Wearables in Learning

The brave new frontier
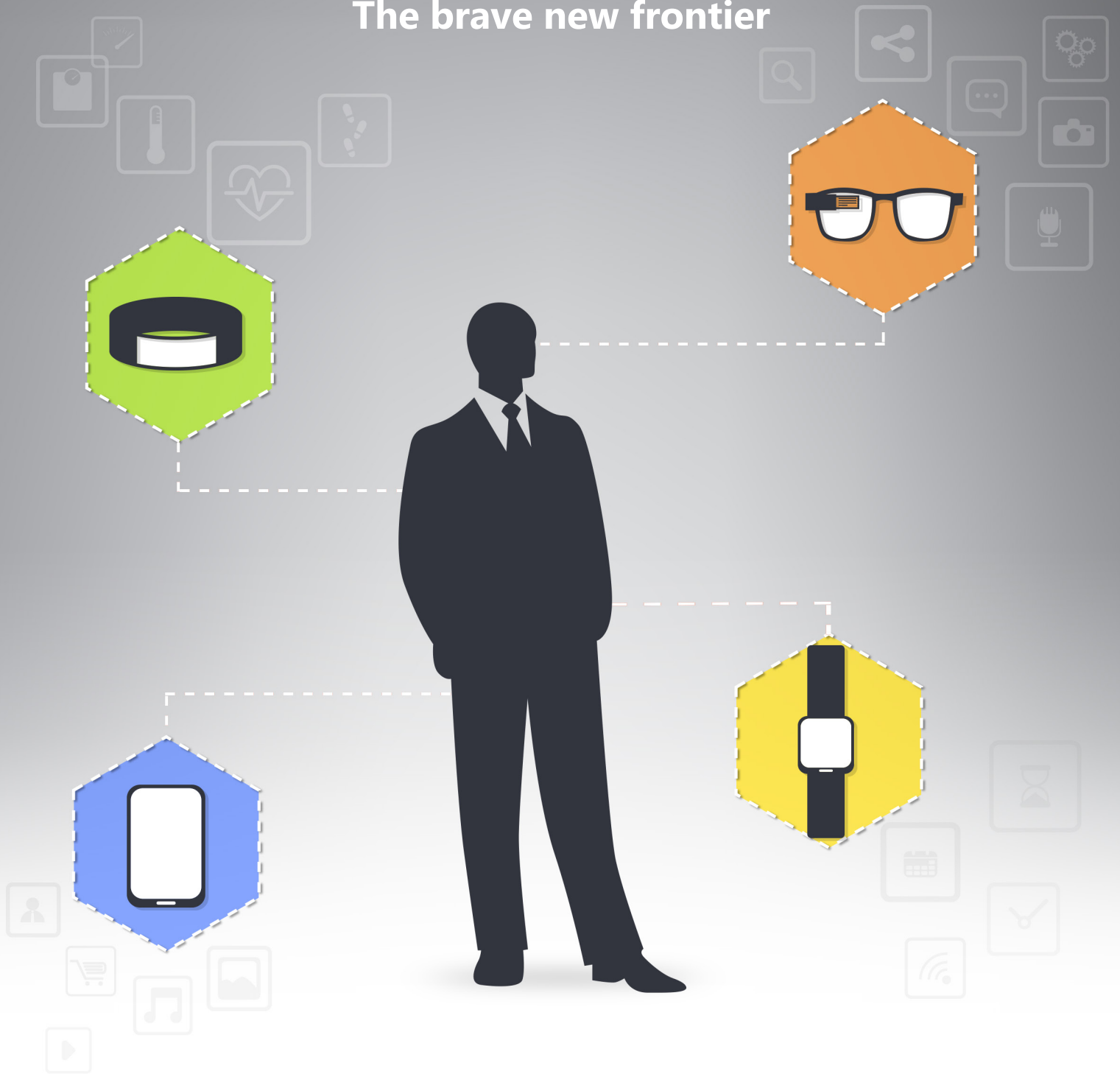
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Wearables in Learning

Executive Summary

In the current wearable era, Inspector Gadget - the famous cyborg with bionic gadgets built into his body would blend right in. Wearable has over the past few years moved from a bleeding tech buzzword to an accepted device and has become part of the mainstream. To better understand this whitepaper on wearable technology, we will first need to understand what a wearable truly means and to some extent its journey till now.

