CREATING POSITIVE SPACES

BY MEASURING THE IMPACT OF YOUR DESIGN

An accessible practitioner's guide on how to measure the value of good design via Pre- and Post-Occupancy Evaluation (POE) - inspiring Architects, Designers and End Users to design spaces with people in mind.

Interface®

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Architects and Designers now have access to incredible data that demonstrates the very real benefits of a human centred approach to design. This evidence can be enormously useful; helping to pique the interest of clients, to support design approaches, to win projects and improve outcomes.

But there is an issue. The research that we have at our disposal is relatively academic; it doesn't relate to our projects, to our clients, or to the occupants of the building we will be designing for. Some of it wasn't even produced in the same decade as we now find ourselves in, with very different social, economic and technological situations.

In terms of relevance - we need to be doing more. Pre- and Post-Occupancy Evaluations (POE) can fill this gap.

It's a subject we may know a little bit about – we may even already be doing it to some degree, but are we getting the most from it? I believe the value is untapped, but potentially enormous. First and foremost, carrying out a POE can improve the wellbeing of building occupants – we need to be asking them how they feel and listen to their needs if we're going to create Positive Spaces that support people. A POE can also help to set a baseline to existing organisational activities and buildings, help us understand what the real issues are that need addressing, improve outcomes, demonstrate the return on investment as well as the real value that good design can bring, and importantly help us to develop long-term relationships with our clients.

Technology is already making this more accessible and cost effective, but third parties are expertly positioned to deliver and interpret focussed and valuable information. In this guide, a collaboration between Oliver Heath Design, the BRE Trust and Interface, we aim to help you to understand what the options are, the process and the true value of POE to benefit the built environment community, business owners and, of course, building occupants."

– OLIVER HEATH, Director of Oliver Heath Design, co-author of this Design Guide

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WHY IS INTERFACE SUPPORTING THIS SUBJECT?

Creating positive spaces where we work, rest and play involves design that incorporates visual appeal, purpose, sustainable elements, and an understanding of human behaviour. Bold thinking is required to strike the balance between reflecting each person's needs whilst adhering to regulatory standards, without compromising on the design aesthetic.

The building industry is increasingly recognising companies who prioritise supporting the wellbeing of their people. Certification systems like the WELL Building Standard™ are gaining traction and the increasing interest in them demonstrates that the creation of positive spaces requires further investigation.

To capture insights from industry and thought leaders, Interface have co-authored a series of papers*: to explore the value of human-centred design, understand how nature can inspire the creation of positive spaces, examine the future of sustainable buildings, and now with this guide, explore ways in which to start measuring the impact of these approaches via POE.

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BRE: BUILDING A BETTER WORLD TOGETHER

BRE is a world-leading building science centre with a mission to improve buildings and infrastructure, building on their research and knowledge generation to develop a range of products, services, standards and qualifications that are used around the world to bring about positive change.

Owned by the BRE Trust, a charitable foundation which supports research and education in the built environment, BRE aims to enrich the lives of people by supporting the delivery of sustainable buildings, communities and cities. BRE has been at the forefront of research, training and delivery of pre- and post-occupancy evaluations for over 20 years. They are champions of Pre- and Post-Occupancy Evaluation (POE) as an invaluable method for delivering continuous improvement in the performance of buildings as well as better health, well-being and productivity for the people who use them.

"Post-Occupancy Evaluation is a vital component in the drive to create better buildings" says Mindy Hadi, Head of Social Research at BRE and one of the co-authors of this guide. "We all need to ensure that people are at the heart of how we design and develop the built environment, and POE feedback is vital for this."

The standards developed and managed by BRE include BREEAM, the world's first sustainability rating scheme for the built environment, established in 1990. BREEAM now covers the whole lifecycle of a building and places great emphasis on Post-Occupancy Evaluation and verification to ensure the "as designed" building achieves its full potential both for the building owner as well as the people who use the space.

Working with Interface and Oliver Heath Design, BRE is also developing The Biophilic Office, a real-time office refurbishment project at BRE's campus site in Watford designed to demonstrate, through Pre- and Post-Occupancy Evaluation, the benefits of nature-inspired design and technology, and its value to health and wellbeing and business performance.

breTRUST

A GUIDE TO MEASURING THE IMPACT OF YOUR DESIGN – WHAT'S IN IT FOR YOU?

