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Ecolibrium

Natural selection

The benefits of
biophilic design.



The unvarnished truth about ABW



What Australian occupants say about high-performance workplaces, by Dr Christhina Candido, Associate Professor Leena Thomas, Dr Fan Zhang, Dr Shamila Haddad and Associate Professor Martin Mackey.

THE BACKGROUND

With the exodus from the private office to the rise of activity-based working (ABW), Australian corporate real estate has changed dramatically over the past decade.

Considering the amount of time people spend indoors and at the workplace, the associated costs arising from productivity and health losses from ill-designed workplaces are just too high to be ignored.

Although much has been said and documented about the issues around open-plan working, less has been done in terms of understanding why some workplaces perform well from the occupants' perspective. This is particularly true when it comes to ABW.

This article focuses on this knowledge gap by presenting results from research conducted in Australia over the past two years focusing on contemporary workplaces, and ABW in particular. The aim is to better understand the impact of workplace design on occupants'

satisfaction, perceived productivity and health – the SHE (Sustainable and Healthy Environments) project.

As part of this project, a series of post-occupancy evaluation (POE) surveys were conducted in 20 contemporary open-plan offices (10 of which were ABW premises). For each office surveyed, information about the physical environment and floorplans was also collected.

Results from 4,300 BOSSA (Building Occupant Survey System Australia) POE surveys indicate that occupants from high-performance, ABW workplaces reported higher satisfaction levels on spatial comfort, indoor air quality, visual comfort, connection to outdoor environment, building image and maintenance and overall performance, health and productivity.

These results serve as an indicator to designers, tenants and buildings owners about how ABW offices are actually performing from the occupants' perspective.

‘The associated costs arising from productivity and health losses from ill-designed workplaces are just too high to be ignored’

At the same time the results will also contribute evidence to the knowledge gap observed in academia in Australia.

THE SURGE IN ABW

In Australia, there is a recent surge in popularity of ABW in contemporary office real estate. Since 2015, a growing number of organisations have moved into contemporary offices designed to support the ABW culture and way of working. Predictions are that as much as 66 per cent of premium office accommodation in Australia may join the ABW trend by 2020 (Telsyte, 2015).

ABW should be distinguished from hot-desking. The office infrastructure supporting the ABW way of working and culture typically provide workers with open-plan spaces designed for supporting tasks, unassigned and shared desks, supporting technology that enables mobility and remote work, centralised storage, and inclusion of zoning and/or neighbourhoods. As a result, workers are required to move frequently during the day to find the best place to develop the activity at hand.

Apart from the significant financial benefits of reducing the office footprint, ABW advocates also claim that this way of working may positively impact workers, especially when it comes to collaboration and productivity. Research evidence has been also built around the positives and negatives arising from the implementation of ABW (Engelen, et al, 2017), including those under the brand, culture and talent attraction/retention umbrellas (De Croon et al, 2005; De Paoli, Arge, Blakstad, 2013), incidental physical activity opportunities (Marmot and Ucci, 2015; Foley et al, 2016) and IEQ performance (Rolfö, Eklund and Jahncke, 2018).

Most ABW studies have investigated design, IEQ and satisfaction-related issues in isolation, thereby losing the opportunity to gain in-depth knowledge of the interaction between space-related variables known to affect workers.

The SHE (Sustainable and Healthy Environments) is an on-going research project that focuses on how the design of indoor environments can be harnessed to deliver occupants' satisfaction, health and productivity. This multidisciplinary project led by Dr Candido provides a platform for experts from the University of Sydney (School of Architecture, Design and Planning and Charles Perkins Centre), UTS (School of Architecture), Griffith (School of Engineering and Architecture) and Southern Cross University (School of Business and Tourism) to develop collaborative research.

One of the research streams focuses on contemporary workplaces, and ABW in particular, and it is aimed at understanding the impact of workplace design on occupants' satisfaction, perceived productivity and health.

