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Google Glass for The Educator: A Postmortem Separating the Reality from the Hype and Some Thoughts for Google

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Google Glass

Photo by Janet Rogers (University of Missouri–Kansas City)

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FOR THE Educator:

A Postmortem Separating the Reality From the Hype and Some Thoughts for Google

By Michael J. Robak and Ayyoub Ajmi

THE GLASS IS DEAD, LONG LIVE THE GLASS! On Jan. 15, 2015, *The Wall Street Journal* reported Google was "winding down the explorers program … [and will stop selling Glass] (except to companies and developers)."[1] Google is moving the project to another Google unit to continue exploration and development of the product, but its precise future is currently unclear.

This is not a particular surprise given that, since about September 2014, a spate of articles and blog posts were written, most of which declared Google Glass dead.[2] Much of this obituary writing was based on an article by Reuters that found a number of Glass application developers ceased production.[3]

This article was being developed before Google pulled the plug. But we believe our library's experience with Glass yielded some positive results and provided some insight into where the product was lacking. It was clear to us after extensive use that Glass was a potentially wonderful device but, at the moment, it won't solve any specific need that can't be fixed using other more affordable and less intrusive mobile devices.

We hope Google continues with the product but pays heed to some of the concerns we discovered while using it.

Some History

In April 2012, Google announced the development of Project Glass. Project Glass was Google's effort to create a "wearable" computing device that can project information in real time directly to a user's field of vision. Later that year, Google's co-founder and Glass champion, Sergey Brin, introduced Glass to the world in a demonstration at the 2012 Google I/O via a Google Hangout, which included a bunch of guys wearing the Glass parachuting from a zeppelin.[4]

Glass then became available for purchase for selected users during the #if ihadglass, Google+ and Twitter contest that ended Feb. 27, 2013. Later, it was available by invitation only and then again during a one-day sale on April 15, 2014.

Glass prompted mixed reactions and ignited controversy, even before it hit the market. While many of the reactions stemmed from privacy and security concerns, in this paper, we—as academic librarians who advocate for educational technology—look at the device in terms of functional and operational use in an academic environment during an 8-month period. Through this pilot use of Glass, we demonstrate certain limitations that, if corrected, will make the device far more useful to the education market.

One Library's Experience

On April 15, 2014, the Leon E. Bloch Law Library of the University of Missouri–Kansas City's School of Law decided to participate in the Glass project. Before joining the program, we outlined some innovative uses for the device in an academic environment. A few of the innovative applications we brainstormed included using the device to make first-person perspective video tours, interview employers and alumni for archival preservation, and invite potential students to a live virtual tour of the school.

Although these projects could have been accomplished with other mobile devices, we believed using a hands-free, wearable device could make the experience richer and more immersive. However, after several months of use, we can identify the device's serious hardware and software flaws, making it less than ideal in an educational environment in its current state of development.

Glass can only connect to **Wi-Fi spots that do not require a password** or single security key to access the network.

Some Google Glass Fault Lines

Many of the current Glass Explorers are educators or provide services to educators. But few of the many ideas they proposed for using the cutting-edge device to supplement and support education have seen the light of day.

One promotional video that Google released is a clip in which it invited Andrew Vanden Heuvel, an independent contractor and a former physics teacher, to chat with a group of students live from the Large Hadron Collider of CERN (the European Organization for Nuclear Research) using Glass.[5] The video is very inspiring and demonstrates how virtual field trips can help students learn about subjects and visit places where they otherwise couldn't afford to go. The first-person perspective added by Glass makes the videos even more interesting and personal. However, the video call feature was dropped from Glass during a firmware update (XE16 release) despite it being one—if not the only—application that makes sense from an educator's perspective. Even if the video chat feature is reinstated, it still won't be suitable for any meaningful educational use with the device's current state due to other connectivity issues.

And here is the first major problem: Glass is a connected device, and most of its applications—also known as "glassware"—rely on the internet to function. A connection can be established by pairing the device to a smartphone or by setting up a Wi-Fi network using the Glass app available for Android and iOS systems. However, this may incur additional charges related to cell phone data plans in order to use the device and this could be no small additional burden (i.e., cost).

Using a Wi-Fi connection when available is a much more reliable and cost-effective option; however, Glass can only connect to Wi-Fi spots that do not require a password or single security key to access the network. That means users cannot connect the device to the internet in places such as airports, hotels, and, most importantly, schools, which require a WPA-Enterprise protocol (basically, a username and password).