This guide is about **integrating evidence-based design into building projects** so that you can create **Positive Spaces** that better meet the needs of your clients and their occupants. We will share our knowledge about **Pre- and Post-Occupancy Evaluations (POE)** and how they can be **powerful tools in building and refurbishment projects.**

A POE often requires outside help from organisations who conduct them as a service. However, if you aren't ready to take the plunge with a full POE, we aim to inspire you to **dip your toes in the water** by gathering the right sort of information before and after your projects. This will help you see **the value of measuring the impact of your design** and may give you the **confidence to take a deep dive into POE** in future projects.

We hope that by the time you put this guide down you will understand:

- **What Pre- and Post-Occupancy Evaluation (POE) is**
- **How POE can benefit project teams, clients and building occupants**
- **What a POE process looks like**
- **How to get started or go all in with POE**

We have also brought together **case studies** to illustrate how **wide-ranging** POE approaches and processes can be. Each one includes great **advice** from the people who conducted them. Whether you intend to learn how to do a POE yourself, or to use POE services, this guide will help you **communicate the benefits** of measuring the impact of your design to your clients.

CONTENTS

CHAPTER 1: THE BASICS OF PRE- AND POST-OCCUPANCY EVALUATIONS (POE)

WHAT DO WE MEAN BY 'MEASURING THE IMPACT OF YOUR DESIGN'?

You may have heard of **post-occupancy evaluations,** which are used to gather feedback on the performance of a recently completed building or refurbishment project. The term post-occupancy evaluation was first coined in the 1960s in the USA, when building inspectors issued an occupancy permit to completed projects, only once they were fit for habitation; buildings had to pass a 'test' before they were given the thumbs up. Since then, despite huge developments, there hasn't been a great uptake in the building or design industry, as it hasn't seemed accessible to many who think of it as something academic and difficult to do. We hope to de-mystify the language, process and approaches in this guide so that this becomes accessible and something all of us can do with confidence.

So, let's start by unpicking the term **POE:**

In this guide, we use the term Pre- and Post-Occupancy Evaluation **(POE),** not just for measuring the physical traits of a building, but also how people feel in a space before and after a refurbishment or move from one building to another.

Whilst **pre**-occupancy evaluation can be carried out in the form of technical evaluations of a building before occupation, for the sake of this design guide, it will simply mean 'the first part of the POE, to gather the data before any changes have taken place'. To gain meaningful insights during the **post**-occupancy evaluation, it is essential to measure before changes are made to establish a baseline and be able to make comparisons after a project has been completed.

BRE offices

"

Without data you're just another person with an opinion"[1]

– William E. Deming, engineer, statistician, professor, author, lecturer, and management consultant.

WHAT'S EXCITING ABOUT POE?

The essence of a POE is **measurement** – it provides a route to measuring the performance of a building and its impact on occupants when it is in use.

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Increasingly, I see that clients are asking of their Architect to show or provide evidence of why they think that their design is the right one. I think there's beginning to be a market side to this where Architects that are doing evidence-based design have a competitive advantage."

Kerstin Sailer, Reader in Social & Spatial Networks, The Bartlett School of Architecture

The pre-occupancy evaluation will establish how well a building is working for its occupants and organisation before any design work (or move) takes place. This is a form of **intelligent briefing for the project team** and is basically a smart way to find out the client's needs and identify any problems and aspirations to inform the design.

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Just do it. Do it at the briefing stage, use it as a briefing tool. A pre-project feedback survey is one of the best, efficient and cost-effective briefing available."

Nigel Oseland, Environmental Psychologist & Workplace Strategist

When conducting the post-occupancy evaluation, you get the chance to find out:

- What has **worked well** and should be **built upon** for use in future projects
- What **didn't work** as well as hoped, and why not
- What should be **done differently** to improve current or future projects

As such, POE creates a culture of **continuous improvement.** This denotes a forward thinking shift from buildings being products that are handed over at completion, to being part of a **cyclical design process** with opportunity for **on-going design services** (or tweaks). This can benefit both project teams (providing on-going work) and clients (through on-going support). We'll show you exactly what we mean by this in chapter 4.

IN A NUTSHELL

POE findings can be used by project teams to:

- **Fine-tune new buildings:** by understanding how a building is working, any issues can be addressed promptly, either by adjusting the building itself, or the way in which it is managed and operated.

- **Improve the design of future buildings:** understanding how buildings perform in use means lessons can be learned for the design of future projects, thereby avoiding mistakes and capitalising on successful features.

