

# Mobility and Accessibility: The Rosetta Stone Approach to Genealogical Web Design

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## Introduction

The field of genealogy is not limited to a small group of individuals, nor to a specific country, language, or region. It reaches out to every human who has ever lived or who will ever live on this earth.

Genealogy reaches deep, far, and wide. Unfortunately, the same cannot be said about genealogical software.

Two of History's great leaders, Ptolemy V and Darius I understood the power of, and need for communication. Those remnants we have from their reigns, respectively dated 196 BC and 515 BC, speak to a broad base of individuals and give insight into these leaders' methods for communication. Ptolemy's "Rosetta Stone," or decree on taxes and temple statues was recorded thrice on a single slab of stone and in three different languages. Darius I, King of Persia, recorded in the cliffs near Behistun a history of his reign and rise to power, also recorded in three languages, Old Persian, Elamite, and Babylonian.

While Darius provided a tamper-resistant environment for his message for preservation and noticeability, he also limited access and readability to his time-persistent message by placing it high on the side of a cliff. Likewise, genealogical websites often provide limited access and readability for users well versed in the language of that website, or those accessing the website with limited technological resources. Ptolemy's communication, on the other hand, served its immediate purpose by communicating his instructions to Egyptians and Greeks, but served an even greater purpose by later unlocking these languages to future generations, almost 2000 years later. Following Ptolemy's example of the Rosetta stone, genealogical web applications can unlock an entirely new market demographic, and communicate the importance of the message of genealogy in more than one way. This may be accomplished through creating an arena in which genealogical data is easily accessible for disabled individuals while at the same time simplifying mobile access to online genealogy applications. Provided in the following pages is a conceptual model for achieving both objectives intended to magnify the developer's reach while providing a minimal impact to the developer's schedule.

## The Responsibility of Leaders in the Genealogical Industry

Leaders in the genealogical community, like Ptolemy V and Darius I, have the responsibility of communicating to more than one group of individuals; however, the group that is most often targeted is what may be termed, technology's social elitists. The social elitists of technology may be described as those with the resources, means, and capability of using technology. A learning curve may be required to reach the point of efficiency in using a genealogical web client, but if well designed and tested, the

learning curve is often minimal for these users. Both Darius and Ptolemy understood the importance of communicating their message, and wanted to make sure that the message would reach all those it impacted, rather than the single largest group of individuals that happened to speak the most common language. They both attempted to reach a majority of individuals by providing more than one version of the message.

While many developers may see value in reaching out to those requiring assistive technologies, this concept does not provide the motivation to spend the necessary time and effort needed to solve the problem. Instead, a billboard approach is much more favorable: create a tool that is as desirable as possible to the largest number of individuals. After all, the real strength in building online genealogical clients lies in the majority of numbers, and splitting hairs over a small segment of users does not seem to be a highly marketable approach. Most developers are eagerly seeking that golden egg of a user: The one nobody can seem to engage in genealogy, simply because of its long-time tainted image of being difficult and boring.

The objective is to change that image with the right product; to create something different and easy enough that those much needed numbers will flood in, eager to engage in genealogical research, or at least to use the genealogical product that has managed to spark the interest of the golden egg user. Unfortunately, in an attempt to reach that user, many have overreached, and passed up the golden opportunity to both engage the target user and at the same time meet the needs of the disabled users in the community.

## **Mobile Access to Genealogical Data**

Every day in the United States, over 115,068 mobile phones are sold, with an estimated growth at 100% per year.<sup>1</sup> Many individuals throughout the world see mobile phones as a means for mobile banking, commerce, Internet access, conducting business, and regular communication in lieu of landlines, mail, and face-to-face business interactions that often require the expense of travel. Many of these mobile devices are being marketed with some type of Internet accessibility package; however, not all of these Internet-ready devices have the functionality of top of the line smart phones like the iPhone. They may be limited on the types of files they can access, and the types of drivers they are capable of downloading, either due to space limitations or the cost of upgrading their mobile technology needed to better handle the drivers. In 2008, 6,892,000 iPhones, and over 20 million Windows Mobile Devices were sold.<sup>2</sup>

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<sup>1</sup> <http://www.strategyanalytics.com/default.aspx?mod=PressReleaseViewer&a0=4114>

