

The group would like to thank the sponsors at SitFlow, Cal Poly students who participated in the experiment, and Tali Freed, Karen Bangs, and the rest of the Cal Poly IME Department for their help and cooperation.



SitFlow Senior Project

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PROBLEM

SitFlow has been validated and certified as NEAT by Mayo Clinic. The company would like more information to further verify its effects (or lack thereof) on productivity. Our goal is to design and run an experiment that examines if SitFlow affects user cognitive ability, specifically whether or not cognitive ability is significantly different when an individual is using SitFlow.

OBJECTIVE

- Conclude whether SitFlow impacts user productivity in terms of cognitive performance
- Record our findings in a formal paper that will be published in the future

CURRENT STATE

SitFlow has three existing studies:

1. Mayo Clinic: The SitFlow apparatus is certified in NEAT (nonexercise activity thermogenesis) demonstrated that the apparatus burns up to 20% more calories than sitting alone.
2. University of Chicago: SitFlow elevated metabolic rate by 17.6% when sitting compared to sitting without disrupting cognition.
3. Tokai University: SitFlow heat production by 18 to 20%, improving blood circulation.

DESIGN ALTERNATIVES

Effectively measures cognitive ability
Reasonable time limit (1 being not reasonable)
Affordable Test (1 being not affordable)
Doesn't require prior knowledge base
Measures a wide variety of abilities within cognitive scope
Test was designed for cognitive testing purpose for tasks similar to ones in our experiment

1. WONDERLIC TEST
2. MOCA
3. CCAT
4. PLI
5. STROOP TEST

- Analyzed tests above in Many Criteria to Consider (MCDA) decision analysis
- Used specific criteria seen on the left
- Determined the CCAT was the best design

Rank	Cognitive Test	Total Score
1	CCAT	495
2	Stroop Test	474
3	MOCA	471

FINAL DESIGN

Criteria Cognitive Aptitude Test (CCAT)

- 50 multiple choice questions, 15 minutes
- Topics covered: verbal, math and logic, and spatial reasoning

Experiment Part I

- Performed in ENGR IV -220
- Received 18 Cal Poly Participants
- Conducted ANOVA Test
- Independent Variable: Intervention type & Intervention Sequence
- Survey administered at the end