- **Better communicate the value of design services to secure new clients:** demonstrating the benefits of different design options to clients and other stakeholders using evidence from previous projects and POEs can help them understand and see the value your design can bring to their building. In fine-tuning your projects after handover, as mentioned above, new clients can also see that you accept increased accountability for the building's performance and strive to make it the best it can be.

- **Improve client relations:** regular check ins throughout a project enables you to address any issues as they arise and be more responsive to clients' needs. If you end up with some great statistics, it'll make you look good to future clients too…

"

This could be a valuable asset in a portfolio. Say you're interviewing a prospective Architect, and you can see time and time again, project after project, the post-occupancy evaluations show really positive outcomes and high levels of satisfaction with the work that's been created. That's incredibly powerful, because it's quantitative – it's a form of proof of ability."

Paige Hodsman, Concept Developer for Offices, Saint-Gobain Ecophon

We know that all stakeholders in a building project can benefit from a POE being carried out, but some may have **concerns that need addressing** before they will readily get involved in the process. So, in the next chapter, we'll look at how a project team can **encourage their clients, building facilities teams, and building occupants** to see the **value** of a POE.

CHAPTER 2: THE BUSINESS CASE

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POE is about reducing waste. Enormous amounts of money, time, effort, energy and resources go into creating inappropriate buildings that have to be adapted or even demolished only a few years after completion. Only by finding out how our buildings are behaving can we know how to build better in the future and avoid a proliferation of the industry's mistakes."

– RIBA, in Building Knowledge Pathways to Post Occupancy Evaluation[2]

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No workplace should be designed without a proper assessment of what it is that the organisation and the employees need."

Peggie Rothe, Development Director at Leesman

"

Both designers and owners sometimes have reservations about POEs, due to concern about negative feedback. However, if the POE is performed tactfully, seemingly negative outcomes can be a great learning experience and a win for future building performance."

Kerry Drake, AIA (Associate at Payette) and Tom Simister, AIA, LEED AP (Director of Space Strategies at Payette).

WHAT'S HOLDING US BACK?

If you think about it, whenever we obtain goods or services, we are routinely asked to **give feedback** on our experience to the supplier, through **paper survey forms, phone calls or computer pop-ups,** to help them evaluate and **improve their products.** Yet, very rarely are we asked to give feedback on the buildings we occupy and whether they are functioning well for our needs. This is bizarre, considering buildings are such a huge investment!

Despite the fact that RIBA have found there to be 'a clear appetite for POE'[3], a 2015 post-occupancy evaluation survey[4] revealed that, whilst **18 out of 29** Architects and Designers (who are seen as Sustainable Design leaders in the US and Canada) did carry out a POE that year, and **75% expressed desire** to carry out a POE on more of their work, they only actually managed it on **5% of projects** completed that year. Thus, whilst there is interest in POE, we need to do more to **increase the uptake**.

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So, why aren't people doing POE? Let's look at some of the common **barriers[5]**. Maybe some of these concerns have crossed your mind too…

- Cost, insurance, liability and failure to agree **who pays for the POE**

- A fear that an evaluation could uncover problems that the project team would prefer to remain hidden, to **keep up reputation**

- The potential of **causing disruption** to HR and staff

- A perceived **culture of blame, fear and conflict** within building procurement[6]

- **Opening a "can of worms"** that would have been easier to not draw attention to

- **Information request overload** – everyone seems to want feedback these days no matter how small the product of service, which can put people off being part of the process

- **Lack of knowledge** around the area (so stick with us!)

Whilst we hope we've already convinced you of the many reasons why POEs are worthwhile for the project team, we know that you will need to get **clients on board** with the process by communicating **what's in it for them.**

> " The barriers tend to be financial, and unearthing things that are a potentially embarrassing to the project sponsor. But, in my experience, that is not what happens. You get really good feedback and generally find that the buildings are 80-90% there but require minor physical or behavioural use changes that can usually be resolved with very little budget."

Nigel Oseland, Environmental Psychologist & Workplace Strategist

> " The greatest challenge when conducting POE is getting all necessary parties to participate. Everyone is busy, and it can be difficult to find the time to provide thoughtful answers to the survey. TKD incentivizes our clients by sharing the data and lessons learned so they can better understand how they are using their building and how they might be able to use it more efficiently."