<sup>2</sup> <http://www.apple.com/pr/library/2008/10/21results.HTML> Apple Reports Fourth Quarter Results

Number of Mobile Phone Subscriptions per 100 inhabitants, 2002<sup>3</sup> 4 and 2007<sup>5</sup>

Country	2002	2007	Country	2002	2007
United States	48.8	83.5	Malaysia	34.8	87.9
Canada	37.7	57.6	South Africa	30.2	87.1
Brazil	19.5	63.1	United Kingdom	84.5	118.5
Chile	40.9	83.9	Germany	71.7	117.6
Uruguay	15.1	90	Poland	36.3	108.7
Singapore	79.4	126.7	Russia	12.1	119.3
Solomon Islands	.2	1.3	Montenegro	33.9	107.3
Australia	63.9	102.5	Egypt	6.4	39.8
Qatar	38.9	150.4	Congo (Brazzaville)	6.06	35.4
Afghanistan	NR*	17.2	Kenya	3.7	30.5
India	1.2	20	<u>Composite: Asia</u>	NR	36.8
Bangladesh	.8	21.7	<u>Continental: Oceania</u>	NR	78.2
China	16.1	41.2	<u>Continental: Americas</u>	NR	71.6
Japan	63.7	78.6	<u>Continental: Europe</u>	NR	110.1
Burma	.09	0.4	<u>Continental: Africa</u>	NR	27.5
Somalia	<.03	6.9	<u>World-Wide:</u>	<b>26.3</b>	<b>49.3</b>

\*No record

As shown in the tables above, the number of mobile phone users between 2002 and 2007 has grown significantly in all of the sample countries listed in the tables, as well as throughout the world, almost doubling the number of users in only five years. Worldwide mobile phone users continued to increase in 2008. Based on a report from July 2008, of those mobile phone subscribers, 15.6% in the United States were actively using mobile Internet on their mobile devices, with the UK close behind at 12.9%, and Italy came in third place at 11.9%.<sup>6</sup> The anticipated number of mobile Internet users is expected to continue to rise.

World mobile phone usage is expected to increase to 80% in 2013.<sup>7</sup> The National and International reach for marketing and product use is becoming more and more mobile. In 2006, mobile Internet access in major countries ranged from 10-40% of mobile phone users, and a recent survey reported in October 2008 stated that, "over 50 percent of consumers would [choose to] substitute their Internet usage on a

<sup>3</sup> NationMaster Media Statistics Bar Graph. International Telecommunication Union.  
<[http://www.nationmaster.com/graph/med\\_mob\\_pho-media-mobile-phones](http://www.nationmaster.com/graph/med_mob_pho-media-mobile-phones)>.

<sup>4</sup> [http://www.nationmaster.com/graph/med\\_mob\\_pho\\_sub\\_percap-mobile-phone-subscribers-per-capita&date=2002](http://www.nationmaster.com/graph/med_mob_pho_sub_percap-mobile-phone-subscribers-per-capita&date=2002)

<sup>5</sup> <http://www.intomobile.com/2008/07/03/juniper-research-mobile-web-users-to-top-17-billion-by-2013.HTML>

<sup>6</sup> <http://www.nielsenmobile.com/documents/CriticalMass.pdf>

<sup>7</sup> <<http://www-03.ibm.com/press/us/en/pressrelease/25737.wss>>.

PC for a mobile device.”<sup>8</sup> Finally, 86 percent of all mobile phones in Korea are WIPI\*-enabled, giving users some level of Internet access.<sup>9</sup> As of mid-2008, 95 million mobile phone subscribers in the United States were paying for mobile Internet access, with 40 million of those users regularly accessing the Internet from their mobile device.<sup>10</sup>

An entirely new generation of devices is being developed to access the Internet. These are in addition to smart phones and PDAs. Mobile Internet Devices, or MIDs, allow users to access the Internet without the need to work through a mobile phone company. Using a variety of applications on these devices, including iCall, Skype, and Gorilla Mobile, VoIP could satisfy the need for mobile phone Internet services by using WIFI instead.<sup>11</sup>

With these additional devices comes an entirely new opportunity for genealogical web clients, especially those that can be viewed with a wide variety of web browsers, and those applications that can be accessed without the need to download special drivers or customized players. There is a constant need to engage a younger demographic, and mobile accessibility may be the answer, however, the sites and online clients must be easy to access and use from a mobile device, without taking an inconsiderate amount of time to load the data for these applications.