The distinction between computers and devices (automated doors, automated thermostats, smartphone-enabled locks, et al) is fast blurring. This has led to the development of wearable technology. We can now harness the power of ubiquitous computing and wearable technology to assist humans in doing tasks seamlessly and with supplementary knowledge and abilities.

What is a wearable?

Wearable technology, wearable devices, tech togs, or fashion electronics are clothing and accessories that incorporate computer and advanced electronic technologies. Wearables often incorporate practical functions and features, but may also have a purely critical or aesthetic agenda. Wearable technology evolved from the world of Ubiquitous computing when research made the proliferation of computers everywhere. Ubiquitous Computing led to the idea of wearable computers which has led to this era of wearable tech.

Inspector Gadget who was seen as an anomaly in the early 1980s (Part Bionic, Part Human) would have uttered his favorite phrase "Wowser" if he were to see some of the wearable technologies of today. The wearable of today has evolved when compared to its predecessors and the main area where evolution has occurred is consistency. There is a constant interaction between the computer and user, i.e. there is no need to turn the device on or off. This truly makes it a key milestone in the journey of ubiquitous computing. Another feature is the ability to multi-task. It is not necessary to stop what you are doing to use the device; it is augmented into all other actions. These devices can be incorporated by the user to act like a prosthetic. It can therefore be an extension of the user's mind and/or body. Inspector Gadget would have fit right in today's world.

Wearable, as specified in the earlier paragraph, is in multiple areas. Hence, to further understand wearable technology, we need to comprehend the broad categories of wearable technology that exist today.

Categories of Wearables

WEARABLES

Personal Assist
- Voice Device (Siri, Nuance)
- Finger Motion (Ring, Fin)
- Eye Track
- Google Glass

Sousveillance
- Undersight
- Life Logging (Memoto)
- Activity Logging (GoPro)
- Inverse Surveillance

eTextiles
- Children Health (Intel Mimo)
- Fabric Music (XY Interaction)
- Operable Clothes (Soft Switching)

Virtual & Gaming
- Immersive VR (Oculus, Xcope)
- Aids (Smart Cane, Exoskeleton, Smart Spoon)
- Motion Sensors (Stem Clips)
- Glasses (Training)
- Cyborg (Samsung, Gameface)

Security & Payment Gateways
- Cardiac Rhythm (Nymi)
- Home Security (ADT Pulse, NFC Ring)
- Personal Safety (Cuff)
- Bio Metric (iOS, Paypal)

Health & Fitness
- Health (Bio Sensors, Heart Rate)
- Body Vitals (HA Device)
- Fitness (FitBit, Notch, Spree)
- Control (Blood Sugar)

Wearables fall under several categories, and each of them cater to various aspects of life:

- **Sousveillance**: This is in the area of surveillance, personal life logging and social surveillance
- **Security & Payment Gateways**: Adoption of other forms of signature like Cardiac Rhythm and Biometric over traditional signature for access and payments
- **Personal Assist**: Devices that help and engage humans with computer interaction
- **eTextiles**: Fabric, threads and apparel that provide a symbiotic connection between humans and machines
- **Virtual & Gaming**: A fast growing area that truly takes the human learning experience to a new level with immersive learning and a heightened interplay of humans with an engaging and far richer virtual reality

Wearables that enable a new way of learning

Since the topic of this whitepaper is 'Wearables in learning' we will need to further understand some of the wearables that can be leveraged for learning and development. The categories that can help in learning and development include:

1. Personal Assist – Devices that help and engage human with computer interaction
2. Virtual & Gaming – A fast growing area that truly takes the human learning experience to a new level with immersive learning and a heightened interplay of humans with an engaging and far richer virtual reality

The development of Google Glass, Apple's rumored iWatch and the acquisition of virtual reality headset Oculus Rift by Facebook are the opening shots in the battle for a wearable tech future. These devices represent the industry's best guess in terms of the devices that will be used in the near future. Internet giants as well as device manufacturers expect the mobile handset market to mature and are jostling for a position in wearable technology, as this is the next big thing to be in. Whether these guesses are right or not, they are an indicator of where a post-mobile future could be heading.