Tsoi Kobus Design, Architecture,
Design, Planning & Development Practice, Boston USA

GETTING YOUR CLIENT ON BOARD

The Commission for Architecture and the Built Environment have outlined 6 Values[7] that exist within a **well-designed built environment.** We want to arm you as part of the project team with a few striking **business cases** for how conducting a POE can improve each of these 6 values – they might just spark your client's enthusiasm:

VALUE	HOW POE CAN HELP
Exchange value: The amount your client could sell their building for.	Offices rated in the top 20% for the **quality of design** can charge **22% higher rental rates** than those in the bottom 20%.[8] A recent analysis[9] also revealed that gaining **BREEAM certification,** which includes POE as part of its process, has a significant effect on rental rates, outperforming non-certified assets by more than **100%.** So, although doing a POE may incur costs, demonstrating that your building has a **well-considered design** will benefit the exchange value in the long term.
Use value: How the building contributes to productivity, profitability, competitiveness, staff retention and repeat business.	As staff costs are the highest costs to any office-based business (the UK Green Business Council estimate this as up to 90% of turnover[10]), carrying out checks to ensure that their working environment is optimised will bring benefits to overall business outcomes in terms of **improved performance, reduced absenteeism and better health, well-being and engagement.**
Image value: The building's 'wow' factor that creates a strong corporate identity, vision and reputation.	With a rise in the focus on human centred design, buildings that demonstrate a care for staff wellbeing are more likely to **attract young talent,** with 85% of young employees now seeing this as a key determinant of whether to work for a company.[11] Conducting a POE demonstrates care for staff health and wellbeing, and showing that staff are happy through POE results is a great way to **set your company apart** from others. Gaining certification in standards such as WELL and BREEAM can also do your image the world of good; **certification is a 'wow' factor in itself,** and positive findings from the certification process can attract visitors and staff and create PR opportunities.
Social value: How a building encourages connections between people, social interaction and social identity.	Creating a sense of community within an organisation can have huge benefits; organisations with high social capital (networks of relationships that enable society to function well) have **lower turnover rates, higher economic returns and more effective virtual communication skills.**[12] A POE can be used to discover what more could be done to create an environment like this, in line with the particular organisation's culture, such as providing staff with an area for socialising or space for informal meetings. *You can read more about how to use human centred design to enhance a sense of community in our previous design guide here: **interface.com/whitepapers**
Environmental value: The sustainability of the building and its use of natural resources.	Figures show that, on average, buildings consume between 1.5 and 2.5 times their predicted values. This performance gap between design intent and actual energy use is partly due to the way the building is managed and how occupants behave in the building.[13] Carrying out a POE can help **minimise a building's environmental impact,** both in measuring resource use against targets, and as a catalyst for **awareness** and **behaviour change.** For example, one POE conducted by BRE for the Carbon Trust identified that staff weren't initially aware of sustainability features of the building; highlighting this acted as an educational exercise - *'It made me more aware of things - I turn taps and lights off now and am more aware of recycling in the office'.*
Cultural value: The extent to which a building creates a sense of place and connects us to culture, other generations, national identity, and the local area.	By including questions around cultural value in a POE, the sense of connection between building occupants and the local environment or community can be explored (e.g. working in partnership with local communities as a Corporate Social Responsibility effort), which is important as feeling a sense of **placelessness can be detrimental to self-identity and wellbeing.**[14] According to Kellert, creating a **cultural attachment** to place and placemaking can increase both loyalty to, and comfort within, a physical space. This can lead to **increased staff productivity and retention.** Further, we know that companies prioritising employee engagement and well-being outperform those that don't by an average of 10%.[15]

BENEFITS FOR THE FACILITIES TEAM

There is an increasing need for the project team to get **Facilities Managers** (FM) on board – not only are they a very valuable resource to have on a team (as they have good knowledge of building systems and how it works already) but they'll also understand the **existing constraints** and how to get around them.

Unfortunately, the **Facility Manager's opinions often aren't considered from an early stage.** However, we would encourage you to get them involved at the beginning of your project in order to iron out any facilities issues and glean insights early on, particularly if you are refurbishing a building they know well. So, here's how to get them on board too…

Conducting a POE means that the Facilities Managers could:

- **Improve space utilisation** based on actual space usage
- **Gain early warning** of potentially serious problems that can be avoided by addressing them promptly, such as inefficiencies in building operation and health and safety issues. For example, one POE identified staff propping open fire doors with fire extinguishers.[16] Missing or ignoring issues at an early stage can lead to significantly higher remedial costs.
- **Reduce occupant discomfort, dissatisfaction and subsequent complaints.** Results from the previously mentioned POE also found employees were having to bring in their own plug in heaters and fans to address their own thermal needs, as they were not provided within the building.
- **Help measure progress against targets,** such as energy and water consumption.

