Rochester Institute of Technology

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5-2-2022

Intelligent Relaxation System for Information Anxiety

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Intelligent Relaxation System for Information Anxiety

By

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A Thesis submitted
in Partial Fulfillment of the Requirements
for the Degree of
Master of Fine Arts in Industrial Design

School of Design
College of Art and Design
Rochester Institute of Technology
Rochester, NY
May 2, 2022

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Abstract

The development of information technology has brought a lot of convenience to people's lives and changed the way we work. There are many people who use cell phones and computers every day, which has caused many health problems, and information anxiety is one of them. This paper discusses a project that proposed to help with the problem of information anxiety among workers and investigates the root causes of information anxiety among IT workers. After user testing and design, this project gives a potential design solution that uses sensory feedback. In addition, this paper gives some insights into the negative effects and future trends of technology products.

Keywords: mental health; information anxiety; well-being at work; occupational diseases; TCM acupuncture points; immersive experience

Introduction

One of the challenges facing a healthy human is the work lifestyle changes. Excessive work stress and rapid work pace have led to an increase in disease rates and there is a growing trend toward younger age groups manifesting problems from stress. In the past decade, computers have replaced traditional work products such as typewriters as the primary work device, and prolonged use of computers is associated with a few health problems that are more problematic than first thought.

IT workers need to use computers for long hours every day, they are prone to problems such as eyeglass fatigue and dry skin, which are relatively short-term symptoms. Some chronic diseases and even mental illnesses can have a huge impact on their healthy lives and are difficult to treat. For example, because of the long-term use of the mouse keyboard caused by tenosynovitis, lack of exercise, staying up late leading to obesity, and a discussion on information anxiety.

This paper describes my design process to address information anxiety in the IT workforce, taking into account both physical and psychological causes. A phased solution is then given, followed by a reflection and appeal on the link between technology, health and design responsibility.

Information Anxiety

The word "information" has been an ambiguous term used with abandon to define a variety of concepts. *The Oxford English Dictionary* describes the word's roots as the Latin *informare*, meaning the action of forming matter, such as stone, wood, leather, etc. It appears to have entered English in the sixteenth century with its present spelling and usage. The most common definition is: "the action of informing; the formation or shaping of an idea or character, training, instruction, teaching; the communication of instructive knowledge" (Ibid. 37.).

Information anxiety proliferates with the vagueness of the word "information. This mantra in our culture has been overused to the point of meaninglessness, just as a word can lose its meaning when repeated. The word information has been stripped from noun information, and the form or

structure has disappeared from verb information. Many of the things we think of as information are just data or meaningless content.

In their landmark treatise in 1949, *The Mathematical Theory of Communication,* authors Claude Shannon and Warren Weaver define information as that which *reduces uncertainty.*

As the world economy moves toward an information-dependent economy, the difference between data and information becomes even more critical. Information drives the field of education, the media, consulting and service companies, the postal service, lawyers, accountants, writers, certain government employees, and those who work in data communication and storage. Many countries already have a large portion of their workforce in information processing-based occupations. The shift to an information-based society has been so rapid that we have not yet recognized its impact.

Understanding of information overload lags production of useful solutions. "The channel, storage, and retrieval capacities of electronic hardware are rapidly growing, such as in the field of laser optics or microcomputers," said Orrin Klapp (1987) in *Overload and Boredom: Essays on the Quality of Life in the Information Society.* "… There hasn't been a corresponding gain in human capacity. Better information processing can speed the flow of data but is of little help in reading the printout, deciding what to do about it, or finding higher meaning. Meaning requires time-consuming thought, and the pace of modern life works against affording us the time to think" (Mansfield, U.1987).

Richard Saul Wurman identifies a special ailment of this age of communications so-called "information anxiety," caused, in his view, by an overwhelming flood of data, much of it from computers and much of it unintelligible. My thesis project is used to alleviate the information anxiety of office workers through sensory experiences meant to relax and soothe. Functionally, this product should provide users with physical and mental relaxation in terms of hand massage, visual and auditory sensations, and eliminate the negative effects of work in a timely manner.

Problem Statement

Information technology workers increasingly show varying degrees of information anxiety symptoms from workplace stress. How can I design a quick and fun interaction product or system that helps IT workers lessen their information anxiety?