METHODOLOGY

Over the past two years, extensive research investigations were conducted in contemporary open-plan offices, including subjective POE surveys and objective monitoring of IEQ conditions and step-count under the SHE project umbrella. The research project also focused on a series of investigations before and after relocation to ABW premises.

One of the key research aims of this project was to provide empirical evidence about the performance of Australian ABW workplaces. Results focusing on the impact of workspace layout, case studies before and after relocation, IEQ and step-count monitoring have been reported elsewhere (Candido et al, 2016a; Candido et al, 2017).

Under the SHE umbrella and for this paper, POE surveys were conducted with the BOSSA Time-Lapse tool.¹ The POE questionnaire includes background questions addressing participants' gender, age, type of work, time spent in buildings, workspace arrangement and modules focusing on spatial comfort, individual space,

indoor air quality, thermal comfort, noise distraction and privacy, visual comfort, personal control, building image and overall occupant satisfaction. Workers rate their satisfaction on a seven-point scale (1 = the lowest rating; 4 = neutral and 7 = the highest rating). The research database features a total of 10,000 POE responses from 100 workplaces in Australia.

For this paper, results from a total of 4,300 BOSSA POE surveys conducted on 20 contemporary open-plan offices were analysed – 2,900 from 10 ABW offices and 1,400 from 10 other open-plan offices. Data from ABW premises were then compared against the BOSSA benchmarking database.

Workplaces investigated here are premium office space, holding certifications from NABERS and/or the GBCA. Two workplaces also hold certification from the WELL Building Standard. Tenants' organisations are from the finance, construction, government and consulting sectors.

All POE surveys were conducted at least six months after relocation. All organisations implementing ABW had a structured change in management, engagement and training initiatives before and after relocation.

In addition to POE surveys, floorplans and BOSSA Building Metrics information are also collected from all workplaces investigated along with site visits. Structured notes were taken about the physical configuration of the space, including the framework proposed by the NSW Heart Foundation Healthy Active by Design (NSW Heart Foundation, 2017), and the use of biophilic concepts and green features, including vertical gardens and walls. Combined, this information aims to provide context for the interpretation of results from POE surveys.

RESULTS

As depicted in Figure 1, mean satisfaction score results indicate that workers occupying ABW spaces rated these workplaces significantly higher than the BOSSA benchmarking database for six out of 10 dimensions, namely spatial comfort, indoor air quality (IAQ), visual comfort, connection to outdoor environment, building image and maintenance and overall performance, health and productivity.

The four modules where the biggest differences were observed were spatial comfort, IAQ, visual comfort and connection to outdoor environments.

