

## The Advancement of Smart Cushion Product and System Design Enhancing Public Health and Well-Being at Workplace

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**Abstract :** According to the National Institute of Health, living a sedentary lifestyle leads to a number of health issues, including increased risk of cardiovascular dis-ease, type 2 diabetes, obesity, and certain types of cancers. This project brings together experts in multiple disciplines to bring product design, sensor design, algorithms, and health intervention studies to develop a product and system that helps reduce the amount of time sitting at the workplace. This paper illustrates ongoing improvements to prototypes the research team developed in initial research; including working prototypes with a software application, which were developed and demonstrated for users. Additional modifications were made to improve functionality, aesthetics, and ease of use, which will be discussed in this paper. Extending on the foundations created in the initial phase, our approach sought to further improve the product by conducting additional human factor research, studying deficiencies in competitive products, testing various materials/forms, developing working prototypes, and obtaining feedback from additional potential users. The solution consisted of an aesthetically pleasing seat cover cushion that easily attaches to common office chairs found in most workplaces, ensuring a wide variety of people can use the product. The product discreetly contains sensors that track when the user sits on their chair, sending information to a phone app that triggers reminders for users to stand up and move around after sitting for a set amount of time. This paper also presents the analyzed typical office aesthetics and selected materials, colors, and forms that complimented the working environment. Comfort and ease of use remained a high priority as the design team sought to provide a product and system that integrated into the workplace. As the research team continues to test, improve, and implement this solution for the sedentary workplace, the team seeks to create a viable product that acts as an impetus for a more active workday and lifestyle, further decreasing the proliferation of chronic disease and health issues for sedentary working people. This paper illustrates in detail the processes of engineering, product design, methodology, and testing results.

**Keywords :** anti-sedentary work behavior, new product development, sensor design, health intervention studies

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