by its visual form – font choice, or visual style.

According to Roland Barthes (1915 – 1980), every sign can be analysed according to three different orders. First, denotation is a literal description of a sign. Secondly, connotation is a secondary meaning which relies on "cultural or historical contexts, contexts of both the image and the viewer" (Carroll, no date). Last but not least, a third level of meaning – a myth – expands the area of possible connotations. Barthes' myth can be defined as a collective historical and cultural background which influences the viewer's subjective understanding of a sign. The possible amount and content of the connotative meaning is therefore unpredictable.

It can be concluded that form of a written or typed word can influence the overall comprehension of a sign – especially if the visual aspect of the sign articulates the "signified" faster, or together with the verbal aspect, helps the viewer to comprehend the message in a specific way. However, the presence of Barthes' myth leaves the connotative meaning open to the collective background and knowledge of the society, as well as to subjective experience and judgment of a viewer. The importance of material quality indicates that the symbolic perception of a word can be strengthened by using a specific style of a typeface. Thus, the font choice is extremely important in order to evoke an optimal viewer response. Furthermore, a positive emotional response to design, looks and overall feel of the piece of work, be it printed material, web experience or native application, is extremely important for a message to be clearly communicated and well-understood by a viewer.

3. THE UPRISE OF MOBILE TECHNOLOGIES

In 2009, Meeker, Devitt & Wu (2009) in their talk at Web 2.0 Summit stated that "usage of mobile devices on IP-based networks should surprise to upside for years to come and bandwidth suppliers (telcos / cable) face serious challenges in managing incremental traffic". "Smartphones were boldly predicted to out-ship the combined global market of laptop, desktop and notebook computers in 2012. They did so in the last quarter of 2010 [...] – two years earlier than predicted" (Wroblewski, 2011: 7). It is expected that by 2013, the number of heavy mobile data users will reach one billion" (Wroblewski, 2009).

In spite of different smart phone brands having different screen and browser (both web and OS-based, in-built one) features, the current wave of app-development seem to focus on three most popular mobile operating systems: iOS, Android, and Windows Mobile. In December 2011, Google announced that they had reached a milestone of 10 billion downloads from Android Market (Fig. 4). Earlier in June, Apple had celebrated 15 billion downloads from the App Store.

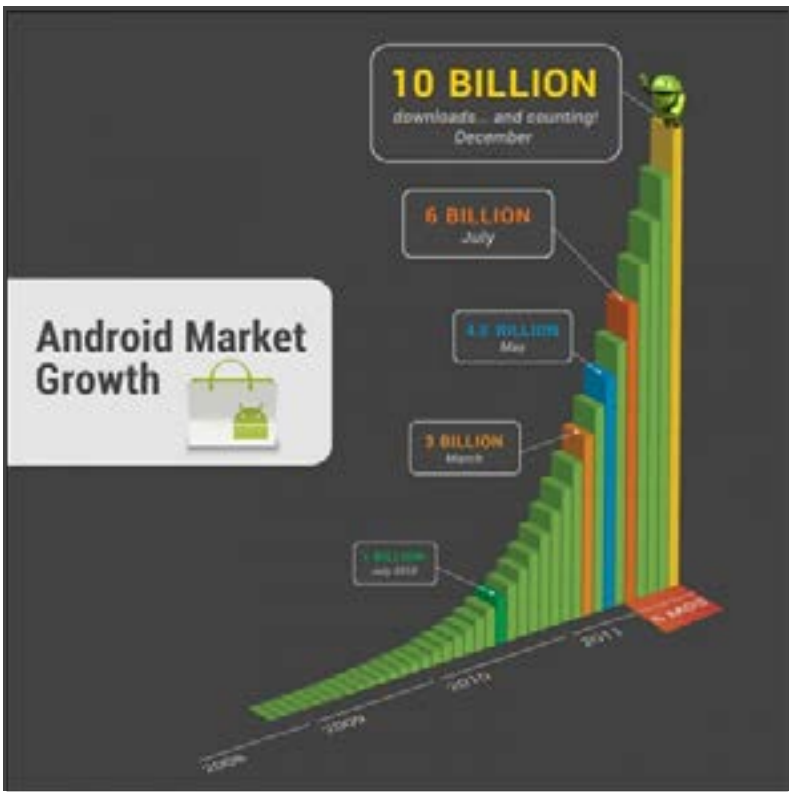

Figure 4: The number of downloads from Android Market has been rapidly increasing..

