

Chapter 29

Wearable Technologies in Academic Information Search

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ABSTRACT

Wearable technologies and appliances are making inroads into a variety of consumer and commercial applications, including leisure and entertainment, health care, and gaming. A natural evolution of the technology is in academe where faculty and students have begun exploring the possibilities of the technology in a variety of settings, most visibly in libraries where the process of seeking information using such devices holds significant promise. This chapter provides an inventory of the state of wearable technology, its challenges, its possibilities, and how it might be used in academe, including a study regarding the ability to access common library indexes using two wearable appliances: Google Glass and a smart watch.

...wearable technology is not limited to just the wrist. There's a whole lot more. The whole sensor field is going to explode. It's a little all over the place right now. With the arc of time, it will become clearer.
 - Tim Cook, Apple CEO

INTRODUCTION

As wearable technologies become more commonplace in society, the capabilities of the devices is likely to improve. While generally limited to basic utility, including checking email, calendaring, messaging, checking weather conditions, etc., the functionality of these devices is expected to drastically improve in the near future. Already we've seen the potential of wearable technology with the now ill-fated introduction of Google Glass Explorer which was introduced without a clear market segmentation – a hallmark of many Google product launches. However, it's within reason to expect these devices to have many of the same capabilities and characteristics as Glass and other mobile technologies – including built in video, access to search engines, etc. Wearable technologies will also become more discreet. The form

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factor will likely be smaller and less obtrusive than glasses and headgear when worn – sometimes directly embedded into jewelry, clothing, and other fashion. The use of these discreet devices will range from recreation to fitness to travel to health care. Some health screening prototypes are being developed that take the form of pills and other investigable components. Other systems will be permanently implanted chips that provide real-time sensory feedback no matter the environmental context. Still others are being developed that can be used in conjunction with mass transit systems.

This chapter explores the current state of wearable technologies, where it's being used, and how academia might be able to leverage the technology in the context of information search – a common activity conducted by both students and faculty. An analysis of common library search engines is provided in the context of using wearable technology. It's safe to say that the technology is not yet mature enough to be used effectively in most common information search processes. The indexes themselves have not yet built out their infrastructure to support these types of devices – likely because there isn't yet a critical user mass. However, there is considerable promise. Whereas current search processes are relatively two dimensional in nature, future wearable devices will likely provide information search to be conducted in a third dimension using embedded RFDI sensors within the library that provide the researcher related resources, author biographical information, and even media that supports the query.

BACKGROUND

Wearable technologies are broadly defined as unobtrusive, miniaturized sensors attached directly to the body or garments. These sensors can even be embedded directly into the fabric of garments (Bonato, 2005). In recent years wearable technologies have become part of the larger ontology called *The Internet of Things* (IoT) which is broadly defined as a world of connected devices, objects, vehicles, machines, consumer durables, clothing, and other components all hooked to a network (Kranenburg, Anzelmo, Caprio & Dodson, 2011).

Increasingly, more people are acquiring and using wearable technologies and appliances; however exact adoption metrics remain elusive given its relatively recent introduction into the consumer market. In fact, EDUCAUSE (2013) still considers wearable technology “experimental”. Perhaps the best evidence regarding adoption metrics are provided by Mary Meeker from Columbia University who provides a macro snapshot of growth rates as of 2013 (Figure 1). Cisco, Inc. forecasts there will be more than 50 billion such devices connected to the Internet in just five years (Evans, 2011). ABI Research has indicated the wearable computing device market will grow to an astounding 485 million annual device shipments by 2018 (OPC, 2014). Forbes magazine projects by 2017 the revenue from these devices will exceed \$20B (Sabhlok, 2013) making this a very lucrative growth market.

As wearable devices become more commonplace within the framework of the *Internet of Things*, their use in a variety of academic disciplines will likely begin to challenge traditional instructional technologies and methods of research. In particular, ready access to information - a hallmark of academe - will likely be influenced, if not fundamentally shaped using these types of devices and appliances. This shift may also influence libraries and other traditional curators of information. The ability to instantly gain access to information based on geo-positioning, voice-activated commands, body/Radio Frequency Data Identifier (RFDI) sensors, tactile input, gestures, heads-up displays, and other discretely transportable input/output sensors allow users to access a variety of academic resources in locations never before considered.

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