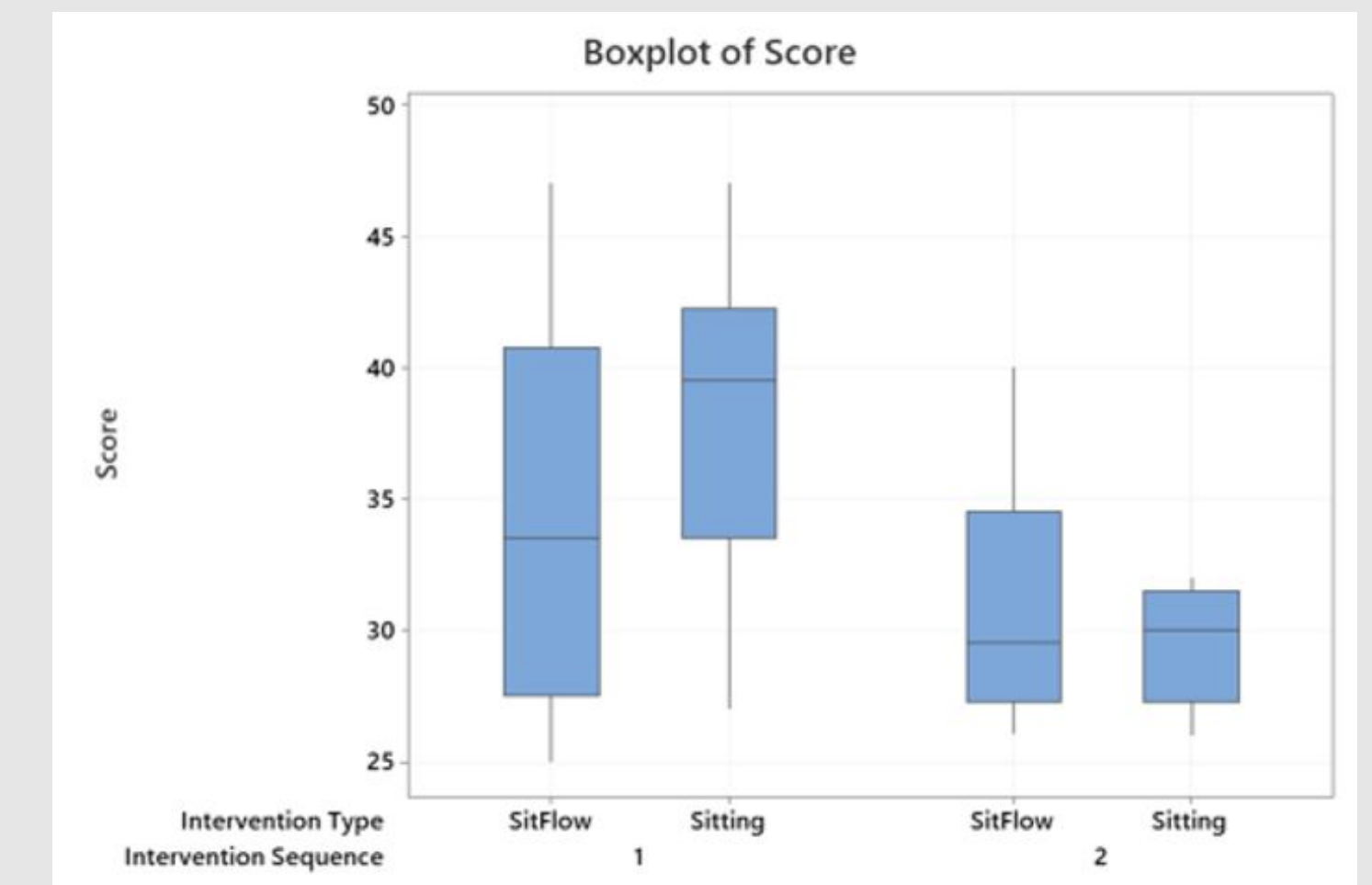
Experiment Part II

- Performed in ENGR IV 220
- 9 Returning participants from 1st round
- Paired T-Test and ANOVA
- Compared statistics from 1st round to 2nd
- Experiment time was a significant effect
- Survey administered at the end