The rapid growth and development of mobile technologies call for a prompt switch towards the "mobile first" approach to web- and UI design.

3.1 TECHNICAL LIMITATIONS

3.1.1 SCREEN RESOLUTION AND PIXEL RENDERING

The boom of digital technologies was triggered in 1983, "when Apple introduced the Apple Lisa, the first desktop computer with a graphical user interface (GUI)" (Hillner, 2009: 79). Followed by Apple Macintosh only a year later, digital typography did not only meet its first important milestone but also a series of setbacks. Apple Macintosh's screen was 9 inches wide, therefore slightly smaller than today's iPad, with resolution of only 512 x 342 pixels. Low screen resolution combined with poor pixel representation, resulting in mere 68 PPI (or 4,680 PPI²) and 0.3713mm dot pitch, did not allow the use of sophisticated serif type. Compared to Apple iPhone 4 which is equipped with approximately 330 PPI (or 108,669 PPI2) and dot pitch of 0.0771mm, the graphic representation of visual elements in the first Apple Macintosh was extremely limited.

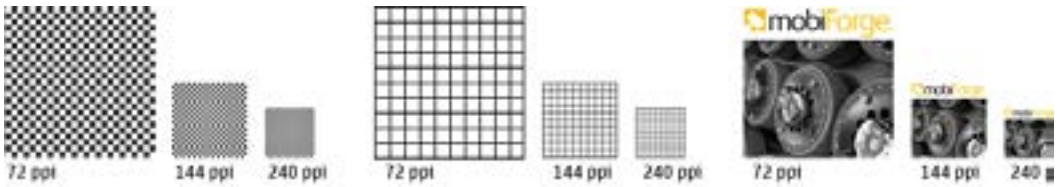

Figure 5: The simulation of the identical 100 x 100 pixel image on devices with various pixel densities.

Another problematic aspect of on-screen reproduction of traditional serif typefaces is scaling. With the invention of metal moveable type, the moulds for the various sizes were individually customised in order to maintain optimal readability and legibility in print. Therefore, a serif typeface would in smaller sizes consist of thicker strokes, serifs, and slightly increased kerning. "When printed, the serifs on typefaces are only a tiny percentage of the typeface's design. But on-screen, in order to display the serifs using the limited number of available pixels, they take up a much bigger proportion of the information than they do on a printed page. Serifs should be small things--but on screen they become big--no longer visual cues but noise--distracting chunks of interference" (Will-Harris, no date).

On the condition that text of the same typeface, size, width, and leading is displayed on-screen and in print, side by side, the on-screen version would presumably be less legible. First of all, that is due to the fact that a modern laser printer is able to reproduce a document at resolution up to 2400 dpi, as compared to screen resolution of 72 or 96 dpi.

The modern approach to digital typesetting allows the designers to scale the text pari passu, or in other words, proportionately. The infinite scalability is caused by the fact that single glyphs are stored as Bézier curves. Assuming that a glyph of a vector-based font is digitally resized, the form itself shall not demonstrate any distortion or malformation (Fig. 6).

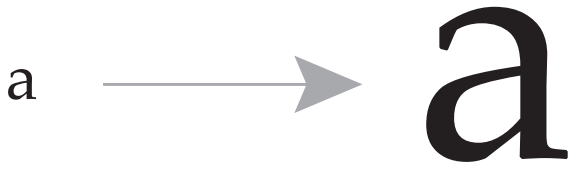

Figure 6: A font stored in Bézier curves does not show any distortion when enlarged.

However, a font is not displayed in vector format in the web and UI environment. On-screen font rendering from a vector format into raster may cause significant changes to the shape and form of a glyph, as illustrated by Fig. 7. "The translation of a font's outlines into pixellated text of varying quality, consistency, and sharpness is not straightforward. It involves both a font and a rendering engine, and only so much can be controlled by type designers and web designers" (Adobe Systems Incorporated, 2009).

Figure 7: Rendering of a lowercase "a" by three different rendering engines.