Wearable technology with all these changes is leading its way into every facet of life. And, education is one of the areas where wearables is making a great headway.

For a moment, picture your school's chemistry laboratory; you would recall the distinct odour of various chemicals. It was also impossible to ascertain whether the fumes from mixing of chemicals were dangerous. However,

in the current wearable era, it is quite easy to have sensors embedded in smart jewelry to detect fumes and tell possible exit scenarios to the wearer. Thus, wearables are getting better at many things in the realm of education and learning.

Wearable technology could also extend the mobility of learning. For instance, it could connect learners to each other as well as those facilitating this learning. This could serve as another collaborative learning tool that can be integrated into the learning process at many levels. With the anticipated release of several immersive wearable devices to the general public over the next few years, we will probably see quite a bit of experimentation as well as several discussions about the benefits and challenges that wearable technology might bring about. In fact, there are several groups, forums and discussion wikis proliferating on the Internet, clearly indicating a growing need for information and acceptability of wearables in the education world as well.

Devices like Google Glass can significantly improve how students interact with video tutorials and follow instructor demonstrations. As their hands are free, they can interact with the software twithout having to disengage from one screen in order to access another. The ability of voice control would also allow a student to say 'Stop', implement an instruction, and then say 'Continue' in order to move to the next step. This would be a much smoother process and one that could be applied to distance learning model as well as a traditional classroom setting. The idea of hands-free exploration of an immersive world will only truly be appreciated once we begin utilizing the technology.

Some of the areas in learning and education that wearables can play a strong part in are listed below:

- Instructional Videos (Repairs, Maintenance, Service) of Automobiles
- Architecture Walk-throughs (Modelling and creation of virtual worlds)
- Virtual Campus Visits (See your prospective campus right from home)
- Walk through of a business process (KYC, Policy Selling)
- VR World (A Day in the life simulations)
- Gamification – VR Immersive Serious Games
- First Person Videos (For collective experiences)
- Virtual Learning Environment
- Augmented Reality for Field Trips
- Multi-Player Game Simulations – using Face recognition
- Research apps for training modules
- 3D Design for 3D Printing
- Anxiety & Phobia treatment

Concerns & Issues of Wearables becoming integral to learning

The first concern with wearable becoming integral to learning and a "bionic" appendage to the human is privacy. Wearable technology could easily become an extremely useful tool supporting learning at many levels but will undoubtedly create many challenges, including the privacy concerns that are already receiving abundant attention. The other thing that raises concerns in the education/learning space for wearables is of the "casualness" of the learning. Trainers and professors will be entering a new classroom where every student has a camera aimed at them and nothing is sacrosanct and private anymore. Learning organizations will also have to grapple with the new world of WYOD (Wear your own device) that takes BYOD to a whole new level and the lines between personal and public domain will start to blur further.

Another concern will be the erosion of a traditional classroom set-up (instructor-led training) where the professor or facilitator held the stage. Statements like "put away your device" will hold no stead as the device will be used to learn. Instructor roles will get muddled and the casual approach to learning will proliferate. Whether it really enables greater learning or hampers learning will be known in the days to come.

Conclusions of wearable in learning

Technology is transforming education at lightning speed. Mobile devices had ushered in a BYOD (bring your own device) culture in many schools and workplaces. These technologies are now commonplace and used to enhance the teachers' teaching experience and the students' learning experience. But even essential devices like smartphones and tablets may only be flashes in the pan when we look at the new wave of wearables and how it will impact and change the way we learn. Much like Inspector Gadget, we won't be hiding the next essential technologies in our pockets or our purses.

Wearable technology is the new wave that educators are exploring in terms of their usage in the classroom. From tracking students' progress to providing a new way for learners to interact with data, environment, and one another, wearable technologies have many practical applications in education and training. These uses span all educational environments, from elementary school classrooms to operating theatres and even facilitator-led training courses in the corporate realm. As wearables proliferate, mutate, grow and become commonplace, the current disadvantages of devices being expensive, heavy, lower battery life, discomfort and security will start subsiding and a new regulation will come into effect in order to make this technology commonplace.