Spargaliyev, D. (2014) Paper presented at the Bristol Ideas in Mobile Learning 2014 symposium, Bristol.

Wearable learning: How Google Glass is changing education

Wearable computers have become very popular among consumers last year. The emergence of new types of devices (including bracelets, watches, clothing and glasses) can significantly change our society, consumer markets and education. The demand is constantly growing and the global spread of such devices is expected to increase in the near future.

One of the most anticipated and popular wearable computer is Google Glass. This device displays information in a smartphone-like hands-free format that can interact with the Internet via natural language voice commands (Wikipedia, 2013). Google Glass is still in a development stage and is not available to customer market. The Glass Explorer program was available for developers to test this wearable computer since February 2013. Today 10,000 people were selected as part of a contest to test the early version of the device (Wikipedia, 2013).

Google Glass has the potential to bring new possibilities to educators and students. Probably, Google Glass is a new educational tool that allows using actions, such as “Search”, "Take a picture", "Record a video", “Translate” and other for integrating into teaching and learning activities.

Successful implementation of new technology (in this case wearable technology) in education depends on many circumstances. We need to understand how Google Glass can change teaching and learning. The following questions should be asked:

- How to use Google Glass for teaching and learning?
- Which of subjects are appropriate for Google Glass?
- Are educators and learners ready to use Google Glass?

Currently we have a limited number of quantitative and qualitative researches on the use of Google Glass in teaching and learning. However, in our work, we tried to consider the various aspects and problems of using Google in different areas related to education.

Some researchers are studying new cultural aspects related with emergence of Google Glass. Pace (2013) provides a preliminary analysis of how users are creating the cultural platform that will determine the success of Google Glass. Users are shaping the meaning of this product through two contrasting ideas: that Google Glass will empower users or that it will detach them from reality.

Meanwhile, Gates (2013) argues that Google Glass designed to literally integrate bodies more seamlessly with devices and more thoroughly into network infrastructures. The appearance of new Google Glass applications can help consumers to integrate real and virtual worlds. For example, Campbell (2013) describes game application that brings crowdsourcing to Google Glass and has real-world tasks.

Norman (2013) points out that Google Glass is deliberately designed to be inconspicuous and nondistracting. When technologies are used to supplement our activities, when the additional information being provided is of direct relevance, our attention can become more highly focused and our understanding and retention enhanced.

Also, there are several different opinions about technological limitations Google Glass. Current edition of Google Glass is not supporting augmented reality (simply overlays information about the scene before the user) and helps users pay attention to the real world as opposed to retreating from it (Furlan, 2013a; Starner, 2013a). Google Glass user needs only a short adaptation period to become fully comfortable using device, then streams of information fade into the background as conscious attention is replaced with mostly automatic behavior (Furlan, 2013b). On the other hand, positioning a micro display outside a person’s natural field of view could lead to eyestrain and visual

confusion (Ackerman, 2013). As we can see from the examples, wearable technology still needs improvement, particularly regarding health.

Although our work is devoted to the study how Google Glass could improve education, but wearable technology is actively used in medicine. Google Glass has good prospects in pharmacology and healthcare (Fox & Felkey, 2013). Several medical institutions consider Google Glass as the most convenient device for coordinating and delivering information to doctors in real time (Wiltz, 2013a). Google Glass can predict glucose levels in the food diabetics eat and help paralytics (Marks, 2013).

Developers offer special applications that greatly facilitate the work of physicians. Some of medical wearable apps have facial recognition features, but Google do not allow using such apps without having strong privacy protections. Though face recognition is fastest, most efficient way to bring up data and allows doctors and nurses to search patient records by taking a picture of the patient's face (Wiltz, 2013b). Wearable technology allows also recognize colors and patterns on clothes as a human fingerprint for discriminating one individual from another (Wang *et al.*, 2013). It seems that the privacy issues expect changes with growth of wearable computers' popularity in the near future (Hong, 2013).

One of the first projects of using Google Glass in education was STEMbite (www.youtube.com/STEMbite). This YouTube channel with a series of bite size videos have been set up to show the math and science of everyday life. It is the shift in perspective, from watching a lecturing teacher, to seeing as if through the eyes of a teacher that allows for new teaching and learning experiences (Buchem & Pérez-Sanagustín, 2013).

There are several examples of the successful use of Google Glass in medical education. Many physicians are excited about how Google Glass could revolutionize graduate medical education. Google Glass allows medical students watch different medical procedures in real time. Wearable computer could be helpful educational tool because it allows residents to view their bedside manner from the patient’s perspective (Glauser, 2013).

Vallurupalli *et al.* (2013) carried out a study of using wearable technology for enhancing medical education. The authors used Google Glass to explore different scenarios in cardiovascular practice. A mock trainee was wearing Google glass that enacted to each scenario. Live video stream from Google Glass was transmitted via wireless connection to smartphones of each fellow who participated in experiment. It allowed improving education and patient outcomes in cardiology fellowship program.

We still can hardly determine whether teachers and students are ready to use Google Glass in the classroom. But we can assume that wearable technology significantly changes the situation in educational practice. It will be important to determine the recommendations for revision of curriculum, assessment to new skills and extending educational opportunities by using wearable technology in the near future.

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