Additional techniques have been developed in order to avoid substantial changes in the form of glyphs. Anti-aliasing is a font-smoothing rendering method "uses partial opacity to emulate smooth curves of the glyphs. As the final result, the shape of glyphs is more true to the type's design" (Szafranek, 2009) (Fig. 8). Anti-aliasing is dependent upon hinting (Fig. 9, p. 13), a technique which uses mathematical algorithms to determine not only the exact position of a pixel, but also to determine what areas of a glyph need to be smoothed. However, anti-aliasing is not being used for small font sizes due to "blurriness" it causes.

Figure 8: Comparison of an uppercase "A", aliased and anti-aliased.

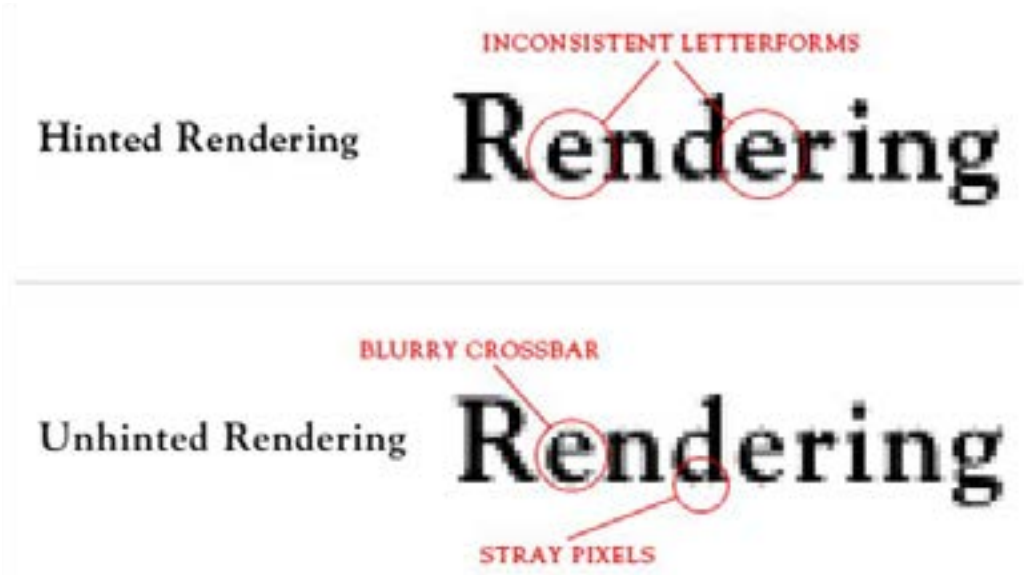

Figure 9: Visual comparison of differences between hinted and unhinted rendering of a typeface.

Sub-pixel rendering method – a technique which involves a subdivision of RGB pixels – smooths the edges by distributing red, green and blue sub-pixels along the ragged edge (Fig. 10). "Software capable of using subpixels can effectively emulate horizontal resolution that is 3 times bigger than normal resolution, eg. 3072×768 instead of 1024×768. Subpixels are small enough to be indistinguishable to a human eye, but can be identified with a magnifying glass" (Giannattasio, 2009).

Figure 10: Standard rendering causes greyscale pixels to be added, while subpixel rendering creates pixels of different colour shades.

Current methods of pixel rendering generously vary across operating systems and browsers. However, operating systems and browsers using subpixel rendering engine Quartz, such as OSX, seem to render the fonts more accurately than Windows-based ClearType engine is able to represent. Therefore, Quartz-rendered fonts lose less detail and are significantly closer to the original type designs.

3.1.2 BACK-LIT ENVIRONMENT

Another factor to impact the text legibility is the back-lit environment it appears in. "Since a lit monitor is much brighter than the reflective light of paper, the contrast between black and white on a monitor is much greater than it is on printed materials. To promote readability, screen typography should have enough contrast to be legible, but not so much contrast as to unnecessarily irritate the viewers' eyes" (Rabinowitz, 2006: 260).

It is suggested that on-screen text should be laid out as in reverse, using black background and white colour of the text. Taking into account the basic colour theory rules, black, grey and white are considered to be neutral colours. However, as seen in Fig. 11, "high levels of contrast can cause an optical dazzle effect. High contrast can also cause type glow, which occurs when the brightness of a background permeates the edges of darker or duller letterforms, making them appear thinner. Type glow can also happen when the brightness of letterforms seems to overflow into a darker or duller background, creating an optical aura that makes the letters seem to glow" (Rabinowitz, 2006: 261).