A potential workaround for the video calls and Wi-Fi limitations would be to use third-party applications. However, the process—also known as "sideloading"[6]—requires installing applications not officially supported by Google at the user's risk of voiding his warranty. In addition, it is not easy for unsophisticated users to "hack" Glass through the Android Developer Kit.[7]

Another issue: By default, Glass records 10 seconds of video. After extending the duration, users can record up to 45 minutes of video in a single charge. However, recording videos generates a significant amount of heat applied directly to the skin, making the task very unpleasant. According to a case study of Glass' power and thermal characteristics published by Rice University, when using applications that require a lot of processing power (such as video and GPS), the heat generated by the device can easily reach 50 degrees Celsius.[8] According to the report, it is mainly due to the need to house all the electronic components in the small area between the battery and the camera. In addition, the small size of the battery

limits the usage time. The study demonstrates the power consumption and battery life of Glass in different usage scenarios, such as keeping the device idle, which can last up to 95 hours, and recording up to 43 minutes of videos in a single full charge.

fixed position while walking. This results in a video that looks like it came from a bobblehead doll.) In order to make a final product for use, we had to enhance the video in postproduction (with other software) to stabilize the image and improve the brightness and contrast.[9]

However, at this point, we also think it is **time to 'hack' our device** to see if we can't **help Google reinvent the product**.

The quality of the video captured by Glass is also questionable. Glass records videos with a 720p resolution that looks great in optimal conditions. However, the quality takes a hit when used in low lighting or when facing the light. Another issue we encountered while recording our tour was the audio quality. The microphone is designed to primarily capture the user of Glass—anything else serves more as ambiance. Therefore, trying to interview someone using Google Glass is difficult, if not impossible, depending on the nature of the location.

What We Did With Glass

During our 8 months of testing Glass, we learned a lot about the device. Not being able to connect Glass to an enterprise network left us with fewer features for experimenting. Despite this limitation, we were able to develop some significant use cases. As one of our earliest use cases, we decided to make a virtual tour for our library using the first-person perspective that Glass provides. We were able to create a walkthrough video tour of the library using Glass.

Due to the limitations previously mentioned, the video was done in multiple attempts, and the final result fell far short of our expectations, with a process that, at best, can only be described as clunky. (One problem, for example, is the difficulty in keeping your head in a

In another use case, we invited a student to use Glass during his practice interview. In normal situations, students will either use their own devices or check out a camera from the library to record their interviews. In this case, the student used Glass to make a video of a role-playing exercise. The final product was satisfactory for both the student and the instructor. The student mentioned that the hands-free capability allowed him to focus more on the content and the interaction with his interlocutor rather than being distracted by the technology. This is a good example of when staying stationary and having control of the room's lighting yielded a good result.

We also attempted to use Glass to quickly share pictures and updates to engage our online audience during law school social events. Because we could not connect the device to the school's network, we decided to stick to our laptops and other connected mobile devices instead of using our personal data plans at a high additional cost.

Our Future

Despite this and Google's announcement, we have not given up. We are still demonstrating the device to faculty members and students in order to generate other ideas for using it.

Ultimately, while the device is suited to accomplish many tasks, we are primarily focused on ideas for the hands-free video and audio feature because of the absence of any applications that seriously improve the teaching and learning experience without making Glass a distraction. However, at this point, we also think it is time to "hack" our device to see if we can't help Google reinvent the product.

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Endnotes

1. gizmodo.com/google-packs-up-glass-explorer-program-vows-to-try-aga-1679734877

2. For example, see gizmodo.com/is-google-glass-dead-1659023012 and technologyreview.com/featuredstory/532691/google-glass-is-dead-long-live-smart-glasses

3. reuters.com/article/2014/11/14/us-google-glass-insight-idUSKCN0IY18E20141114

4. techcrunch.com/2012/06/27/sergey-brin-demos-google-glass-at-io

5. *Explorer Story: Andrew Vanden Heuvel [through Google Glass]*, youtu.be/yRrdeFh5-io

6. "Voiding Your Warranty: Hacking Your Glass," developers.google.com/events/io/sessions/332704837

7. See the video in the third endnote.

8. "Draining our Glass: An Energy and Heat Characterization of Google Glass," www.ruf.rice.edu/~mobile/publications/likamwa2014glass.pdf

9. Library Video Tour, youtu.be/ON9wgHca9aE