

*Research in Progress*

## **Designing technology for active sitting: An example of Feldenkrais Method®-inspired body-centric interaction design**

**Margaret Kaye**

Feldenkrais Practitioner, Feldenkrais Method Assistant Trainer, Sydney, Australia

**Lian Loke**

PhD, Certificate in Fashion Design and Illustration; Sydney School of Architecture, Design and Planning, University of Sydney, Australia

### **Keywords**

design technology, active sitting, Feldenkrais Method, body conscious design, activity-based workspace design

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**Please cite:** (First published in the) *Feldenkrais Research Journal*, volume 6; 2018-2019.

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## Designing technology for active sitting: An example of Feldenkrais Method®-inspired body-centric interaction design

### Margaret Kaye

Feldenkrais Practitioner, Feldenkrais Method Assistant Trainer, Sydney, Australia

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*“The aim [of the Feldenkrais Method] is a person that is organized to move with minimum effort and maximum efficiency, not through muscular strength, but through increased consciousness of how movement works.”*

*Moshe Feldenkrais*

With the increasing ubiquity of digital technologies in everyday life, we find our daily habits and routines dependent to a large extent on the interactions made possible by how these technologies are designed. As digital technologies continue to be integrated into work and leisure activities, our very movements become choreographed and often restricted in range and quality – whether or not we are aware of it. Recent studies in health science have raised the alarm to the negative health consequences of sedentary behaviour, linking a lack of physical activity to an increased likelihood of cardiovascular disease, not to mention musculoskeletal problems. New evidence defines long term sitting as the ‘new smoking’ as cardiovascular action is restricted for long periods of time in many work, study or leisure contexts that rely increasingly on seated activities related to writing or screen work (Stamatakis 2017). In this context acknowledgement is increasing of the importance of movement and variation (Chau and Engelen 2015). What this recognition of long periods of static activity does not acknowledge is the effect on musculoskeletal, or biomechanical function.

The office workplace, in particular, is seen as a prime site for intervention. A myriad of different approaches to transforming the workplace into a place of healthy productivity have emerged in the past decade: activity-based workspace design (Foley *et al.* 2016), active design guidelines (Center for Active Design 2010), yoga and meditation rooms, and a host of new interactive technologies aimed at monitoring and motivating people to take breaks and move more (Stephenson *et al.* 2017). As yet no conclusive evidence has emerged to support widespread adoption. What is more troubling are the paradigms of health that are reinforced by the design of environments and technology.

As everyday technologies become more implicated in our physical health and mental wellbeing,

the dependent relationship between people, technology and the environment cannot be ignored. There is a responsibility to examine assumptions around the relationships between body, technology and culture. What are the dominant paradigms and tacit assumptions underlying the designs and products that become embedded in daily life? How is movement and posture understood? What implications do these models have on how people understand and use their bodies in daily life?

It is this set of questions that underpins our research into the application of principles of Feldenkrais Method to interaction design, or what we call body-centric interaction design. We began this enquiry with a focus on the workplace, and how it could be redesigned through the lens of Feldenkrais Method. Our approach shares the values of body-conscious design introduced by Galen Cranz (2000), and extends the focus from the design of furniture and environment to include the use of digital, interactive technologies. It also builds on Margaret Kaye's previous Feldenkrais-based workplace consultancy, including running workshops, on sitting, examining individual work areas, and adjusting work physical structures to suit the individual person. The consultancy was premised on the basis that we work with what we have. In contrast, the new study has enabled an exploration of new concepts using interactive technologies to support the aims of Feldenkrais practice in the workplace.

In our study, we are using Feldenkrais Method principles of conscious awareness to our mind-body in the context of the workplace. We conducted a series of workshops to explore possible thinking and ideas, as a dialogue between a Feldenkrais teacher (first author), an interaction design researcher (second author), and a software developer. The exploration began with Margaret leading a set of Awareness Through Movement® (ATM®) lessons, to ensure we all had a basic understanding of the Feldenkrais work and shared bodily experience. The premise of the movement lessons included finding skeletal support while sitting on chairs, finding efficiency in standing, and increasing the range of motion for ease and efficiency in movement while engaging with a range of activities, including just sitting or standing without any other intention.

We undertook conceptual explorations of broader interactive, and active workplaces, where playfulness and movement are considered. We then brainstormed several ideas, starting either from a desired movement pattern and then speculating on what kind of interactive technology could support that movement, or examining a specific technology and identifying what kinds of movement-based concepts could be possible with that technology. When we shifted to prototyping ideas, we used existing products that could be 'hacked' and repurposed, e.g., the Nintendo Wii balance board and the Microsoft Kinect motion sensor.

In this article, we will focus on just one of the concepts we are exploring for seated solutions to address the issue of prolonged sitting. *Let's Sway* is a pressure-sensitive seat that provides feedback and feedforward on the act of sitting. Through this concept, we are critiquing conventional models of posture and sitting. Our intention is to challenge the dominant paradigm of corrective behaviour such as 'fixing' posture. Our approach is more concerned with somatic

learning as an ongoing process versus disciplining the body. To illustrate our points, we will compare *Let's Sway* to a commercial product, *Lumo Lift* (The Grommet n.d.).