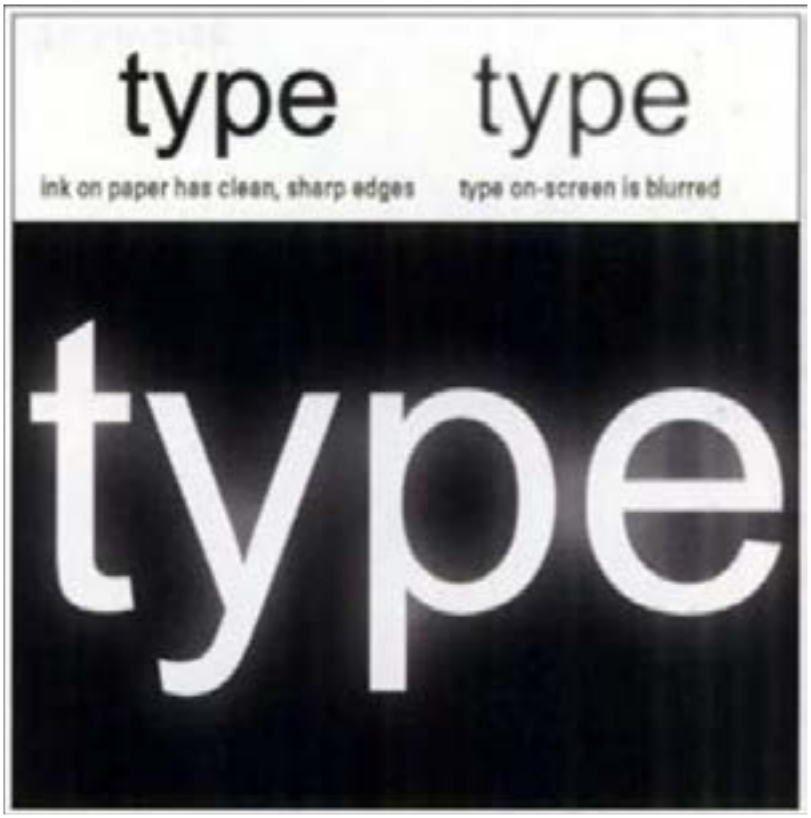

Figure 11: Type glow.

Frazier (1920: 13) states that "recognition of letters may be difficult if there is not in them an adequate amount of white space, as for instance in the center of the "o," the loops of the "p" and "b," the spot at the top of the "e" and at the bottom of the "a," and between the stems of the "m," "n," "h" and "u". It is important to note that according to some studies, a human eye does not focus on reading individual letterforms but on comprehending general shapes and forms, mostly by processing the white space around the glyphs.

A revolutionary approach to reading comfort emerged with successful development of digital link technology. "E Ink is a proprietary technology of a company called E Ink Corporation. E Ink is considered a type of electronic paper, which is a technology class designed to mimic the look of real paper and print on an electronic screen" (Zarley, 2011: 17). Unlike the liquid crystal displays, E Ink-based eBook readers such as Amazon Kindle, Barnes & Nobble Nook, and Kobo eReader do not reflect light which notably improve the legibility. Furthermore, the displayed text is less limited in terms of upholding to the standardised set of typographic rules.

3.1.3 MARK-UP LANGUAGE AND BROWSER SUPPORT

The pre-determined options for control over the web typography are still limited. The latest version of Cascading Style Sheets (CSS 3), and CSS Fonts Module Level 3 in particular, specify a wider range of font properties than the older versions. The constraints stem from the fact that in essence, CSS's main purpose was to provide control over the style of web elements and not the layout. Additionally, the cross-browser support of CSS 3 varies greatly, and therefore scripts, hacks, and other complementary techniques are being used to overcome the existing restrictions.

In addition to the aforementioned lack of control over the typographic aspect of web layout, there is an extremely scarce number of effective and legible screen fonts. Verdana (Fig. 12), Georgia, and Trebuchet MS (Fig. 13), both designed specifically for display on screen, contain the most important characteristics which enhance their readability and legibility on screen. They were "most popular in the 90's and early 2000's. Of late, Helvetica [...] is gaining huge popularity" (Kolman, 2009: 4).

Benevolent x-height, wider tracking, relatively wide space within the glyphs, and distinctive letterforms significantly add towards legibility of the text, even if displayed in small sizes.

Figure 12, 13, 14 (from top to bottom): Desired characteristics of a screen font demonstrated with Verdana, Trebuchet MS, and Helvetica.