Many online genealogical applications are either difficult or impossible to access using mobile Internet due to the drivers required to view or run the application, the page arrangement, or the amount of time it takes to load each pedigree or webpage. While mobile Internet users are eager to try new applications and websites with their mobile devices, whether or not it is their only method to access the Internet, few will attempt to access it again using their mobile device if it didn't work the first time, but may choose to abandon the mobile access out of frustration in favor of computer access, or will opt to choose an alternative site or application. In addition to the inability to load genealogical web clients using mobile devices, web applications often contain help windows, additional screens, and cumbersome text that make it difficult for mobile device users to quickly and efficiently navigate genealogical data.

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<sup>8</sup> <<http://www-03.ibm.com/press/us/en/pressrelease/25737.wss>>.

<sup>9</sup> <<http://www.cellular-news.com/story/35190.php>>.

\*WIPI (wireless Internet platform for interoperability)

<sup>10</sup> <<http://www.moconews.net/entry/419-us-takes-top-nod-for-mobile-internet-usage-report>>. Out of 254 million mobile subscribers in the US, 95 million paid for mobile Internet, while 40 million of those regularly used those services at least once a month. Based on statistics taken from Q1 and Q2 in 2008. The total increase of mobile Internet users increased 28% from Q1 2007 to Q1 2008, with a 73% increase of unique users from May 2006 to May 2008. The User Profile for Mobile Internet users was 10.8% for users over the age of 55, 37% for users age 35-54, 39.2% for users age 18-34, and only 12.7% for users under the age of 18.

<<http://www.nielsenmobile.com/documents/CriticalMass.pdf>>.

<sup>11</sup> <<http://gigaom.com/2008/08/26/thanks-to-smartphones-mobile-voip-growing-steadily/>>.

## Disabling the Disabled

In a recent World Telecommunication and Information Society report, secretary-general of the World Telecommunication Union, Hamadoun Touré, is quoted as addressing a concern that impacts ten percent of the world's population: "The key to the information society is universal access. Everyone must have equal opportunity to participate in the digital age. And no one should be denied the potential benefits of new information and communication technologies, not least because they are hampered by their disabilities."<sup>12</sup>

Age, disability, and the challenges of cognitive friction with users is always a present concern that often falls easier into the category of de-prioritization rather than addressing the issues surrounding the users who fall into these categories. Not only does accessibility limit the creativity and visual potential of a web client, but it is often frequently misunderstood. Tools already exist that give disabled users access to most websites, and desktop and online clients, but this requires some careful considerations in the initial planning, design, and developmental stages of web applications. Some user interfaces may be retro-fitted to allow this type of access; however, newer technologies may prevent this type of afterthought.

The World Telecommunication report identified three areas that should be addressed in the development of web clients that may assist in providing accessibility to disabled users: "accessible design, which assures issues are addressed from the start of the development process; availability, to ensure those who need them can get access to technologies; and affordability."<sup>13</sup>

While mobile web standards already exist that provide alternate views, these standards are becoming quickly outdated.<sup>14</sup> HTML, on the other hand, continues to be a consistent method in which mobile devices can read websites. Also, mobile web standards do not accommodate for the deficiencies that exist in online genealogical applications. Current genealogical applications interact with accessibility tools on a variety of levels. For example, those applications using an HTML user interface may be read by a screen reader to allow visually impaired users to "see" the web page or application through aural rendering. Unfortunately, however, those using aural rendering cannot see, without the assistance of a helper, the layout of various pedigree configurations on different genealogical software or web applications. Because most pedigrees are not designed to make it simple for blind or visually impaired individuals to read or navigate through a pedigree, this limits them from using current accessibility tools already available on a computer to "view" pedigree information.