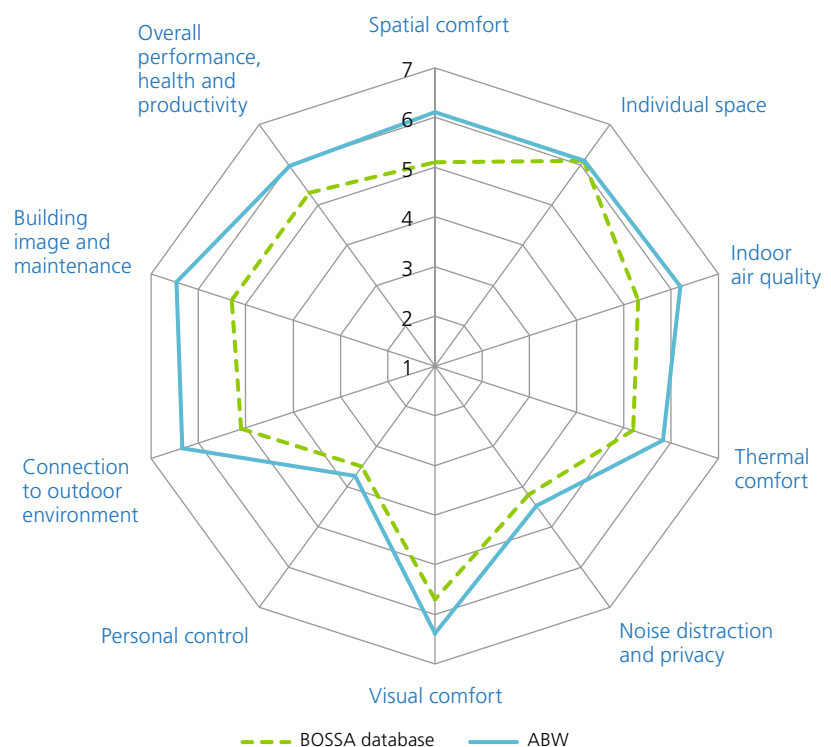


Figure 1: Aggregated mean score satisfaction results from ABW premises compared against the BOSSA benchmarking database.

Further analysis also showed that office layout, workers’ age and gender were key predictors of satisfaction ($p < 0.00$).

When it comes to workers’ overall satisfaction and IEQ, perhaps one of the best features (and potential) of ABW workplaces is allowing people to find the best place to develop their activities. As a result, ABW workplaces may also allow workers to find a “sweet spot” within the work area that will suit their individual preferences and, in turn affect workers’ perceptions of the indoor environment. This flexibility may help to compensate for the lack of personal control systems and adaptive opportunities commonly observed in air conditioned open-plan offices and, in turn, increase workers’ satisfaction.

As argued elsewhere (Thomas, 2017), the potential for behavioural adaptation coupled with new functional spaces with less stringent environmental requirements could also serve to develop a range of climate-interactive environmental control options.

Results in Figure 2 depict the breakdown of total percentages of dissatisfied votes cast from ABW premises compared against the BOSSA benchmarking database. Occupants reported significantly lower dissatisfaction levels on key questionnaire items, with the exception of individual space, and noise distraction and privacy. The overall openness of the floorplan of ABW settings discussed previously in this article may be one factor influencing workers’ perception of lighting and daylight. Another possibility is the flexibility to work from workstations by the building façade, which is commonly observed on layouts investigated here.

As seen in Figure 3, workers occupying ABW rated their workplaces much higher on space for breaks and relaxation, visual aesthetics of work area, interaction with colleagues, adjustability of work area, formal and informal spaces for collaboration, and work area furnishing.

The workspace configurations used to support ABW investigated here have considerably more spaces purposively allocated for collaboration and overall incidental interaction including lounges, cafes and a mix of breakout areas.

A key difference between ABW and other open-plan offices investigated here comes from the overall layout and placement of workstations, which follows a more organic arrangement, with strong preference for the implementation of active and biophilic design strategies.

This arrangement helps to blend workstations with collaborative and concentration zones, blurring limits between these spaces, which is quite rigid in other open-plan offices configurations investigated here. The overall quality and variety of furniture available as well as the incorporation of sit-stand workstations observed in ABW settings may influence occupant satisfaction results.

Results from 4,300 BOSSA Time-Lapse POE surveys indicate that workers occupying ABW settings were significantly more satisfied with spatial comfort, indoor air quality, visual comfort, connection to outdoor environment, building image and maintenance and overall performance, health and productivity.

All high-performance ABW workplaces studied have designs that incorporate biophilic principles, prioritising access to daylight and green features. Several wellbeing and health initiatives are in place. Workplaces are designed to promote physical activity and sit-stand workstations are available; offices have purposively designed breakout and outdoor spaces. These workplaces also adopted several of the NSW Heart Foundation “active by design” guidelines.

Workers were placed at the centre of design, through strong engagement before, during and/or after moving into the workplace. These results serve as an indicator to designers, tenants and building owners about how ABW offices are actually performing from the occupants’ perspective, while at the same time contributing evidence to the knowledge gap observed in academia in Australia.