While Helvetica (Fig. 14) was not initially designed for screen, the aforementioned characteristics have contributed towards its popularity as a screen font. In all three cases, the ratio of white and occupied space is notably similar. Therefore it can be concluded that nearly any typeface with relatively tall x-height, wide tracking, wide punch width, and relatively thick distinctive glyphs can potentially be a successful screen font, if adhering to pre-existing fundamentals of typographic layout. Consequently, the designers should focus more on designing screen fonts because "larger numbers of computer users spend their entire time in front of a screen and never (or seldom) print anything. So it became obvious to us that this was a reversal of priorities -- we should not approach this as doing printer fonts adapted for the screen, we should design them as screen fonts from the outset. The printer fonts are secondary in this case" (Byrne, 2003: 14).

3.2 USER'S INTERACTION

3.2.1 READING PATTERNS

In 2006, Nielsen Norman Group conducted a study on web reading patterns. For this purpose, an eye-tracking device was used. It was discovered that the most prevalent way of reading a website sequentially resembles a F-letter, when a viewer starts reading with two horizontal eye movements across the top area of the website, which are then followed by a vertical movement towards the bottom of a browser window or a website.

Unfortunately, very little is known about the reading patterns on small screen devices and concerns "whether information gathering from such small screens results in a cognitive trade-off in subsequent performance" (size-on-small-screens) have been raised. Although the smartphones and tablets ordinarily offer a "landscape view" option, large font size causes an increased need for scrolling, which has proven detrimental to the cognitive comprehension of the text. While it is important to minimize the need for scrolling, the user should also be given an option to resize the text according to his/her needs.

Reading patterns on small screen devices are significantly dependent upon the design of the website or application itself. Mobile versions of websites tend to adhere to design which supports the F-letter reading pattern by implementing a horizontal menu and logo at the top. This trend is clearly shown on Jonathan Snook's website (Fig. 15). In the mobile version (Fig. 16, p. 17), the hierarchy of elements is essentially maintained; the main emphasis is put on dynamically-generated text (blog entries), while the sidebar with stagnant information and advertisements has been removed.

Figure 15: SNOOK.CA – J. Snook's website.

Figure 16: Mobile version of SNOOK.CA, as shown on an iPhone screen.

This tendency is prevalent in web-based applications and mobile websites – a website which contains CSS styling especially for mobile devices.

3.2.2 EMOTION IN INTERACTION

As any aspect of design, the user's interaction with UI and displayed information are affected by their emotion-based perception. According to Norman (2002), "emotion is one of the strongest differentiators in user experience namely because it triggers unconscious responses to a product, website, environment or interface. Our feelings strongly influence our perceptions and often frame how we think about or refer to our experiences at a later date."

While the importance of overall user experience and functionality cannot be undermined, aesthetics and visual form of a design piece play a crucial role in forming a positive bound with the user. The strive for a pleasurable experience can be well explained by the Maslow's Hierarchy of Needs (Fig. 17).

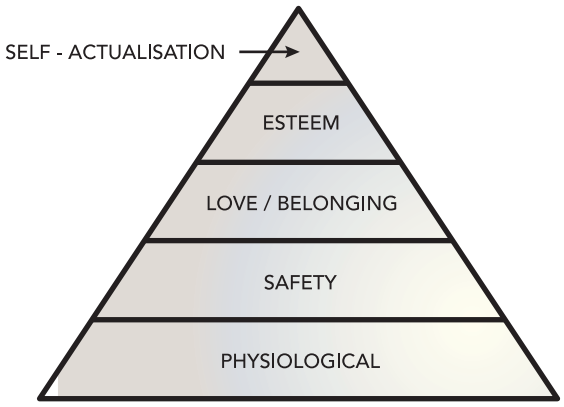

Figure 17: Maslow's Hierarchy of Needs.

As reported by Walter (2010), a Hierarchy of Needs for UX (Fig. 18) emphasises that "the interfaces we design must first be functional – they need to solve a problem for us. Next, they need to be reliable – no fail whales please. Our interfaces need to be usable – easy to learn, easy to use, and easy to remember."