Project Overview

As a case study, I chose to do a project that can help users to release anxiety in a short period of time. Considering the user's working environment and usage scenario, I need to consider the size, privacy, length of use and other factors in addition to the function.

In the concept stage, I summarized 8 different relaxation categories (see Fig 1), hoping to find the most effective solution from them. After many rounds of critical thinking and ideation, I chose three of these concepts to continue the work. The first of them is to relax the user's head area through infrared technology and steam (see Fig 2), the second uses the principle of acupuncture points in Chinese medicine to relax the hands while also relieving stress on a mental level, and the third is a desktop projection device that uses simulated images and sounds to give the user an immersive relaxation experience.
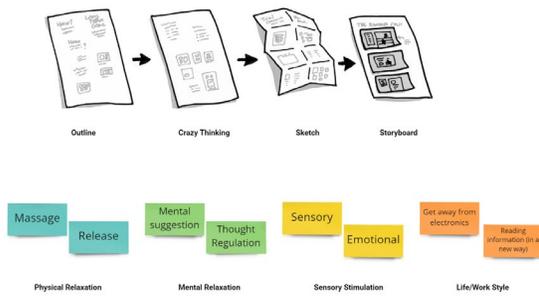
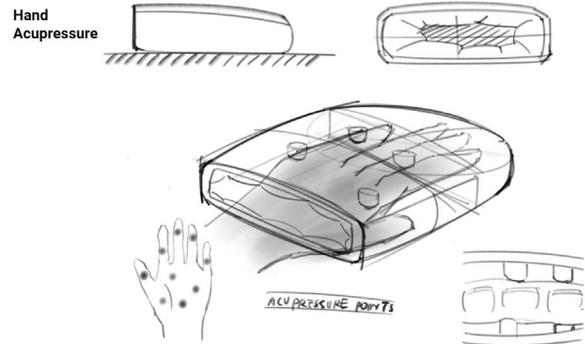Fig 1. 8 different relaxation categories

Fig 2. Hand massager sketch

Prototype and Test

Entering the prototype testing phase, I uncovered problems and came up with new ideas after getting the initial prototypes of the three concepts. In order to solve the problem of user initiative with the product, I decided to combine two of the concepts - a system containing hand massage and desktop projection. Users want to use the device to relax must stop the work at hand.
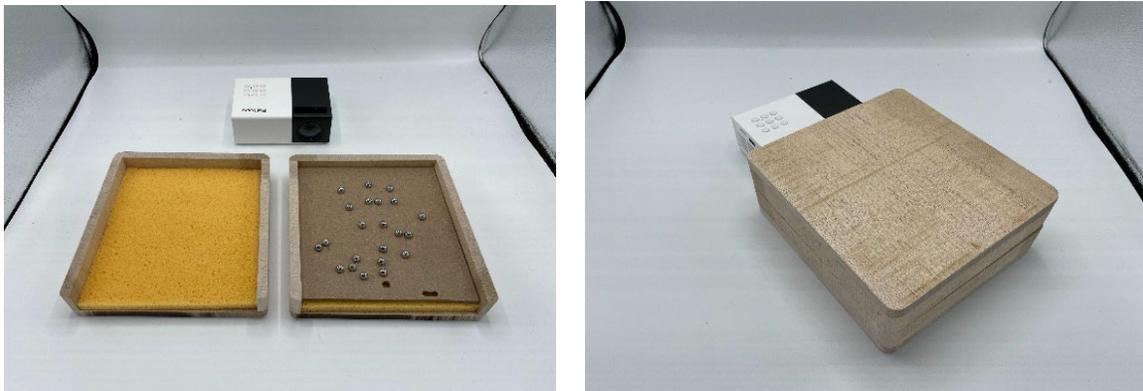

Fig 3. The interior and exterior of the test prototype

Considering that long-term computer users will use the keyboard to type at s high speed that can cause hand fatigue, the system can release the user's stress while relieving their hand fatigue.

