Undergraduate Thesis Prospectus

Human-Powered Technology
(technical research project in Mechanical Engineering)

Technology in the Workplace: A Balance of Power
(STS research project)

By

Tierra Peerman

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technical project collaborators:
Erika Davis
Andrew Farruggio
Emma Grossman
Adam Hershaft
Sam Varrieue

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

signed: _____Tierra Peerman_____ date: __12/13/2019_____

approved: _____Peter Norton_____ date: __12/6/2019_____
Peter Norton, Department of Engineering and Society

approved: _____Mike Momot_____ date: __12/3/2019_____
Mike Momot, Department of Mechanical Engineering

General Research Problem

How is technology being integrated into everyday life?

At their best, technological advances can improve efficiency and simplify processes, including major enterprises and personal tasks (Kruse 2013). Devices have become smaller, more portable, and more user friendly, making them more desirable (Smith 2019).

Human-Powered Technology

How can human motion recharge batteries?

The capstone project is advised by Professor Mike Momot of the Dept. of Mechanical Engineering. My team will design a device that uses electromagnetic induction to generate power for a motor. The magnet and coil capsule will be connected to a battery amplifier and a lithium poly ion battery that is inside a pocket of a sleeve that slips onto the wearer's forearm. As the person walks or runs, the magnet will move between coils, charging the battery. The design must be small in weight and size; our budget is $400 per semester. The end goal is to have a prototype of a portable, human powered charger designed in hopes to provide battery power access for those with active schedules while not disturbing the comfort of the user nor recycling and sustainability progress within industry.

Technology in the Workplace: A Balance of Power

How are employers and employees competing to shape the workplace norms governing personal device use?

Portable, personal technology has transformed office jobs. With Bring Your Own Device (BYOD) programs, companies can reduce costs and employees can use devices they are familiar with. But such practices introduce complications. How do companies properly enforce device use guidelines when it is difficult to tell when employees are using their devices for work or for personal reasons?

Many employers, especially those over 40 and those earning higher incomes, see phone use at work as symptoms of slowing production (Washington 2013). Roger Lipson, the founder of accounting organization the Lipson Group Inc, says "executives [find] smartphone or tablet use in meetings is one of the most frequent comments in the 'behaviors to stop' category" (Kruse 2013). James Brown, chief executive of Brown, Parker, DeMarinis Advertising, banned phones during meetings when his employees were distracted at his presentation. Brown found that when the new rule went into effect, he, like many employers, faced resistance (Simmons 2018).

Compliance can be hard to achieve. Before BYOD can succeed, rules must be ready for it (Top 10, 2019). Companies must also take steps to protect sensitive data.

Many employees resist workplace device rules. Many employees are accustomed to spending most of their waking hours interacting with screens (Osusch 2019). Millennials are three times more likely than those over the age of 40 to consider checking their devices in formal and informal settings as acceptable, while most older professionals see phone use as "signifying disrespect, inattention, indifference, and impotence" (Kruse 2013). Some employees see uninterrupted access to their phones as a practical necessity (BYOD 2015). With phones they can work in and out of the office as they choose, keeping in touch with clients and family from the same device.

The World Health Organization warns that personal devices and technology, especially video games, can be addictive (Dodgen 2019). U.S. addiction expert Nicholas Kardaras asserts that screen addiction is harder to treat than heroin addiction, in part because screens, unlike heroin, are “so ubiquitous in our society that people inevitably have to interact with them on some level” (Ferranti 2016). Interacting with them can trigger the brain to release dopamine and alters mood inducing addictive behavior (Smith 2019),.

Tech companies encourage employees to use their devices to simplify tasks. Apple claims it makes its products accessible by “bringing the best user experience to its customers through its innovative hardware, software, and services” (Apple 2019). However, accessibility can produce addiction (Smith 2019). Companies have responded to technology dependence. Google has built-in system software that shows how much time they are spending on their devices and how the time is spent (Simmons 2018).

Consultants can help employees and employers meet in the middle. Human resource departments help connect employers and employees to each other. They recommend ways to enforce policies and to ensure they are both reasonable and effective (Prochepan 2018). There are also experts in leading successfully that offer their experiences and resources to those trying out certain programs (Simmons). The resources can also extend to those for addictions. There are ways to improve the dependence of technology in one's work and personal use (Kruse).

The surge to be on top continues to be the goal in organizations, encouraging individuals to be more productive. Employers and employees compete to have one’s goal prioritized over the other.

References

Apple Inc. “Supplier Responsibility.” *Apple*, 2019

“Bring Your Own Device (BYOD): What It Is and Why It Matters.” *R & G Technologies*, 2015

Dodgen-Magee, Doreen. “Tech Addiction Is Real. We Psychologists Need to Take It Seriously.” *The Washington Post*, WP Company, 18 Mar. 2019

Ferranti, Seth. “How Screen Addiction Is Damaging Kids’ Brains.” *Vice*, Vice Media, 6 Aug. 2016

Kruse, Kevin. “Why Successful People Never Bring Smartphones Into Meetings.” *Forbes*, Forbes Magazine

Osuch Michale, and Turner, Steven. “Addiction to Modern Technology: What the Science Says.” *Elsevier Connect*, 2017,

Pochepan, Jeff. “Employees Working On Their Personal Devices? How You Can Protect Your Business Data.” *Inc.com*, Inc, 27 Apr. 2018

Simons, John. “'I Lost It': The Boss Who Banned Phones, and What Came Next.” *The Wall Street Journal*, Dow Jones & Company, 16 May 2018

Smith, Melinda, et al. “Smartphone Addiction.” *HelpGuide.org*, HelpGuide International, 8 Oct. 2019

“The Top 10 Mistakes Employees Make with Their Personal Devices for Work.” *Movius*, 19 Mar. 2019

Washington, Melvin C., et al. “Perceptions of Civility for Mobile Phone Use in Formal and Informal Meetings - Melvin C. Washington, Ephraim A. Okoro, Peter W. Cardon, 2014.” *SAGE Journals*, Association for Business Communication 2013