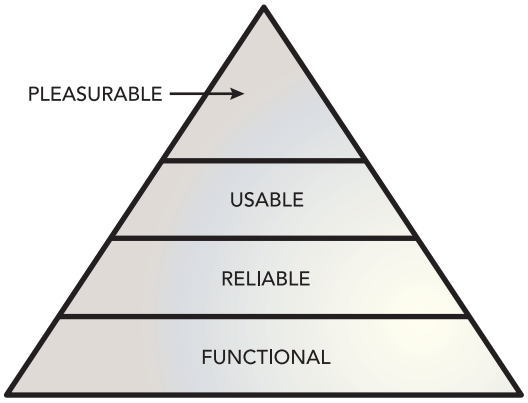

Figure 18: Hierarchy of Needs adapted for the demonstration of needs in user experience.

Similarly to the Maslow's Hierarchy, if any of the needs are insufficiently fulfilled, the person does not feel content. Self-actualisation, defined as "the realization or fulfilment of one's talents and potentialities, especially considered as a drive or need present in everyone" (Oxford University Press, no date), is essentially a group of positive feelings and actions, such as spontaneity, happiness, self-growth, autonomy, excitement, appreciation, joy, and pleasure. Therefore, the interaction with UI should be enjoyable enough to provoke such positive feelings in a user.

Undoubtedly, type as a significant - and often crucial – part of user experience is subjected to emotive response from a user. While the technical requirements, such as legibility, appropriate font size and leading and relatively easy to measure, the overall success of the interaction is subjected to a level of uncertainty. The type is considered a "sign" or "code", thus semiotic and hierarchal problems might be present; the response is influenced by the user's aesthetic preferences; last but not least, "emotive responses, however, are dependent, somewhat, upon the reader's individual psychological state and social-cultural context" (Jury, 2004: 138). Saltz (2009) argues that "the proper choice of typeface is [...] essential to the tenor of the message, and it may add to – or, if a poor choice, may detract from – the believability of the text".

Although the "tone of voice" of a UX is important in order to make the user's interaction with the device enjoyable, functionality, reliability, and usability should be granted as much attention. The typographical treatment of the layout, namely right font choices, can aid to establish desired aesthetic effect. Successful UX significantly increases the user's satisfaction, accessibility of information, trust and loyalty, credibility of the brand, enjoyment and sense of accomplishment.

4. THE PRESENT & FUTURE OF TRADITIONAL TYPE ON SMALL SCREENS

From the major part, the future of traditional typefaces and their usage on small-screen displays seems to be defined by the prospective development of internet browsers, applications and UI.

Even though the on-screen representation of information has severely improved in past few years, especially with the outbreak of fast and intuitive devices such as Apple iPhone and other smart-phones, the older devices with limited view and UI capability have to be taken into account (Fig. 19).

Figure 19: An example of different websites viewed on older devices with various resolutions and CSS browser support.

The release of Apple iPhone (1st generation) in 2007 has provoked a revolution in treatment of applications for small-screen devices. While their development was limited to only a couple of devices (iPhone and iPod Touch), the UI designers and developers obtained an important advantage – the opportunity to focus on a single device without taking different sizes and resolution of non-Apple devices into consideration. Thus, the rapid expansion of quality Apple-approved applications granted the developers more freedom in the treatment of UI and UX, which could be easily tested.

A significant opportunity for screen fonts has emerged when Apple introduced iPhone 4 with its signature Retina Display. Seemingly misleading marketing claims about the extraordinary sharpness, resolution, and vibrancy are recognised as valid when a neuroscientist Bryan Jones stated that "Apple's Retina Display adequately represents the resolution at which images fall upon our retina" (Jones, 2010).