BENEFITS FOR THE OCCUPANTS

It may seem obvious that the occupants would be on board with this process, because isn't the whole point of POE **to make the building better for those that inhabit it**? However, getting them to see the value in their on-going involvement through responses to questionnaires and participation in interviews and focus groups, on top of their existing workloads, is an incredibly important part of the POE process. You need to show them that **they will be heard.**

By involving the occupants in the process from day one, you can not only inspire them by **sharing your vision** for the future of their work environment and demonstrate how it really will **benefit them,** but also keep them **properly informed** and make sure they have given **consent** to taking part (we're not trying to break the law here). You want to **listen to their needs** and **consider them in your design** to improve their health and wellbeing. What have they got to lose?

"

Clients find that participating in the POE process gives them valuable facetime with building users… This can make a world of difference for users and contribute to a transparent, supportive and personal work environment."

Kerry Drake, AIA (Associate at Payette) and Tom Simister, AIA, LEED AP (Director of Space Strategies at Payette).

"

If organisations want to get the most out of their biggest resource [their employees], offices have to change, and soon. It's as simple as that."[17]

Elizabeth Nelson, Research Director at Learn Adapt Build

SO, WHAT DOES IT COST?

As you can see from our previous values table, a POE should not be seen as an expense, but as a way of **adding value to a business.** However, we understand that this question will still pop up.

The cost of a POE is dependent upon several factors, such as:

- The type and number of methods used to collect information
- The amount of staff time required
- The need for specialist equipment
- The size and complexity of the building.

As such, you can adapt your approach to suit your budget. A very basic POE involving, for example, a survey and expert walkthrough, is not costly, but the **benefits** of identifying ways to make savings and improvements can be extensive. So why not?

"

If you think about it, for a client, this just boils down to having some good information about the investment you made. This is where you were, you've invested all this money, and this is how well it turned out. Why would you not want this information?"

Paige Hodsman, Concept Developer for Offices, Saint-Gobain Ecophon

CHAPTER 3: PREPARING FOR YOUR POE

> "There is a shift towards data collection becoming much more frequent… Clients are seeing the value of having an ongoing picture of how their space is being used, as opposed to having a one-off snapshot, so that they can keep it at an optimum state as things naturally change and evolve… Projects like this are more successful when you've got a really good internal team who are running that and owning it."

Rosie Haslem, Director at Spacelab

> "The advantage of doing things 'in house', if you can train your people, is that the insights are much more immediate. So, once you've done the data collection yourself, and the design, there's a much greater integration. The analysis team and researchers who have collected the data can sit alongside the designers."

Rosie Haslem, Director at Spacelab

WHO NEEDS TO BE INVOLVED?

Starting to feel convinced? Great. But, at this point, you may be thinking: **'How on earth am I going to find the time and resources to do this?'** Well, the good news is that there are a growing number of **experts and services** out there who you can get to undertake the POE with you. However, if getting a third-party involved is not feasible just yet, there are things you can do yourself, and doing anything is better than nothing!

The first thing you need to decide when considering a POE is who's going to do it. You could:

Give it a go yourself: Some think that the best way for the project teams to get involved with, and take on board, the findings is if they do the POE themselves. Start small and **learn by doing!** You might want to bring in experts for certain stages, such as using a third-party survey, as designing a survey accurately can be risky business. However, you can do parts of the data collection, such as observational walkthroughs and interviews, on your own. We'll look at how in our **'Quick Reference Guide to POE Methods'** in this chapter.

Go all in: Leave it to the experts to do the POE for you. Your role? Convincing your client that this is something they should do using the **business case** we've provided in Chapter 2 and talking them through the process as the experts do their thing. The benefit of this is that the third party won't have any **emotional response or bias** when generating the findings, ensuring **impartiality.** Naturally, it may be a little tempting to 'overlook' a flaw in your design or pay more attention to the positive findings. Further, a large, complex project (for example, one that uses innovative materials and technologies) might need a **more in-depth study** similar to a research project, which no one expects you to know how to do. You will be able to use the results from both the pre and post-occupancy parts of the process to inform your current and future designs. Win-win.

Basically, whoever carries out the POE, at whatever scale, it is crucial that they **maintain their objectivity** without being influenced by any subjective viewpoints or interests.

CBRE, Photographer: Stijnstijl

WHAT CAN BE MEASURED IN A POE?