CONCLUSIONS

This paper presented results from research investigations conducted over the past two years in contemporary Australian workplaces under the Sustainable and Healthy Environments – SHE – project. One of the main goals for this project was to understand the success of ABW workplaces from the occupants’ perspective.

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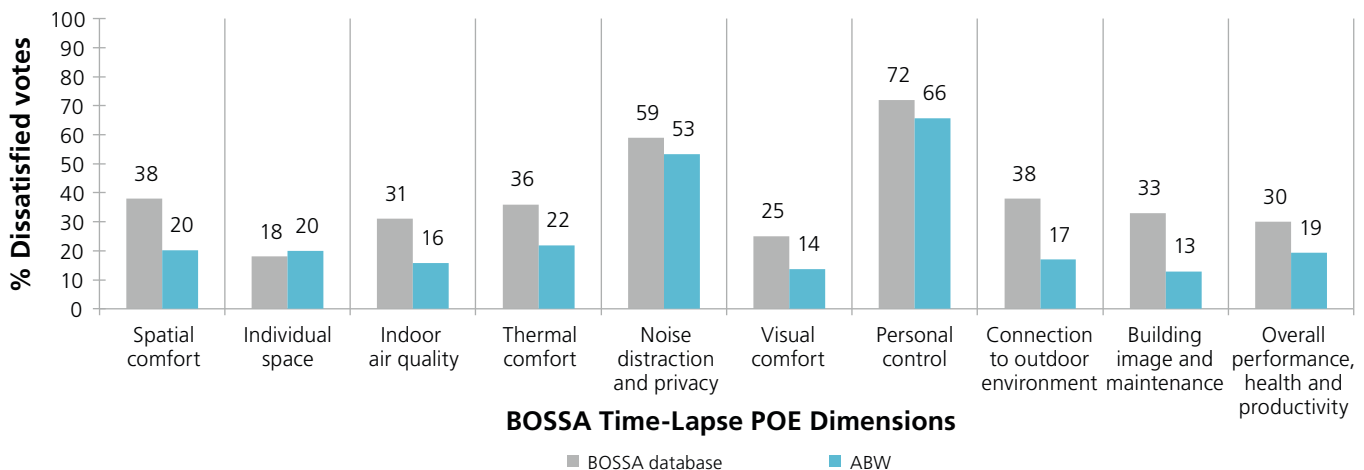


Figure 2: Breakdown of % of dissatisfied votes from ABW premises compared against the BOSSA benchmarking database.

