**Medella: Healthy Habits Through an Online Platform**
(Technical Paper)

**Biometrics and Data Privacy: an Analysis of Policies**
(STS Paper)

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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

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## Introduction

Currently, health is in a dire state in the United States. In a study done by the Center for Disease Control, it was found that only 22.9% of adults in the United States met the federal guidelines for both aerobic and muscle-strengthening activities between the years 2010 and 2015 (Blackwell & Clarke, 2018). It is estimated that health problems related to obesity cost the US between $3.38 billion and $6.38 billion each year through non-medical, indirect factors ("Adult Obesity Causes & Consequences | Overweight & Obesity | CDC," 2019). 30.9% of adults in the country were classified as obese and 11.2% had some type of heart disease in 2018 (*Age-adjusted percentages (with standard errors) of selected circulatory diseases among adults aged 18 and over, by selected characteristics: United States, 2018*, 2018).

To address this issue, I am working with a Charlottesville-based startup, Medella, to develop a technical solution. Medella is an online platform to encourage users to adopt healthy habits and educate them about various wellness-related topics (Gamble, 2019). By providing educational newsletters, videos, and quizzes, Medella aims to encourage users to think about and carry out healthy habits in their daily lives. Medella also tracks user information such as quiz scores, numbers of clicks, and aggregated health insurance data. Companies that use this service will view and analyze their employees' aggregated insurance data to create a program that is tailored to each corporation's key health care cost areas.

When working with such sensitive health information, it is important to ensure that user data is secure and private. In doing so, users can be assured that their data is not being collected without their knowledge or misused. This must also be kept in mind when considering information collection of a similar vein: biometric data, or the measure of a person's physical characteristics to verify their identity (Porter, n.d.).

By using Hughes' theory of technological momentum to explain the development of biometric data privacy laws, we investigate the role of privacy in America and how policies concerning that topic were developed over time. When analyzing both the social and technical aspects of this issue, we gain a better understanding of a technical solution to health issues in the United States in the form of an online corporate wellness application as well as a greater understanding of the development of biometric data policies over time.

**Technical Topic (Capstone)**

We are helping Medella design a corporate wellness platform to help improve companies' employees' health. The goal is to provide educational content to employees and statistics to employers to indicate overall health in the company. A successful product will help employees control their health while giving businesses feedback on their overall health.
One existing workplace health product is a mobile-first platform called Limeade ONE. Limeade uses a gamified approach involving assessments and rewards (Limeade). While Limeade provides many services, these are complicated and result in a steep learning curve. It can take time to learn to navigate the various features (Desai & S, 2019). Furthermore, using Limeade requires knowledge of its file-sharing system, Sharepoint, which adds more complexity (Desai & S, 2019).

Our product will serve as a platform that employees, employers, and the Medella team interact with. Employee health will be tracked to provide personalized resources. The platform will include quizzes with questions like: "How many cups of water should you drink in a day?" Employers will see aggregated employee data to learn how Medella has impacted the company's

overall healthcare costs. Medella employees will be able to use the application to create content. There will be forms within the application to create quizzes, upload videos and write newsletters.

Gathering system requirements is vital to the development process because it ensures the client and developers have the same expectations for the finished product. Below is a list of our system requirements.

Minimum Requirements

- Businesses, employees, and the Medella team should be able to securely login.
- Businesses should be able to view aggregate health data points of company employees.
- The Medella team should be able to create quizzes and blog posts.
- Employees should be able to click on quiz links, view questions, submit answers, and receive a score after submission.
- The Medella team should be able to view aggregate and individual results for each quiz
- Businesses should be able to view aggregated results for each quiz.
- The Medella team should be able to input YouTube links into a form to display them in users' content feeds.
- Employees should be able to watch videos through the platform.
- The Medella team should be able to send emails to employees to inform them of relevant content.
- Employees should be able to opt out of receiving all information from Medella.
- Users should be able to view a page with a mission statement and contact information when going to the webpage without a log-in.

Sample of Desired and Stretch Requirements

- The Medella team should be able to use a newsletter builder form to add text, images, and links to health-related topics to newsletters, as well as publish the newsletters to employees.
- Employees should be able to view previous quiz submissions.
- The Medella team should be able to track clicks by users and businesses on the website in order to monitor user engagement.
- The Medella team and businesses should be able to see a graph depicting how Medella has impacted healthcare costs.
- Employees should be able to opt out of receiving only one type of content (quizzes, blogs, videos, etc.)
- The Medella team should be able to limit content to specific users.
- Businesses should be able to view the dashboard data broken down by department.