HTML layout may be set up using tables to visually render a pedigree. Screen readers interact with the priority in which these tables are set up. Tables can be set up to read top-to-bottom, or left-to-right, and do not need to match the visual layout on the screen. Tables that are designed to be read top-to-bottom

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<sup>12</sup> May 2008 [www.guardianweekly.co.uk/images/supplements/10.pdf](http://www.guardianweekly.co.uk/images/supplements/10.pdf)

<sup>13</sup> May 2008 [www.guardianweekly.co.uk/images/supplements/10.pdf](http://www.guardianweekly.co.uk/images/supplements/10.pdf)

<sup>14</sup> [http://en.wikipedia.org/wiki/File:Mobile\\_Web\\_Standards\\_Evolution\\_Vector.svg](http://en.wikipedia.org/wiki/File:Mobile_Web_Standards_Evolution_Vector.svg)  
[http://en.wikipedia.org/wiki/Wireless\\_Markup\\_Language](http://en.wikipedia.org/wiki/Wireless_Markup_Language)

return aural “garbage” to the user trying to use a screen reader. The rendering reads the paternal fourth generation, jumps to the paternal third generation, to the primary individual, to the paternal fourth generation spouse, and so on, with no logical order in the information returned to the user.

Additionally, visual models often contain help windows, additional screens, and text for visual cues. When this information is not carefully ordered in the layout of an online application, these can become stumbling blocks to the visually challenged user, not dissimilar to placing bricks in the path of the blind. Because the user does not want to miss any important cues or information on the page, that user must listen to every word of text that appears on the page rather than easily skipping to the information he or she wishes to “read.”

Problems with various online genealogical applications may be resolved with proprietary accessibility tools built into a client, however, this, too, creates a challenge for developers who have to invest enormous amounts of time and resources into building an accessibility tool, and afterward are required to update and support the tool each time the program changes. The necessary tools for accessibility already exist, and are often freely available on computers as part of the operating system, as long as a web client has taken into consideration the need for logically ordering data on the page.

Some user interfaces are much more limiting than HTML, however, as with Flash UIs. A Flash user interface does not allow the user to interact with the data on the page simply by the nature of the product. Flash essentially offers a user interface not dissimilar to watching an interactive video. Words shown in video form cannot be read by a screen reader without additional provisions.

Flash does contain the ability to turn on an HTML wrap during the initial stages of development, however, if these steps are not taken in the initial stages of development for a new product or client, it cannot be retro-fitted to allow for accessibility. Also, even when accessibility features are activated initially in the Flash UI, the accessibility is still limited. Disabled individuals without the use of sight or limb may find it difficult to access the full featured-set of the Flash UI because there are still features and content that will not be completely compatible with the HTML wrap.

Screen readers, though capable of interacting with style sheets, do not often do so depending on how the style sheets were set up. Because of this fact, screen readers often interact with the DOM or Document Object Model. T.V. Raman, Research Scientist for Google, and former employee of Adobe, has worked hard to make technology accessible for the blind. Raman recently discussed the quirk nature of screen readers in an e-mail to the author:

“Screenreaders are funny beasts -- they mostly use document order --- not by design, but mostly because they don’t implement CSS. Speech style sheets allow you to specify aural properties of the voice, but Windows Screenreaders don’t implement any of it -- it's implemented in my open source Emacspeak <http://emacspeak.sf.net> -- and partly in fire-Vox).”<sup>15</sup>

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<sup>15</sup> Message sent to Anne Roach by: T.V Raman [mailto:raman@google.com] Sent: Tuesday, January 13, 2009 11:59 AM, Subject: Speech Style Sheets

Two known screen readers do interact with the Flash UI, but again, on a limited basis. These screen readers are JAWS, available for \$1095, and IBM Home Page Reader available for \$170.<sup>16</sup> While the second of these is a much more reasonable option, requiring users to own a special screen reader costing close to \$200 does not appear to be a very user-friendly proposition.

Why should disabled individuals have access to genealogical software? First, the majority of individuals who are engaged in genealogical research are over the age of 55 and visual impairment is a natural consequence of age. Visual limitations should not prevent the expertise of genealogists in a high age bracket from learning, contributing, and sharing knowledge with others. Despite age limitations, all are susceptible to visual and physical impairment whether age-based, health-based, or through accidental vision or motor-skills loss. Second, no one should be excluded from the opportunity to learn about or share information about ancestors based on disability or physical limitations.

