Adaptive architecture in dementia care

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Adaptive Architecture that responds in real-time to the respiration of its inhabitants is also called Biofeedback Architecture. Inhabitants of Biofeedback Architecture can directly interact with the physical structure using a respiration sensor. The link—or coupling—with the surrounding architecture establishes a feedback loop between inhabitant and environment, which allows inhabitants to affect the environment through their own breathing. For example, the physical structure moves up when breathing in and down in response to breathing out.

In collaboration with a local Elderly Care Provider, we are in the process of designing and deploying a new instantiation of biofeedback architecture in their dementia unit. Our new design will enable two people to share their experience of biofeedback architecture. While collocated in the same space each inhabitant will be able to interact independently with the structure using his or her own respiration. Both inhabitants will also be able to see their partner’s respiration pattern expressed in the environment.

Slow and deep respiration has been linked to improved relaxation and resilience, and generally improving health. Moreover, mind-body therapies have been shown to positively influence a variety of neurological disorders, such as dementia, Parkinson’s and Alzheimer’s disease.

Our own previous laboratory studies of a biofeedback architecture prototype called ExoBuilding have shown that its inhabitants tend to fall into slower and deeper breathing patterns without having been instructed to do so.

Using their respiration to affect the environment directly may give inhabitants an increased sense of control over their physical environment, which is especially beneficial for people with dementia.

Our own on-going laboratory studies indicate that sharing biofeedback can lead to the synchronisation of respiratory behaviours between the two inhabitants. Such synchronisation may have positive effects on, for example, memory and an improved interpersonal relationship of the synchronised pair.