A total of five testers participated in this test (see Fig 4), and they would give their feedback using the prototype I created, combined with the projected images. I also prepared some questions to ask in advance, and the answers given by the testers helped me to optimize the materials, structure and interaction of the final design. In addition, I used a smart bracelet as a heart rate device to record their heart rate changes in real work scenarios and to compare the changes before and after using the device.
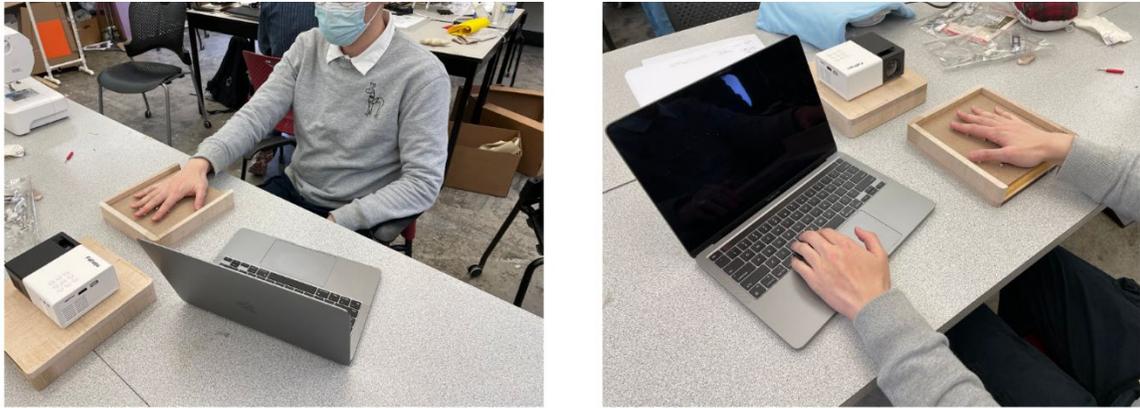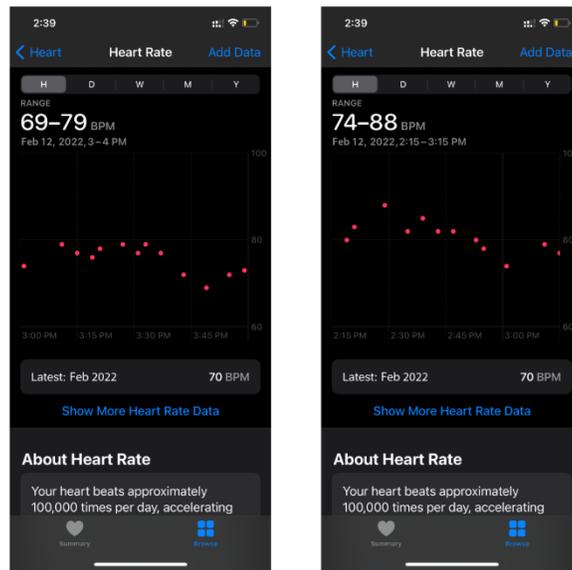
Fig 4. Part of the test scenario

To simulate a real usage scenario, I had testers type rapidly on a laptop for 10 minutes and then relax using the test prototype. Heart rate changes were recorded throughout, and subjective feelings were also collected.

A   **B**

Fig 5. Heart rate test records

The test results (see Fig 5) showed that sample A is a record of heart rate variability obtained by sitting motionless in a chair after work, and sample B is the data obtained after using the test prototype.

After testing and comparison, the heart rate decreased by 10/min for sample A and by 14/min for sample B.

Testers also commented on their experience with the device at the end of the test, saying I don't think the music and images directly make me calm, but they put me into a calm state very quickly, and I started to imagine some images, which is similar to the state I used to meditate in. They think the hand massage is effective, the continuous use of the keyboard makes their hands sore, and the pressure on palms makes them comfortable.

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The test results gave me a lot of useful suggestions and new inspiration, and I decided to make some improvements to my prototyping:

- Further size reduction

- Use hard and medium sized balls for massage contacts

- Make the contact surface more suitable for the physiological curvature of the hand