With *Lumo Lift*, a person wears a small device positioned just below the collarbone that monitors when the body is not in an upright posture. When the person leans over, or slouches, the device emits a simple vibration to alert them to their incorrect posture. In our view this kind of device is in the corrective behaviour paradigm, where there is a correct and an incorrect posture.

Popular understandings of 'correct posture' are developed from childhood through a social process of learning. We become accustomed to our cultural patterns of movement, and this includes in many contexts, the requirement to sit on a chair, to sit in a certain way, to sit without too much movement, and to sit in a way that demonstrates compliance with cultural norms and subordination in recognition of authority.

We learn that sitting upright and certain ways of standing are 'good posture'. We are told to 'pull the shoulders back', 'pull the belly in', and to 'sit up straight'. Or to stand straight. But in reality, nobody knows what this actually means. People may respond to this concept with rigidity, which then collapses with fatigue. Another common and relatively new idea is the concept of 'core strength'. This varies greatly depending on the model of enquiry. Generally, it relies on muscular strength in the pelvic region without detailed consideration of muscular skeletal patterns or inherent movement pathways.

Another deterrent from finding efficiency and comfort is the opposite effect, of self-evaluated 'bad posture', where people may be reluctant to discover non-habitual practices as it feels too unusual, culturally infrequent, or makes them feel 'bad' about themselves. Some people become so habituated to the patterns of movement that become culturally embedded, they feel 'out of sorts' upon invitation to do something new.

This kind of thinking, of good versus bad posture within a corrective behaviour paradigm, is antithetical to the principles of the Feldenkrais Method, where effective posture is related to function, and found naturally through awareness and movement. In our model, the act of sitting is understood as *dynamic*, not static. In a static model of posture, sitting is understood as holding a posture, of which there are good and bad instances. Whereas in a dynamic model of posture, the body *moves* in the act of sitting. The spine is able to articulate and adjust itself in relation to the whole body – what Moshe Feldenkrais (1985) calls "acture", in contrast to posture.

Instead of using technology to monitor for 'poor posture' like the *Lumo Lift* does (which means embedding a model of poor posture into the technology), we are working from a premise of enhancing awareness of how one is sitting over time, and using technology to encourage people to be more dynamic in how they sit. The person is not disciplined to correct their posture, instead they are encouraged to become more aware of how they habitually sit and to

learn strategies for active sitting.

In our prototype *Let's Sway*, the shifts in weight whilst sitting are displayed in a visual form on a computer screen. The position of one's centre of mass on the pressure-sensitive seat is represented as a dot on the screen. The series of weight shifts is displayed as a trace pattern of the dot in motion, providing direct feedback to the sitter. The display is intended as a reflection of how the person is moving (or sitting still), to draw awareness to how they habitually sit. It is also intended as a gentle stimulus, a reminder to change how they are sitting, to experiment or play with how they are sitting, or to take a break from work.

Regarding strategies for active sitting, we are experimenting with forms of visual suggestion (or feedforward) to encourage certain kinds of simple geometric movement patterns whilst sitting and shifting weight, such as forward/backward, side-to-side, circling around the pelvis, or figure-of-eight spiralling. It is also possible, of course, to perform free-form movements of weight-shifting and instantly view the emergent visual drawings. These feedforward patterns are informed by Awareness Through Movement principles and exercises.

Whereas in previous work Loke *et al.* (2013) included an audio recording of an Awareness Through Movement lesson as part of an interactive artwork, here we are exploring how to embed Awareness Through Movement principles into the interactive visuals. The speed of the feedforward visuals is deliberately rendered at a slow pace to encourage the person to slow down as they mimic the geometric pattern and notice the quality of their movement. The drawing of the geometric patterns is intended to encourage the person to smooth out the trajectory of their moving and shifting of weight. This smoothing out of movement enables a person to gain mastery over small movements which are then chained to form larger movement arcs.

This study is in its formative stages, at an exploratory level, and no conclusions have yet been reached. We are continuing to experiment with strategies for providing visual feedback and feedforward on active sitting.

In conclusion, previously there has been a reliance on furniture doing the work of body alignment. Ergonomic approaches generally assess the fit between person and environment, and endeavour to provide solutions that allow optimal functioning, both physical and cognitive. However ergonomic approaches and assessments may not take into account the person's habitual tendencies in function.

Trends in posture correction (e.g., *Lumo Lift*) (The Grommet, n.d.) and workstation design (e.g., sit stand desk) (Foley *et al.* 2016) are attempting to introduce new ways of working aligned with good health, but don't necessarily address the question of how comfortable and efficient we are – how we do what we want to do in the best ways. The rhetoric is often around the impact of sedentary behaviour, such as cardiovascular disease, and diabetes. Despite musculo-skeletal issues also being identified as resulting from poor workplace design and lack of physical activity,

the *quality* of moving is never really addressed.

Under a Feldenkrais-inspired approach to body-centric interaction design, the ethos is about giving agency back to the individual. Agency to make choices about how to use one's body. Agency to find comfort and ease through awareness that will lead to sustainable, revitalising practices in the workplace, and beyond.

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