Typography of Mobile Devices

Mike Pell
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This book is dedicated to my friend Mark Hughes - a true lover of all things type.

Mike Pell
Table of Contents

16 Bitmap Era
18 Color Era
20 Elegant Era
24 1993
26 1996
28 2002
30 2003
32 2004

Evolution of Mobile Devices

Elegant Era

Evolution of Mobile Devices
As any designer will tell you, type is critically important to our lives. We need to read. We need to write. And in these odd times of electronic news literally traveling around the world in seconds, mobile devices are many people’s preferred means of keeping up. Whether with friend or the world at large, simple characters on a screen provide the means to communicate.

Today’s “always on” world is pushing many of us into patterns of constant communication and voracious information consumption - even when we’re mobile. Worldwide, people have embraced the opportunity to share more of their lives than ever before, in ways that could not have been imagined when the principles of typography were being worked out centuries ago. And it is the lessons of those landmark works of typographic art, guides and examples which are most endangered in the modern world of mobile devices.

We simply don’t have time to get it right - at least not yet. Do the best we can and move on. That’s what we hear in the hallways of computer and telecommunications companies worldwide. Next time. And to be fair, that’s how we make progress toward our goal of reproducing the beauty of the printed page. One problem at a time, day after day.

Technologists promise that someday we’ll not miss the printed page, but for now, we can see clearly where we need to do better.

“The state of mobile device typography is appalling.”
- Simon Daniels
Microsoft Typography Group
**Type Basics**

**Readability** - The ease of reading a page or message. It refers to the arrangement of type and involves the design of the total visual entity being viewed.

**Legibility** - The speed with which a character can be identified, based on the visual shape and its relationship to other characters and the surrounding

**Mobile Challenges**

Computer-based type, especially for mobile display, has always been a challenge due to display technologies (resolution), availability of type, color and contrast reproduction variations and size variations. Mobile devices take these issues, magnify them, and add on a spate of unique environmental and use pattern issues. The primary barrier is of technology, and the primary concern is of readability within the user’s context.

**Technology challenges**

While some devices are beginning to allow effectively unlimited type selection, support vector glyphs, and have large amount of storage and running memory, most mobile devices are still resource and technology constrained. General issues of storage on the device, running memory, download times and cost of network access, limit availability of type for mobile application design. As almost all devices require raster (bitmap) faces, each size is loaded as a complete, different typeface.

Most products end up with the device’s default type, or with a very limited set of choices for their application. While this challenge will slowly dissolve, it will always be present to some degree. Inexpensive devices, specialist devices (youth, elderly and ruggedized) and emerging markets needs, seem to indicate these issues will persist for another decade at least.

**Usability challenges**

Mobiles are used differently from desktops, and even most print use of type. They are closest, perhaps, to signage in that they must be comprehended by all user populations, under the broadest possible range of environmental conditions (e.g. poor lighting) and at a glance. The typical mobile user is working with the device in a highly interruptible manner, glancing at the screen for much of their interaction. The type elements must be immediately findable, readable and comprehendible. This is different from the technical challenge in that it’s inherent in mobile devices. Users will always interact with their devices in this manner, so it must be addressed, regardless of technology.¹

¹ - from D4M article on Mobile Typography
Mobile Typography Issues

Resolution
Simply put, the more pixels a screen can display the better the result. Most modern mobile devices have quite good resolution (dots per inch), even surpassing that of laptops and desktop monitors.

Serif vs. Sans Serif
For mobile type, sans serif is often the default choice as it works well enough for all uses, at all sizes. Serif faces are more readable for large blocks of type than sans serif faces, but tend to be more delicate and harder to render.

Bitmap vs. Rendered
Fonts are either raster-based (bitmaps) which are drawn exactly as designed, or they are vector-based (outlines) that are drawn in a resolution independent manner resulting in high quality display. Older mobile devices used bitmaps and the newer ones use outlines when possible. Night and day difference.

Weight and width
Note how weights affect readability, and spacing, which matters a lot on a small screen. Very often, other methods (color, shape, position, whitespace) is more suitable for emphasis than bold on small screens.

Kerning
On most mobiles, there is no kerning control other than setting an default for all type being rendered (versus bitmaps). Thus, fonts used for mobiles are designed with padding that is predetermined as a compromise. This is the most important aspect of mobile typography to be tackled in the future.

