The Internet of Things in Commercial Buildings
Project Updates

New Research Compares Cognitive Functions and Environment

A ccurately measuring workplace productivity represents an important but challenging research goal, as we reported in previous editions of *Centerline* (Summer 2012). A new study directed by UC Berkeley Assistant Professor Stefano Schiavon, in collaboration with a Singapore-Berkeley collaborative research center and Stanford University, is using new tools to investigate the impacts of thermal factors on cognitive function.

The project is studying “executive function,” a set of cognitive processes that include our ability to manage our time and attention, to plan and organize, and to resist distractions and temptations. The goal is to learn to what degree executive function is affected by air speed, humidity, and temperature, in order to know whether certain energy-saving conditioning strategies are feasible in knowledge work settings. Previous CBE research showed that with personally controlled fans or with heated and cooled chairs, people are quite comfortable at temperatures as high as 86ºF, an approach that can save significant energy and reduce peak loads. The previous tests were conducted with subjects who are accustomed to tropical climates, using personally controlled fans, in temperatures from 73ºF to 84ºF, and with relative humidity of 60 percent.

Schiavon is working with Yoni Donner, a PhD student at Stanford who also works on artificial intelligence with Google. He also leads the Quantified Mind project, a “mind hacking” research project looking at the impacts on cognition from drinking coffee, meditation, time-of-day, and even sex. The tests, completed this summer, used survey tools available from Quantified Mind and the Center for the Built Environment, and were supported by SinBerBEST, a collaboration between UC Berkeley, universities and agencies in Singapore, and other academic and corporate partners. The results are expected to be released in spring of 2015.

these factors that would lead to the most comfortable conditions, taking into account the fact that people have a range of preferences about air movement. CBE’s researchers also collaborated with the Big Ass Fans team on the temperature and fan speed logic.

The collaboration between CBE and Big Ass Fans is an example of industry/university partnering, leading to benefits for customers and for the society at large by reducing energy usage and improving comfort for people in their homes and workplaces. The Haiku with SenseME has been featured on CNET, Business Insider, Gigaom, and other media. More information at: [http://www.bigassfans.com/senseme/](http://www.bigassfans.com/senseme/)

Editor’s note: A related article in Low-Tech Magazine describes how ceiling fans are much more energy efficient than air conditioning, and how they can reduce peak electrical system loads.

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