## **Lessons from Ptolemy V: The Rosetta Stone Model to Genealogical Web Design**

Because of the variety of browsers, web applications, operating systems, and pre-existing accessibility tools, it is illogical to create a new text-to-speech or screen-reader program, whether collaboratively or individually. This would limit the ability to provide updated information rapidly, and would require upkeep and support of such a tool. It is likewise illogical to design all web clients to allow mobile users to quickly and efficiently view online data. This would limit the usability for those using full web browsers, and would significantly impact the technologically elite market, or those with the ability and technology to access a full-featured website. What, then, is the solution to giving access to both mobile Internet users and disabled users? The answer rests with Ptolemy V.

Just as Ptolemy understood the importance of providing the same information in more than one language or form, there is great importance in doing the same for those users who are limited in access, whether through technology, disability, or simple lack of knowledge. Simplicity is the key to providing genealogical information to these groups, and offering it in a language they can read. Some may argue that it is absurd to write a second UI, however, when considering the loss of 10% of the general market through disabled users, and roughly 15% of the mobile Internet market, the proposal does not seem so out of the question. With a genealogical web client already built, the time required to build a simple HTML-based UI without the glitz and flair of the primary client is rather minimal, considering the possible return and value proposition of doing so.

### **“Read” and “Write” in the Simple Client**

In the simple client concept model, the “read” function is combined with the “navigate” function, so that the aural rendering allows the user to quickly navigate to the ancestor he or she wishes to access prior to making a decision about the action that will be taken regarding that ancestor. Once the ancestor

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<sup>16</sup> <http://www.webaim.org/techniques/flash/>

is located, the user may, at any time, switch to the “write” function to edit the current information, search for additional information, and extend the line by adding newly found information. This also combines the “write” function with the “search” function by switching from the “read/navigate” mode to the “write/search” mode. The default mode for the user arriving on the page would be the “read/navigate” mode. Hotkeys would allow the users to quickly switch between the two modes (for those with impairments) or non-aural options would be available for mobile users and those navigating the web client without the use of limbs.