INITIAL FINDINGS

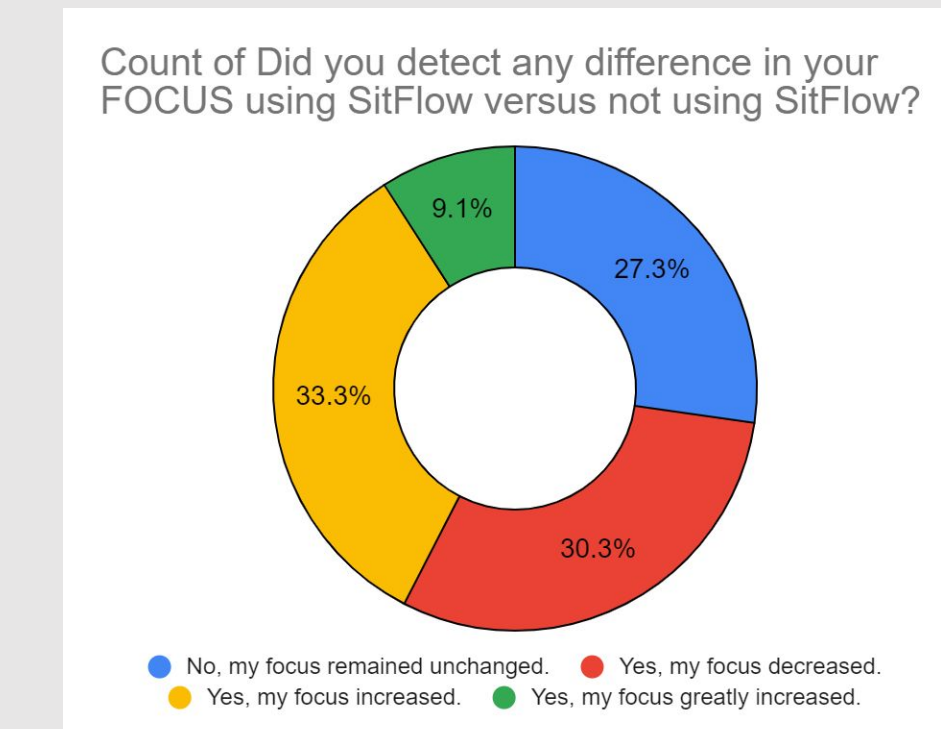
Quantitative Results

The sequence of intervention has a significant effect on cognitive performance, specifically when taking the test using SitFlow first then normal sitting second. As seen in the boxplot, this effect significantly increases one's score.

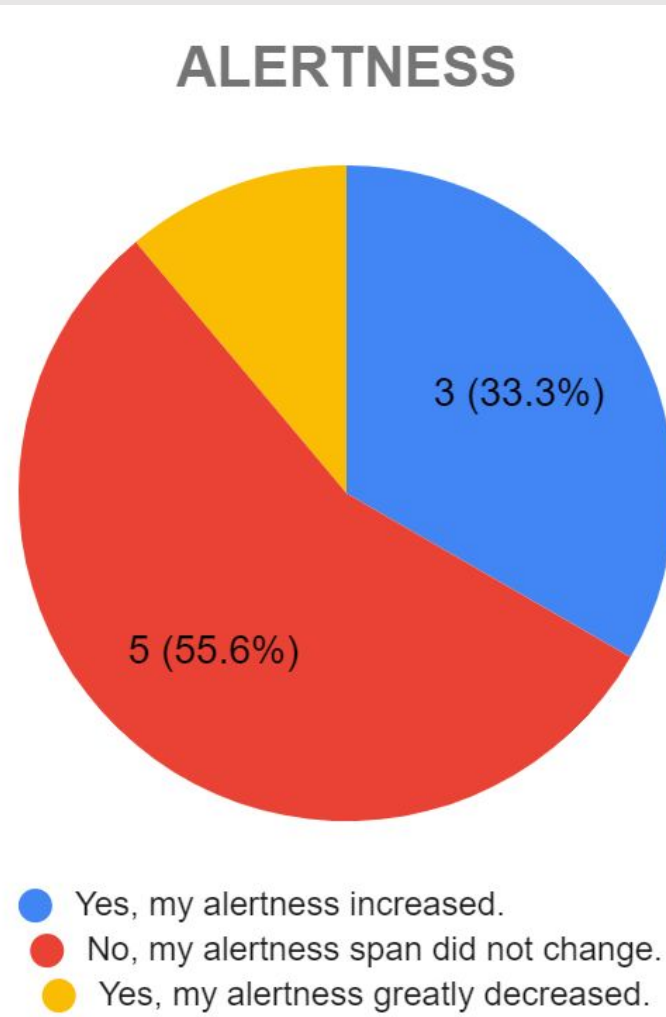


Qualitative Results

We collected qualitative information from the post experimental survey. We determined that participants felt that they had an easier time adjusting to SitFlow during the second part. Most participants felt that their alertness, focus, test taking ability, and attention span possessed the improvement.