There are two main types of data that you can collect during a POE:

- **Quantitative data:** This is **numerical data** that is collected directly or information that is transformed into numerical data, such as measures of energy and water consumption, questionnaire ratings or yes/no tick box responses, temperature, lux, energy consumption data, etc.
- **Qualitative data:** This is **non-numerical, text-based data** used to provide deeper insight, meaning and context. This can be collected via interviews, focus groups, observations, case studies and comments provided in questionnaires. When collected alongside quantitative data, the human voice in qualitative data can provide **rich information** and **explain anomalies** or **reasons behind the numbers.**

Traditionally in Sustainable Design and Architecture the evaluations of buildings have focused on quantitative data to measure the efficiency of building resources. However, we are starting to put much more emphasis on, and realising the value of, a more **human-centred approach** for **creating Positive Spaces.** To do this, in addition to quantitative data, the qualitative is essential, and it basically involves something Architects and Designers already do - **talking to people.**

Within a human-centred POE, the buildings' performance in its ability to support the organisation's goals and user expectations can be measured from various perspectives:

- **Technical performance:** systems, materials, light, temperature, air quality
- **Functional performance:** space, layout, efficiency
- **Social performance:** health and well-being, communication, collaboration, community
- **Economic performance:** value for money, running costs
- **Organisational performance:** business measures, HR, PR
- **Environmental performance:** energy, water, waste
- **Innovation:** performance of innovative materials, systems and processes

In each of these areas, **evidence is gathered.** The resulting **data is then analysed,** and **conclusions are drawn** based on the findings (see our 'Cyclical Design Process' flowchart in the next chapter). Some of the above you could measure yourself, and some would require a third party. Even being able to measure and optimise half of those things would create a much more Positive Space than doing nothing.

> ❝
> **If you can't measure it, you can't improve it.**"[18]
>
> Peter Drucker, Writer, Management Expert & Professor.

> ❝
> **A survey gives everyone a chance to say what they think and as long as the data is representative, you can generalise the results across an entire workplace or an entire organisation. But then to understand why the results are what they are, you might need to combine that with discussions, workshops, interviews, observations, et cetera. So, I would say that the best results you get are when you combine different methods, because different methods have different strengths.**"
>
> Peggie Rothe, Development Director at Leesman

HOW TO CARRY OUT A POE; CHOOSING THE RIGHT METHODOLOGY FOR YOU

The methodology is the approach you take to POE. In other words, your methods should be a **carefully considered combination** of techniques to collect feedback, based on the unique needs of the building, the occupying client organisation, and the end users.

Over the years, several methodologies, techniques and packages have been developed to assess a building.[19] There is no single standard approach because there is **no 'one size fits all'** methodology for different sectors, sizes, budgets, objectives and types of building.

At least **two techniques** should be used to capture the various aspects of what is essentially a socio-physical system, to reduce bias and provide **underlying reasons** for findings and anomalies.[20] For example, in the case of a concern about poor indoor air quality, rather than assume the ventilation system itself is at fault, a **walkthrough** of the office could identify other reasons such as an increase in occupant density, occupants moving desks and covering air vents, or the introduction of partitions that block the air flow path. Basically, it's always good to **check the same thing in multiple ways** to get to the bottom of it.

There are a **variety of methods** for collecting data that you can make use of. Next up is a quick reference guide to introduce the methods you might use, whether you are initiating a POE yourself, or working with a third party. Whilst not definitive, this reference guide is something to start you off and get you thinking about how you might go about a POE…

QUICK REFERENCE GUIDE TO POE METHODS

Methods for measuring how well the building supports the organisation's goals & occupants' expectations*

Audits of energy and water consumption

Energy and water consumption data provided by the building managers can be analysed to identify trends over time and compared against benchmarks, best practice, modelling and targets set for the building during design. The Innovate UK Building Performance Evaluation programme has provided a detailed methodology for collecting and analysing **energy data.**

Organisational/ business performance measures

This is an analysis of the impact of the project on organisational performance in the longer term, by carrying out **comparative measures** pre and post the project, or over time, post-handover. Possible measures include **gathering existing data** from the HR team – they might already have some very valuable information about how the office is working and how the occupants feel about the space, as well as staff retention and absenteeism rates.

Observation

A great deal can be learned from conducting a **walkthrough** of the office to measure the physical characteristics of the space, such as: light levels and proximity of desks to windows, temperature, layout of the space, and noise levels (spot measurements can also be carried out to measure these things further). You could make these measurements using equipment, or simply walk around and write down what you see, feel and hear, to give you a clearer idea of what exactly could be improved on.