**STS Topic**

In recent years, smartphones and laptops have been improving and innovating at a rapid pace, adding features and hardware to improve the user experience. One such technological advancement that has become commonplace in these devices is biometrics, or a way to measure a person's physical characteristics to verify their identity (Porter, n.d.). Electronic devices can authenticate users by recognizing facial features, reading fingerprints, or even scanning irises. Nowadays, the use of biometrics has only become more mainstream. For example, users can unlock their newest iPhones using Face ID ("About Face ID advanced technology—Apple Support," n.d.) and log into their PC laptops using Windows Hello ("Biometric Facial Recognition – Windows Hello—Microsoft," n.d.).

Since these methods of user authentication are growing in popularity, it is important to investigate the policies that regulate the collection and use of biometric data. Although biometrics provides an innovative way to authenticate to devices, it also has the potential to expose sensitive biological data if it is not well-regulated and properly secured. Information privacy has become an increasingly important topic in the past years. Events such as the Facebook data scandal revealed that users' personally identifiable information was being harvested, putting people's online privacy in jeopardy (Fuller, 2019). Privacy protection is especially important with biometric data due to the growing popularity and identifiability of this information.

Currently, in the USA, there is a lack of comprehensive federal policy concerning businesses' collection and use of biometric data privacy (Stewart, 2019). Although states such as Illinois, Texas, and Washington have laws about the regulation of biometric information, not every state has implemented such policies. Even states that have implemented policies lack consistency in their approach to the issue (Stewart, 2019). Due to this inconsistency of regulations, it is clear that laws concerning biometric data in the United States need to be improved. By investigating how and why these policies came about, we may better understand the current state of privacy protection of this information. In addition, we are able to investigate the faults of these policies and suggest better alternatives so that user privacy is preserved.

Thomas Hughes' theory of technological momentum provides a science, technology, and society (STS) framework to analyze the development of such policies in the United States. Technological momentum describes the way that technology and society shape each other over time, stating that "social development shapes and is shaped by technology" (Thomas Hughes, 1994). Critics of this framework argue that this STS theory does not consider the fact that

"technology does not acquire such momentum by itself, but rather that interested actors, as institutional entrepreneurs, must launch the technology toward this end" (Wang & Swanson, 2008). Nonetheless, technological momentum provides a good framework to describe the development of technology and society over time.

Through the lens of technological momentum, we gain an understanding of how society and technology interact with each other in the context of biometric data privacy. We also understand how this technology was socially constructed in the beginning stages but evolved over time to become more technologically determined.

The main deliverable for this STS project will be a written research paper. Research about biometric data policies will be finished by the middle of the spring 2020 semester, and the thesis will be written by the end of the spring 2020 semester.

**Research Questions and Methods**

For my thesis, I plan to answer the STS research question: How did current laws regarding biometric data regulation in the United States come about? To answer this question, I will conduct policy analysis on current and past regulations regarding the collection and use of biometric data in the United States. I will also analyze the effectiveness of such policies in protecting the privacy of biometric data. In order to achieve this, I will investigate background information such as when and why such policies were enacted. The information about policies will be gathered from legal databases, and the social context behind these laws will be extracted from articles released around the same time that these policies were created. For example, I will use the Patel vs. Facebook, Inc. court case to outline the inconsistency of state laws regarding biometric data collection ("Patel v. Facebook, Inc., No. 18-15982 (9th Cir. 2019)," n.d.). I will

also review the specific laws in question, such as the Biometric Information Privacy Act of Illinois (Insler, 2019). Policy analysis is the best suited method to answer this STS question since I am researching formal laws that are put into place in the United States.

**Conclusion**

In this paper, I outline a technical solution to health issues in the United States: a piece of software that allows users to view health-related educational content and take quizzes about such topics. By using this online platform, users will become more mindful of healthy habits in their everyday lives.

The technical portion of the paper deals with data collection of sensitive information. Because of this, it is important to consider data privacy. I will also explore the implications of user data collection and how policies concerning the regulation of such information developed over time through Thomas Hughes' STS theory of technological momentum. This analysis, which will be delivered in the form of a research paper, will help us better understand how both technology and society have shaped these regulations into what they are today.

The results of the technical report will provide users with a platform that will encourage healthy habits in their daily lives, while the findings from the STS paper will allow us to consider the collection of sensitive data and the formation of policies that ensure that such information is kept private and free from misuse.

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