Leading
This is measured as the vertical distance between baselines (or any like-to-like line). Sufficient room must be provided for the ascenders and descenders to not collide with each other. Additional room must be provided to assure lines of type can be read, without forming inter-character counters in the space between lines. And for international use, we must account for accents.
Best (Mobile) Practices

Mobile typefaces should have:

- x-height between 65 and 80% of the cap height
- Strong counters (or “counter-forms”) – often, using squared-off shapes for small counters is a good idea
- Un-stressed forms – straight, even-width lines
- No excessive descenders – avoid exceeding 15 - 20% of the cap-height, to avoid excessive leading
- No ascenders above the cap height – critical for non-English languages

And additionally:

- Be space-efficient – generally this means narrow, to allow sufficient height for all users to read the characters
- Well kerned by default – letters should not run together, or have spaces that look like word breaks
- Have the same, or similar, width for all weights and styles (no penalty for using oblique/italics, or bold face for emphasis)
- Subtle serifs can be beneficial to some sorts of forms; consider them for a face, or for some characters of a face
- Include a true italic – a sloped roman assures that hardly any elements are vertical; a true italic can preserve legibility, following the rules above, while also being different enough to read as “other than body”
- Be part of a complete family. Serif and Sans can both be used (titles and body text have different needs), as well as many weights of each, if space is available on the device
How did we get here?

The font used in the first generation iPod.

THE BITMAP ERA

1993 2002
The Apple Newton burst onto the scene in the early 1990’s as the world’s first Personal Digital Assistant (PDA). Despite being a technical marvel in every way for its time, the brainchild of Steve Capps and his team was widely panned by critics and customers as not being competent at handwriting recognition - it’s only means of text input and touted strength.

Type Analysis - The system font needed to resemble a person’s handwriting so that it was a convincing part of the overall user experience. At that time, handwriting as input was innovative, so the font chosen needed to feel authentic and natural.

Breakthrough - Casual typeface as the default, and using “digital ink” to show pen input.

The Espy Sans custom bitmap font:

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890!@#$%^&*()
```
The second great mobile PDA to take America by storm was the Palm Pilot. Public interest was fueled by the ability to quickly take notes directly on the screen with a pen (like the Apple Newton) and have it accurately (unlike the Newton) converted to text characters. The trick was using a gestural shorthand called “Graffiti”, which used simple strokes to represent letters.

Type Analysis - The system font needed to be as readable as possible at small sizes on a non-backlit display. As a result, the font developed by Palm was quite legible, albeit a jaggy bitmap font.

Breakthrough - The use of the graffiti gesture system as primary input required visual inspection of the converted characters to ensure they were recognized properly. Type was center stage.

The Palm OS custom bitmap font used:

1996

Palm Pilot
Palm Corporation
San Jose, California USA

The quick brown fox jumps over the lazy dog.
At the time of its introduction, the Apple iPod was a novel way to replace one's Sony Walkman - but it remained a sleeper product until the iTunes online music service was launched to enable purchase of albums and singles directly via the Internet. The device's backlighting and pixelated monochrome LCD screen was not earth shattering by any means, but it was quite clear.

**Type Analysis** - When the first generation iPod was released, it re-used Apple's Chicago bitmap font from the original Macintosh OS of 1984. It was a solid system font and highly tuned for limited resolution displays. It was also a bit of an inside joke to use it again for a 1.0 product.

**Breakthrough** - It was critical to quickly scroll through long lists of songs and artists with the scrollwheel to select music - font choice helped.

The Chicago custom bitmap font by Susan Kare:
An example of Microsoft Cleartype font rendering

No ClearType (jaggy)  With ClearType (Smooth)

THE  COLOR  ERA

2003  2006
Perhaps the biggest leap forward in the early history of mobile devices and typography was the introduction of Windows Mobile software and Pocket PC devices which offered color screens and more importantly the ability to render fonts dynamically at various sizes rather than relying on fixed bitmap font solutions for all type.

Type Analysis - The Pocket PC device used an operating system based on Microsoft Windows, making the system font Tahoma a good choice.

Breakthrough - The Microsoft ClearType font technology used in these devices and Windows XP brought an unprecedented visual quality and readability increase. This approach of using on-board fonts dynamically rendered still stands.

The Tahoma TrueType font:

```
ABCDEFghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789 . , ! ? - _ : ;
```

2003
The award for producing the most addictive habit of the late 1990’s certainly goes to the famed Blackberry for making email accessible anywhere, any-time. Many executives couldn’t put theirs down. Which led to RIM’s break-throughs in formatting of email messages for mobile devices. The addition of a much higher resolution color screen was a no-brainer upgrade from the monochrome predecessor.

Type Analysis - Early versions of the Blackberry device used bitmap fonts such as BBCondensed, but as the devices moved to higher resolution color screens, rendered fonts were available.

Breakthrough - Allowing people to change the font that was used for creating and reading their countless email messages was a big deal for this set of type consumers. The built-in web browser capability has also raised the bar on the device.

The RIM BBSystem font:

The quick brown fox jumps over the lazy dog.
The Apple iPhone has single-handedly taken mobile typography to the next level of quality and fidelity.
Although it was panned initially as a true competitor to the Apple iPod, the Microsoft Zune mobile device was light years ahead on the typographic front. Its design center was completely based on large clear text as its user interface. A remarkable design shift for Microsoft, at least in the eyes of its critics. The Zune was also betting heavily on its use of animated type transitions.

**Type Analysis** - A major concern initially for the font choice of Zune was a desire to line up with larger brand initiatives at Microsoft around Vista and the new Segoe font family used in marketing.

**Breakthrough** - Perhaps just as astounding as the use of animated high quality type on the device itself, was Microsoft's use of a typographically driven software program on Windows to configure the Zune. It's visual appearance was stunning.

The **Segoe TrueType font**:

```
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
```
The inflection point where mobile typography truly became “elegant” will certainly be recorded as the introduction of the Apple iPhone. It single-handedly rewrote the rules and reset everyone’s expectations about what a phone or mobile device could be. Social communication and that “always connected” feel wanted great typography - iPhone delivered.

**Type Analysis** - Not only did Apple provide a complete suite of fonts from its OS X operating system, they are rendered using a “grayscale” technique that is very similar to Microsoft ClearType, which provides good legibility and readability.

**Breakthrough** - The ability to scale up any text on the screen on demand was breathtaking from a typography standpoint. Never before had type looked so good on a mobile device, let alone one that is disguised as phone.

The **Helvetica Neue** TrueType font:

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
```

2007

Typography of Mobile Devices
It's been predicted for decades that we'll eventually be able to read books, newspapers and magazines on lightweight electronic slates, eliminating the need to buy so many books and kill so many trees. Turns out that day may in fact be closer than we think. The Amazon.com Kindle has been a runaway success so far in great part due to the outstanding readability of its screen.

**Type Analysis** - Early versions of Kindle used a font called PMN Caecelia to display electronic books. That family has been expanded and the rendering refined in the second version.

**Breakthrough** - Not using a backlit screen seems a bit backward in this age of bright and light display technology, but in fact that decision is key to why people love reading on the Kindle 2. It's so much easier on the eyes to use a reflective screen.

The PMN Caecelia font:

```
ABCDEFGHJKLMNOPQRSTUVWXYZ
```

Spectators watch the spacecraft, Kepler Fla. Kepler, named a
astrophysicist, set off.
In Closing

“The state of mobile device typography is improving.”

- Mike Pell
Mobile Typography book author

Hopefully this quick tour through the exciting world of mobile typography issues and history has given you some sense of how quickly things are starting to evolve now that we’ve got some widely successful and loved mobile devices to drive the demand from great type designs.

Someday in the not too distant future it will be hard to remember a world where every website, newspaper, magazine and book didn't look gorgeous on any screen it's shown on, including the tiniest of handheld mobiles or largest of outdoor billboards.

And at the heart of it all will be type, and the rules to use it to help all of us with the most important of human pursuits - communicating.
Sources

Utilized works

Creating this book would not have been possible without the help of the following sources. All cited work is copyright its creator.

Interview with Simon Daniels and John D. Berry on 5/20/2009, Type Group, Microsoft Corporation  Redmond, WA USA

Various photographers who kindly published their work on Flickr.

Device manufacturers who have published photos of their mobile products: Apple, Microsoft, RIM, HTC, Amazon, Motorola

D4M website by Little Springs Design

Various articles on mobile typography from Wikipedia

About the Author

Mike Pell is a twenty five year veteran of the computer software industry, the last seven at Microsoft Corp. in Redmond, Washington.

An incurable early adopter of mobile technologies, the author owns almost all of the devices featured here.

About this book

The speed and freedom of information in today’s world is intoxicating. We find ourselves constantly checking in with friends, coworkers and the world at large every spare moment - whether on the train, in an elevator or walking to lunch.

Surprisingly, the real key to all of this is not the latest whizzy technology or sleek new device, but rather the most simple and basic communication tool we have as humans - text.

So it follows that the way we choose to display our text as typography on a mobile screen greatly affects how we stay connected with the things that matter most to us.

The focus of this book is to briefly discuss issues that face designers of the mobile screens we read and write with, and to look back at the brief history of this medium.