PART II

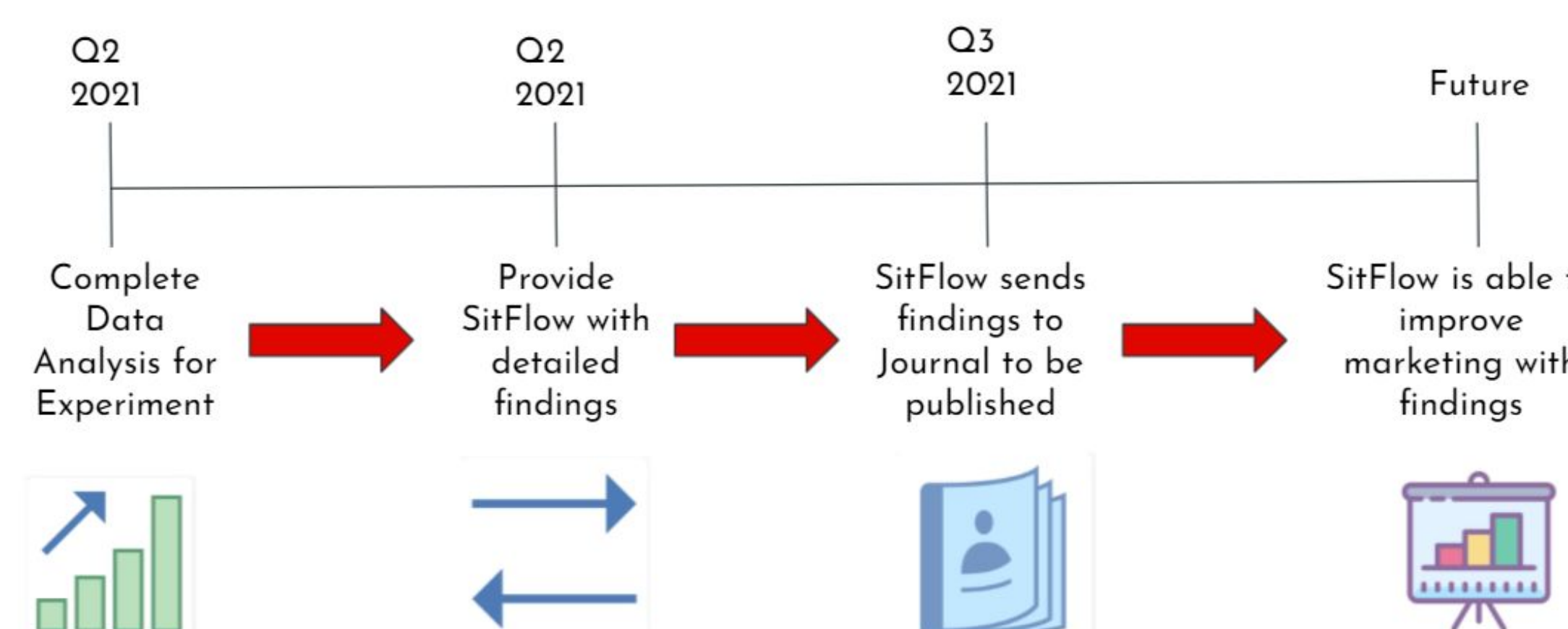


PART I

IMPACT ANALYSIS

SitFlow has the potential to reduce long-term health problems (arthritis, circulatory issues, etc.) that often stem from long periods of sitting by promoting better overall health of employees and creating a healthier workplace culture. Soreness and pain was the second-highest workplace injury in 2020 (15.9 per 10,000 workers), and these numbers can be reduced by adding SitFlow and promoting healthier workplaces. Companies can add SitFlow as an alternative to on-site gyms and exercise facilities for employees to exercise. Insurance companies paid \$888,220 in workers' comp in 2020. A 5% decrease in workers' comp can reduce costs by over \$44,000 by implementing SitFlow.

Implementation Plan



CONCLUSIONS

Data analysis is ongoing to fully analyze SitFlow's effects on user cognitive ability. The coordinators are getting statistical validation from experts before publishing the findings. It would also be recommended to conduct a follow up study, in either a field day experiment or by using a wider age range to match the target audience in corporate offices.