- Use a sandwich structure of sponge-hard material-contacts

- Three adjustable temperature levels

- Optimized shading details at the lens of the projection device

- Provide the interaction option of mute - music - natural sound with one click

- Make the overall appearance more attractive

Finished Design

With the results of the user testing, I made some adjustments to the overall design ideas. I placed a touch screen on the top of the device as an area for video playback and control, and I also kept the projection function.
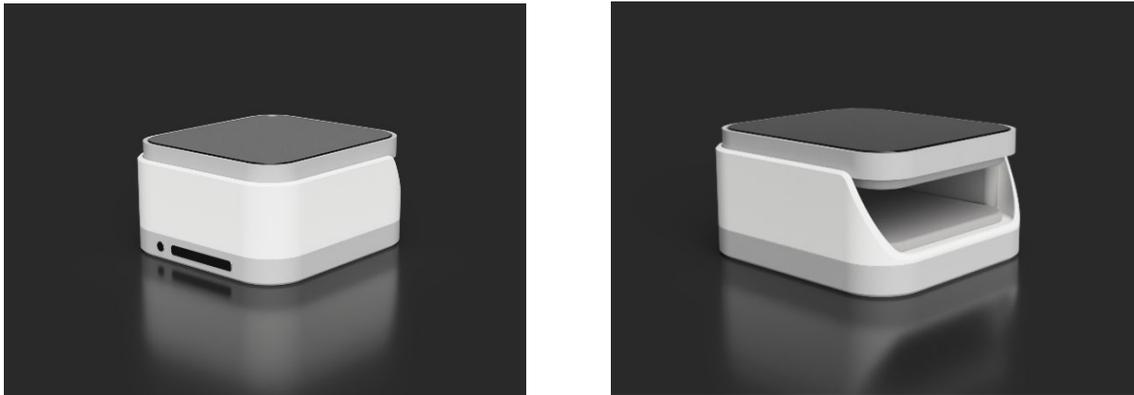

Fig 6. Final rendering

To better integrate these structures and get an elegant look, I divided the product into three parts, which are close to a sandwich structure, and for the internal massage area I ended up using a material with a padded foam and flocked surface layer. I used a simple style for the shape, using black, gray, and light gray to get a soft contrast and transition effect.

Conclusions

In this project, from the research to the completion of the project, my biggest gain was a deeper understanding of the topic of worker stress and anxiety. It's not just work that can bring people anxiety, many technology products, and smart devices can bring some negative emotional impacts in varying degrees. Most electronic devices come from commercial companies who may design these products with the main goal of making users addicted to continue to increase work output.

The project I worked on is an attempt to address the negative symptoms of information anxiety, and as a designer, I should be thinking more about the future trends of electronics and is that future moving in a good direction.

Through a series of surveys and user tests, I got a result combining my understanding and test results, but it is still not a perfect solution path. If there was no time and some technical constraints, I would have done deeper research on the problem and improved my design. For example, some studies have shown that human skin reacts differently to different colors of light, thus affecting one's mood. I can use this conclusion to allow users to use light in a closed-eye meditative state instead of the screen to provide some gain effect. In addition, I hope that the product I design will not only be a relaxation device but will also change the way users live and work and reduce stress. The screen at the top of the device can display richer content, which can be guided or generated according to the user's goal setting.

Technology has largely changed the way we live, but we need to control it, control how it is used, and control the user's emotions by using products. And in this task, designers should shoulder their greater responsibility to guide technology to make people's lives better, not just bring temporary convenience and wealth.

References

Arad, Gal and Yair Bar‑Haim. "Commentary: Information‑processing in Anxiety and depression – Novel Targets for Translational Research, a Reflection on Lau and Waters (2017)." Journal of Child Psychology and Psychiatry 58, no. 4 (2017): 408-410.

Tsai, Meng-Jung and An-Hsuan Wu. "Visual Search Patterns, Information Selection Strategies, and Information Anxiety for Online Information Problem Solving." Computers and Education 172, (2021): 104236.

"Information Anxiety: Towards Understanding" 2012. SCENARIO 00: Power. https://scenariojournal.com/article/richard-wurman/

"Inclusive design. Designing for people with anxiety." 2020Design, LEVEL LEVEL (Jan 9). https://level-level.com/blog/inclusive-design-designing-for-people-with-anxiety/

"Quality of Life; Recent Findings from Drexel University has Provided New Information about Quality of Life (Short-Form Mindfulness-Based Stress Reduction Reduces Anxiety and Improves Health-Related Quality of Life in an Inner-City Population)." Health & Medicine Week,2015.

"Reducing anxiety by design" 2021. News, Tyler School of Art and Architecture (Feb 18). https://news.temple.edu/news/2021-02-18/reducing-anxiety-design

Wurman, Richard Saul. Information Anxiety. 1st ed. New York: Doubleday, 1989.