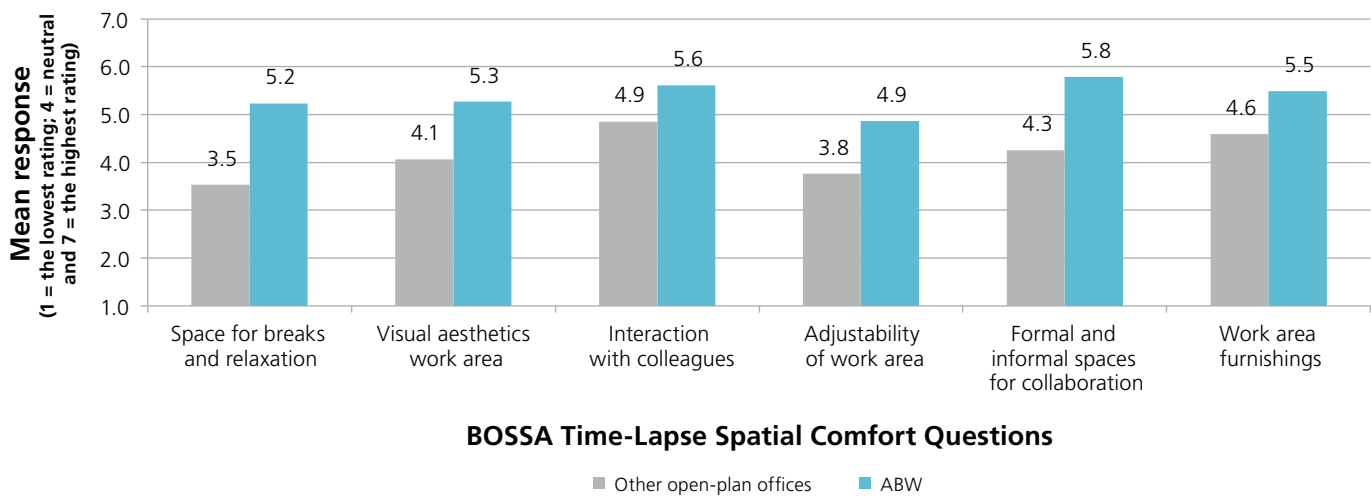


Figure 3: Breakdown of mean score satisfaction results on Spatial Comfort module questions.

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REFERENCES

- De Croon, E., Sluiter, J., Kuijer, P.P. and Frings-Dresen, M. (2005). The effect of office concepts on worker health and performance: a systematic review of the literature, *Ergonomics*, v. 48 (2), p. 119–134.
- De Paoli, D., Arge, K., Blakstad, S.H. (2013). Creating business value with open space ABW offices, *Journal of Corporate Real Estate*, v. 15 (3–4) p. 181–193.
- Candido, C., Zhang, F., Kim, J., de Dear, R., Thomas, L., Joko, C., Strapasson, P. (2016a). Impact of workspace layout on occupant satisfaction, perceived health and productivity. In: *Proceedings of 9th Windsor Conference: Making Comfort Relevant*. Cumberland Lodge, Windsor, UK, 7–10 April 2016.
- Candido, C. M., Kim, J., de Dear, R., Thomas, L. (2016b). BOSSA: A multidimensional Post-Occupancy Evaluation tool. *Building Research and Information* (Print). v.44(2), p. 214–228.
- Candido, C., Thomas, L., Haddad, S., Zhang, F., Mackey, M., Ye, W. (2018). Designing activity-based workspaces: satisfaction, productivity and physical activity. *Building Research and Information* (in press). <https://doi.org/10.1080/09613218.2018.1476372>.
- Engelen, L., Chau, J., Young, S., Mackey, M., Jeyapalana D., Bauman, A. (2018). Is activity-based working impacting health, work performance and perceptions? A systematic review. *Building Research and Information*.
- Foley, B., Engelen, L., Gale, J., Bauman, A., MacKey, M. (2016). Sedentary Behavior and Musculoskeletal Discomfort Are Reduced When Office Workers Trial an Activity-Based Work Environment. *Journal of Occupational and Environmental Medicine*, 58 (9), pp. 924–931.
- Gou, Z. (2016). Workplace Design Revolution: The Inside-Out Urbanism. In: Crespi, L (Eds.) *Design Innovations for Contemporary Interiors and Civic Art* (pp. 225–240). IGI Global.
- Marmot, A., Ucci, M. (2015). Sitting less, moving more: The indoor built environment as a tool for change. *Building Research and Information*, 43 (5), pp. 561–565.
- Rolfö, L., Eklund, J., & Jahncke, H. (2017). Perceptions of performance and satisfaction after relocation to an activity-based office. *Ergonomics*, 1–14.
- Telsyte Australian Digital Workplace Study (2015). Available online: <https://www.samsung.com/au/business/resources/activity-based-working-whitepaper.pdf>
- Thomas, L. E. (2017). Combating overheating: Mixed-mode conditioning for workplace comfort. *Building Research & Information*, 45(1–2), 176–194. doi:10.1080/09613218.2017.1252617.

Footnote

- 1 Developed and managed by The University of Sydney and University of Technology, Sydney, the BOSSA Time-Lapse tool is endorsed by the National Australian Built Environment Rating System (NABERS), the Green Building Council of Australia (GBCA), New Zealand Green Building council (NZGBC) and the International WELL Building Standard.

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