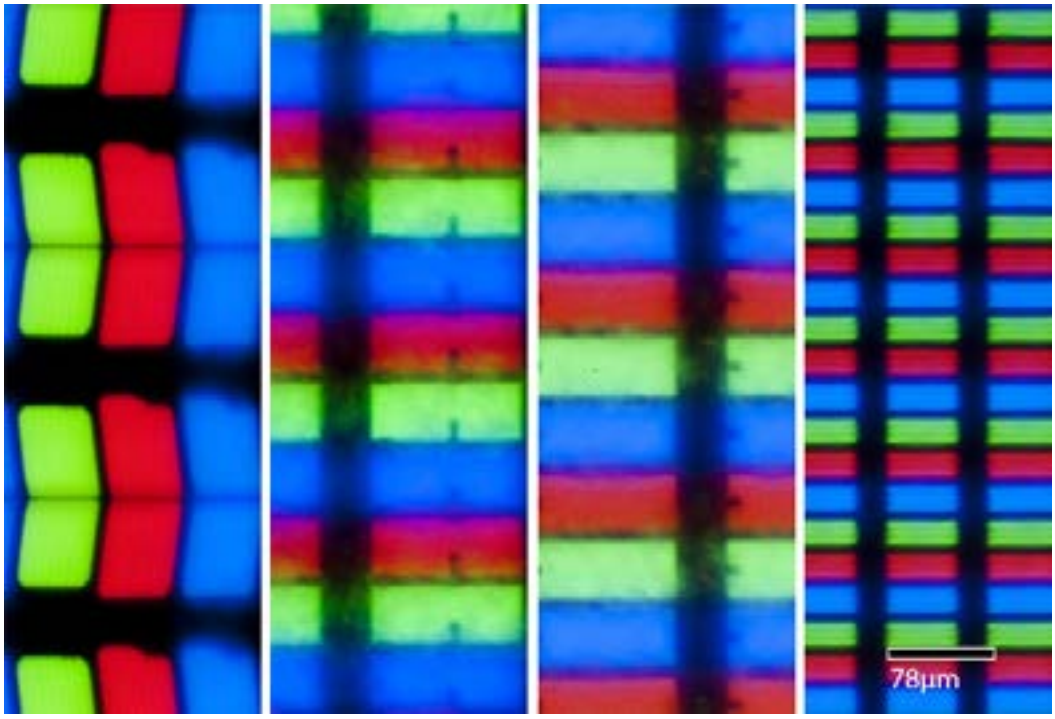

Figure 20: From right to left – pixel density of screens of Apple iPad, iPhone 1G, iPhone 3G and iPhone 4G with Retina Display.

Thus, a rendered font which is consequently displayed on a Retina Display is able to represent significantly finer design details than a regular phone screen (Fig. 20).

Current development of mobile applications is directed in two directions – Web and native apps. Native apps tend to be faster, highly responsive, can easily connect to and use the phone hardware such as a camera or microphone, and offer better control over the typefaces and overall layout. Their downsides are the necessity of update downloads, more complicated sharing of content on social networks, the need of approval for official app stores, and need for specific development platform on the creators' side.

On the other hand, web apps store the data outside the device, updates and installations are downloaded automatically, and there is no need for development for multiple platforms (Calore, 2010). Their biggest setback and blessing at the same time, however, seem to be their architectural structure and potential. While not all the browsers represent the data as precisely as intended, "HTML 5 introduces lots of new tags and enhancements for a wide range of features including form controls, APIs, multimedia, structure, database support and faster processing" (Anderson, no date). While not all the enhancements have been fully utilized yet, it is expected that in combination Javascript, especially with updated libraries like jQuery Mobile, Web apps will be able to fairly compete with the native apps.

Figure 21, 22 (from left to right): Screenshots of The Guardian app for iPhone/iPod Touch. The Guardian app is web-based and its look is controlled by CSS.