An expert will record their observations guided by a **standard checklist,** for example the Soft Landings Checklist and the AUDE Guide to POE 'Observational Evaluation Sheet.'

Physical monitoring, testing and condition surveys

Carrying out **continuous measurements** of light levels, noise levels, indoor air quality, temperatures and CO_2, as well as the spot checks referred to above, provides quantitative data, objective data and enables any reported problems with the internal environment to be pinpointed, investigated and explained. Additional checks can be carried out on the building fabric by experts, such as building condition surveys, thermal imaging and air pressure testing, if there is an identified need.

Study of records

Background project information might include Business Case documentation, project files, briefing documents, concept and detailed designs, Operation & Maintenance files and other handover documentation and operational policies.

This may also include a **cost analysis** i.e. an analysis of project delivery costs and operation cost. This can provide a better understanding of the **long-term value** of the project.

Consultations with clients, facilities manager's & occupants

You can get feedback from building occupants using a variety of methods, including **questionnaires** (paper based and electronic), **structured/ semi-structured interviews** (face to face, phone, group), and **facilitated focus group discussions.**

Leave the full-blown **surveys** to the experts. However, you could ask a few simple questions about satisfaction via a company's existing communication system, both before & after design/ construction. Alternatively, you could gain responses from an entire 'audience' using software such as **Direct Poll,** which allows you to gather live feedback during meetings and presentations. Examples of existing standard **occupant satisfaction questionnaires** which you could use or gain inspiration from include: The Office Environment Survey and the BUS questionnaire.

Gathering a group together to discuss a project in a facilitated, non-confrontational **focus group** setting to learn from their **shared experience** (i.e. what worked well, what did not and what should be done differently) can be a good method of sparking ideas from the participants. From this, lessons, solutions, and recommendations can be developed.

Interview questions should be **non-leading** and **open ended.** For example, a leading question might be, 'Are you happy with the layout of the office?', whereas what you really should be asking is, 'How do you feel about the layout of the office?' This leaves them open to speak fluidly, and not simply answer 'yes' or 'no.'

*See Appendix 1 for pros and cons of each of these. If you're ready to dive in, this might help you consider which ones to include in your methodology.

CHAPTER 4: INCORPORATING POE INTO THE DESIGN PROCESS

WHERE DOES POE SIT WITHIN THE DESIGN PROCESS?

In Stage 0 of RIBA's Plan of Work guidelines[21] one of the Core Objectives is to 'identify client's Business Case and Strategic Brief and other core project requirements.' In other words, you should find out **what** the client really wants and **why.** This comes before developing the 'Initial Project Brief' and reviewing the 'Site Information' in Stage 1.

As such, doing a **pre-occupancy evaluation** before anything else helps the project team develop the brief with the client as part of the **intelligent briefing** process (as mentioned in Chapter 1). The pre-occupancy study will **flag up issues** with the existing space and the way it functions, setting you up nicely to be able to create a design brief that aims to improve those things.
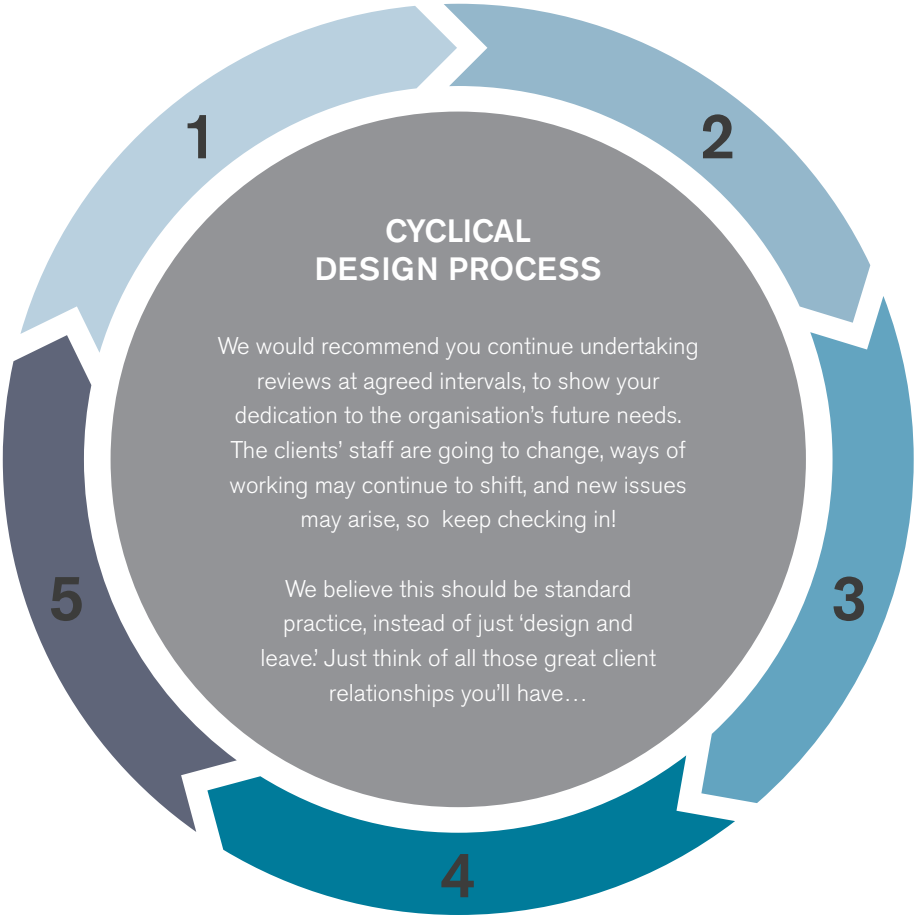
The **post-occupancy evaluation** is included in the **'Handover Strategy'** in Stage 7. This includes **workshops** to consider **lessons learned** from the project. But when does this take place, and for **how long** do these evaluations go on?

