



## Evaluating the 'lessons learned' in transitioning a digital health technology for dementia from lab to care home

Turley, K., Rafferty, J., Bond, RR., Ryan, A., Mulvenna, M., & Crawford, L. (2024). *Evaluating the 'lessons learned' in transitioning a digital health technology for dementia from lab to care home*. Poster session presented at International Conference on Integrated Care, Belfast, United Kingdom. Advance online publication.

[Link to publication record in Ulster University Research Portal](#)

### Publication Status:

Published online: 23/04/2024

### Document Version

Author Accepted version

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# Evaluating the 'lessons learned' in transitioning a dynamic lighting and sensing technology from lab to care home



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## Introduction

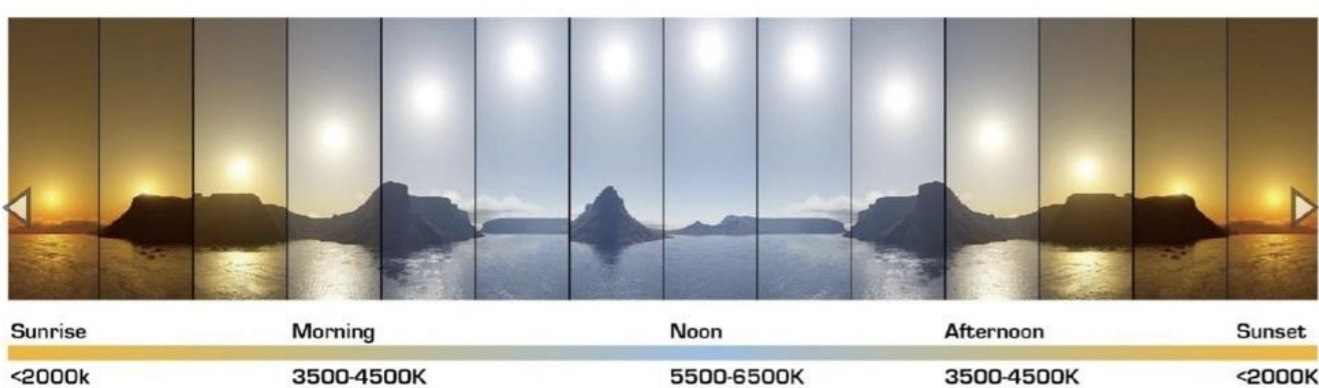
Often, research is conducted in a lab environment before being transferred to the 'real-world' where the somewhat perfect conditions in the lab are no longer available. As a result, there can be unforeseen circumstances that emerge when operating technology within a new site.

This study involves the trial of a dynamic lighting and sensing technology for people living with dementia in a care home <sup>(1)</sup>. The lighting changes in colour and intensity throughout the day in a similar manner to the sun's daily cycle and is designed to support the human body clock. The simultaneous integration of a radar sensor allows for monitoring of rest-activity, sleep/wake cycles, agitation and other wellbeing factors in response to this lighting.