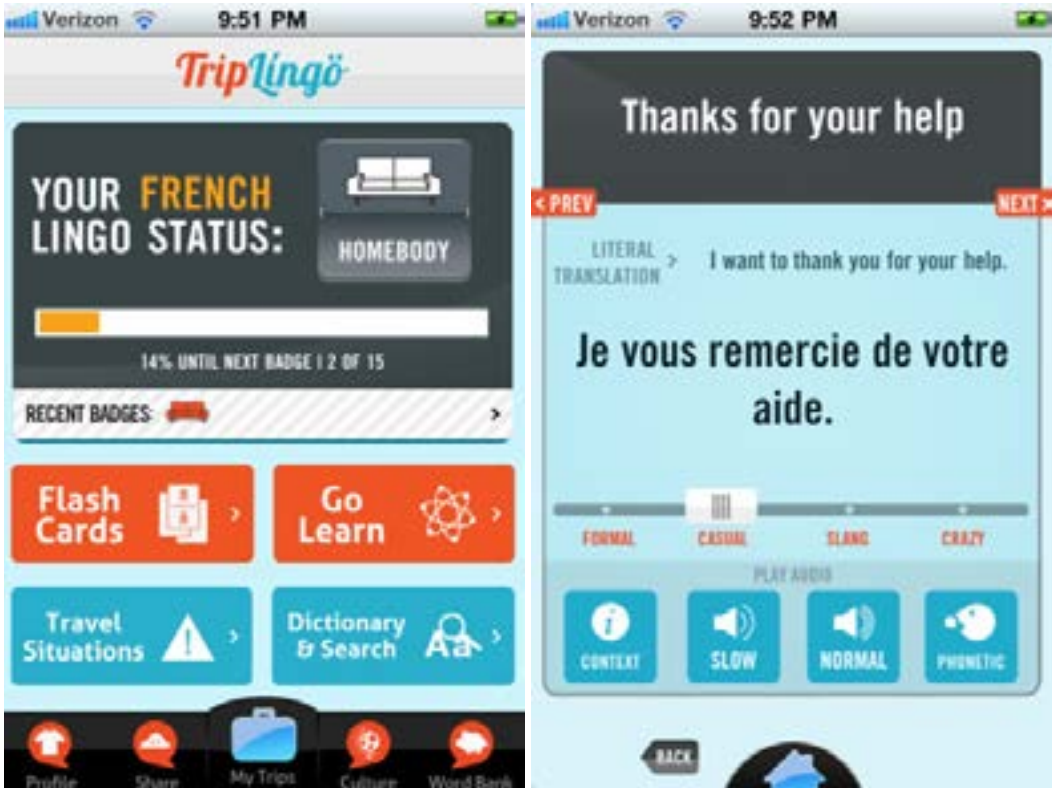

Figure 23, 24 (from left to right): Screenshots of the Trip Lingo app for iPhone/iPod Touch. Native apps allow the developers and designers to experiemnt with typography more than in case of Web apps.

Figure 25, 26 (from left to right): Screenshots of the Instagram app for iPhone/iPod Touch. The combination of photography and social media have helped Instagram to become one of the most popular apps on the App Store.

With the introduction of Retina Display and continuous transformation of the Web apps closer towards the functionality of the native apps, it can be expected that the existing typographic and layout limitations will not be as profound as nowadays. The sharpness of Retina Display allows high-detail elements to be used which contributed to improvements in font rendering and display. As Web apps, the regularly updated services such as news and social apps tend to inherit the CSS styling from the main website (the Guardian). In future, it can be expected that the Web apps will be able to offer a more pleasurable experience to the user.

CONCLUSION

Throughout the time, strive for a legible and visually pleasing typeface was growing until it reached its peak with the invention of Gutenberg's movable type. The metal movable type became a foundation for further development of type-casting and type-setting. In the centuries following the Gutenberg's invention, the iconic typefaces such as Garamond, Bodoni, Baskerville, and Caslon came into existence. Their popularity still lasts, as their old faces and revivals are being used mainly in print.

Type as a sign communicates not only its literal and connotative meaning. It also has a certain material quality which is expressed by its form. Therefore, the appropriateness of the chosen font to the overall message can either strengthen or weaken the meaning of the word. Moreover, the subjective perception of the sign is tightly connected with emotive responses of a viewer. The traditional typefaces, however, often carry an aged, sophisticated, historic, or conservative look. As a result, their visual connotation may not cover the desired visual characteristics of a modern user interface design.

An important factor to influence the use of traditional typefaces in digital environment is a varying screen resolution and different methods of type rendering. The parts of a serif type which require a precise representation, such as serifs and thin strokes, are often distorted. Such deformity negatively influences the readability and legibility on the screen.

Back-lit environment also poses a problem. High contrast levels between the type and background cause undesired optical effects which are even strengthened by the emission of light on the background and additional reflection. E Ink technology used for modern e-readers addresses these problems – the surface of the screen is matte and does not emit any light. Therefore, the reflection is minimal and the feel of reading a hard copy is maintained.

Unlike the traditional serif fonts, screen fonts such as Verdana and Trebuchet MS exhibit characteristics which significantly improve their legibility and readability on digital screens. Generous x-height, wide tracking, wide punch width, and relatively thick, distinctive glyphs contribute to their successful representation in the digital environment. The tools for online font integration, such as Typekit, offer a technological base for usage of fonts outside the default choices; unfortunately, such services still lack a uniform support on small-screen devices.

The future of traditional typefaces in digital media seems to be determined by the technological advancement of the mobile technologies. Current innovations, such as the sharpness of Apple's Retina Display, together with developmental progression of Web-based apps might still bring the dawn to the use of traditional typefaces in digital media.

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