## Rapid Navigation Elements

In order to keep the information usable in a simplified user interface, the information must be organized to allow the user to quickly and easily navigate through the information using headings. HTML headings are one of the means that disabled users employ to rapidly move through a page via aural rendering. This would also allow those who are illiterate or unable to type information to access the site through voice commands using an accessibility tool. Visual numbering systems allow users to jump to a specified location on the page through voice commands, and also allow a mobile user to quickly flip through the data. Visually appealing elements such as help boxes would be considered page clutter for this UI and would be unnecessary to keep navigation quick and simple. The genealogical information must be organized in a linear pattern rather than in tables, to allow mobile users to quickly load the data and navigate the information they are searching for. For example, a simplified model may look like:

```
<h1> Primary individual
  <h2>Name
  <h2> Vital information
    <h3> Birth
      <h4>Date
      <h4>Place
      <h4>Sources/Citations
    <h3> Marriage
    <h3> Death
  <h2>Additional Events
<h1>Spouse of Primary
<h1>Children of Primary
<h1> Father of Primary
<h1> Mother of Primary
<h1>Stepfather of Primary
<h1>Search by Name
  <h2>First name and Surname
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<h2>Surname only

<h2>Jones

<h2>Smith

<h1>Search by Date

<h1>Search by Location

To keep navigation simple, users could access a list of hotkeys through a separate link, to quickly jump between headings, or mobile users could likewise use letters of the alphabet on their device to indicate actions they choose to take regarding an ancestor or family member, such as viewing children or parents, or in the “write” mode, editing a birth date or place, adding a source, or new relationship.

### **API and HTML Considerations**

For those entities with shared APIs, whether the data is returned in HTML or XML, some underlying data structure exists to link individual conclusions together. The API could include an option for returning a simplified HTML output, or could include an option for a slightly restructured XML structure that would favor a linear UI.

Also, additional text could be added to HTML files to provide clarification to the user through aural rendering to help the user keep track of the exact coordinates within the tree. For example, offering a relationship term in relation to the primary individual on the pedigree. Whether this option is implemented or not, the final simplified client will not be a huge consumption of time or resources because the backend of the program, in most cases, has already been established. The data simply needs to be offered in a simplified UI to allow maximum access to the data without placing limitations on the primary client.

### **Complications of Writing and Searching**

As with the primary client, the simplified client must offer an aural rendering of the relationships that will be impacted by each decision to link information. For example, when a user searches for, locates, and chooses to attach an individual to the family tree, the aural rendering would ask, “By linking this person to your tree, this will connect these children, spouse, parents, correct? The user would then need to verify this linkage a second time. This would help the user avoid the need to back-track and undo incorrect family links.

## **Audiences for this Model**

### **The Dynamic Developer**

By offering a dual platform, or a simplified linear user interface model in addition of the primary user interface, the dynamic developer is no longer limited in development possibilities. Flash, 3-Dimensional Family Trees, and other visual stimuli become an outstanding way to fully engage those users who are

both technologically ready, but wanting a more full and rich product to store their genealogical data and family media. By making a linear user interface, developers do not alienate those with limited bandwidth, outdated technology, disabled users, or mobile Internet access while providing a superior product for the technologically advanced or capable user.

### **The Disabled User**

As mentioned earlier, 10% of the world suffers from some type of disability. This model allows users to navigate through and contribute to the pedigree using aural rendering. With a simplified UI, those with literacy concerns or the inability to use limbs can still access the website using voice commands. This type of user interface becomes, in many instances, the ONLY method for which certain disabled individuals will be capable of participating in genealogy web clients.

### **The Mobile Internet User**

Given the increasing number of mobile Internet users, this platform will be more and more in demand, especially for those clients designed as a global product. The very nature of genealogy is international, and globalizing a product is a simple task when the back end is already complete. Clients who have not already taken advantage of this marketing opportunity certainly ought to consider this as a future platform for genealogical web clients.

### **The Genealogist who dares to venture past the home doorstep:**

While creating a linear and simplified tree creates an open door for those who are challenged with disabilities, this model also invites an entirely new generation of users to become involved in an online genealogical community. Users who normally would not look at family history information may take advantage of the ease of mobile access to view their ancestral data. Likewise, those genealogical researchers who normally require a laptop to view their pedigree may not have access to WiFi in an archive, but they will likely have cell phone reception. As a professional genealogist, it is critical to have access to one's family tree when doing onsite research. This may mean traveling to a cemetery for a day, or taking several days to visit an ancestral locality. As the research progresses, it is often necessary to change directions, and work on a different family line. This can be challenging if the researcher has only brought with him or her information on one or two families. Without full access to one's pedigree, research trips may result in less success, and additional obstacles. By giving users perpetual access to their online Family Tree, the user base is broadened, resulting in increased confidence with the online client. Mobility will allow them to add basic information to their family tree as they find it, and they can add sources and other details instantly. Upon returning home, their ancestral pedigree will be up to date and, if desired, temple ordinance work may be done immediately without the delay of adding the newly researched information.

## Summary: Missing the Mark(et)?

When developing a website for genealogical purposes, the general rule of thumb is to provide a tool that is visually appealing and usable. Unfortunately, this can limit those whose only access to the Internet through the following methods:

- Uses a mobile device to access the Internet
- Uses a slower connection to access the Internet
- Uses accessibility tools (ie, screen readers) to access the Internet
- Uses audio commands to access the Internet
  - Includes mobility limitations and illiteracy

Complex user interfaces that require special drivers may render mobile-Internet users helpless from accessing a website. Likewise, complex web clients designed without consideration for the entire audience of users will prevent reaching all critical individuals to building a genealogical community. T.V. Raman, Research Scientist for Google, and former employee of Adobe, has worked hard to make technology accessible for the blind.

By following the Rosetta stone model of offering more than one UIs to users, the genealogical web client developer and designer opens a door to an entirely new market of users. By reaching out to users who need access to genealogical web clients, they are given 24/7 access to their genealogical information, and the opportunity to collaborate, network, and share information on a much broader level. Web clients that provide an alternative, simplified user interface open the door for providing access to those who currently have none, and also provide the opportunity for mobile device users to have greater and more frequent access to genealogical data.