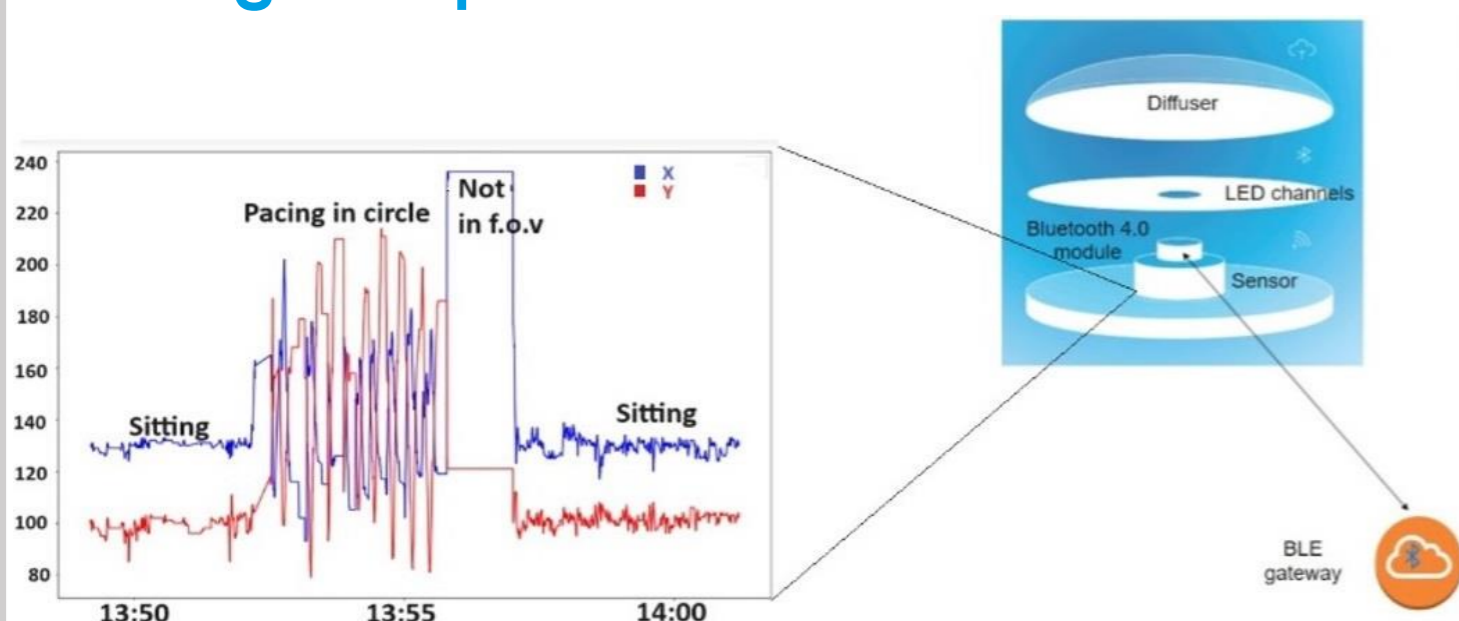
## Method

The technology was deployed in a care home for 16 weeks and data was collected on rest-activity, sleep, mood, comfort of environment and agitation. The luminaires and sensors communicate via Bluetooth protocol and a gateway was installed to transfer data to an external server. Bluetooth switches were installed to replace existing wired switches. Care staff were asked to complete weekly QUALIDEM surveys to determine factors of resident wellbeing over time.

## Lighting Component



## Sensing Component



## Results

The research suggests that dynamic lighting can significantly improve rest-activity, mood and feeling at home for people living with dementia; agitation does not reflect this.

**Technical:** We learned that a lighting 'override' switch may be necessary for times when the programmed dynamic lighting provides lower intensities (for example in the evening before bed), in case of emergency response teams needing to read metrics from health machines. Bluetooth protocol has a limiting range when surrounded by concrete walls/ nonconventional floorplans so the requirement and cost of extenders should be considered. While the lighting provided no opposition, the replacement switches operated differently and proved difficult to manage at the beginning of the study.

**Ethical:** We learned that explicit declaration of exemption (or alignment) with 'Medical Device Status' according to government legislation needs to be carried out for ethical approval which can add time and admin overhead.

**Logistical:** We learned that residential homes exercise strict access policies so planning a brief visit to site will require permission/documentation. Site surveys are essential to familiarise oneself with the layout as roof-space or electrical cupboard access may be required for the technical setup.

**Coordination:** We learned that completion of wellbeing surveys by staff cannot always be a priority so flexibility is necessary. Informal check-ins are useful to help align these demands with their weekly needs. Some site access could not be granted by the care home manager and required site manager's approval so this should be considered.

## Conclusions

Recommendations are made to obtain a floorplan and material composition of a building in relation to the chosen communication protocol while developing the technology to eradicate costs/time lag. Recommendations are also made to allow for adjustments to survey schedules for smooth study operation. Lastly, the authors strongly recommend the consideration and/or integration of post-study suggestions from care staff and people living with dementia.

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## References

(1) Turley K, Rafferty J, Bond R, Mulvenna M, Ryan A, Crawford L  
Evaluating the Impact of a Bespoke Daylight-simulating Luminaire on Mood, Agitation, Sleep-wake Cycles, Rest-activity Patterns and Social Wellbeing Parameters in a Care Home for People with Dementia; JMIR Preprints. DOI: [10.2196/preprints.56951](https://doi.org/10.2196/preprints.56951)