Traditionally, a post-occupancy evaluation is carried out **after the end** of the defects period, once the building has been **fully occupied for 12 months** so that the snagging has been addressed and the building and occupants have had a chance to settle in. This also gives time for staff to go through the **'honeymoon period'** of moving into a brand-new building that can cloud their actual experience.

On-going assessment of a building in-use rather than a one-off evaluation after the completion of a project can also be added into the process and is a valuable activity. Ideally, this process would be **cyclical** ('feedback for feed forward') and conducted at **regular intervals** over a building's lifecycle, to monitor how well the facilities **continue to support the occupants and the business over time.** This takes the clients' changing needs into account and helps to inform the future plans for their buildings.

CBRE, Photographer: Stijnstijl

THE POE PROCESS

We have created a suggested **stage by stage guide to doing POE,** expanding on the ideas laid out in RIBA's Plan of Work, which you can follow or adapt with your project team, if that's what you decide to do. It should also give you a sense of the process a third party might lead you through.

CYCLICAL DESIGN PROCESS

1

2

3

4

5

We would recommend you continue undertaking reviews at agreed intervals, to show your dedication to the organisation's future needs. The clients' staff are going to change, ways of working may continue to shift, and new issues may arise, so keep checking in!

We believe this should be standard practice, instead of just 'design and leave.' Just think of all those great client relationships you'll have…

1. Strategic definition

Before carrying out a POE, you should:

- Establish the **need**
- Talk to the client and find out **aims and business targets** (e.g. improve collaboration)

Next, you should:

- Agree the **methodology** and **frequency** of measurement
- Assign **roles & responsibilities** to members of both yours and your clients project teams
- Agree & put aside a **budget** for the POE

2. Preparation & Brief

Carry out the **PRE-occupancy evaluation:**

Undertake your data collection **methods** to:

- Gather information about the **building's performance**
- Collect **feedback** from occupants
- **Observe** occupants in their existing space

Use the insights you have gathered to:

- Create a **brief** with your client
- **Inform your design proposals**

(e.g. if your survey highlighted noise levels as a problem in the office, the brief would include the need to address poor acoustics within the new design, and an appropriate design response could be to incorporate acoustic panelling or partitions between areas of focused work and meeting spaces)

3. Concept Design & Developed Design

Develop the **design proposal** and present it to your client, making sure to:

- Highlight where you have **addressed the issues** raised
- Ensure that all relevant feedback and documentation is stored and **accessible to make comparisons** after the design process is complete during the **post-occupancy evaluation.**

4. Handover & Close Out

Collect data for **initial review.** Once the occupants have moved in:

- **Revisit the methodology** used for developing the brief
- **Gather feedback** on/observe the use of the space.

Remember:

- This is the **honeymoon period,** and as such, insight may differ from later reviews.
- It is an opportunity to address any **initial issues** with the space as part of a 'settling in' process.

At this point, it would be a good idea to:

- **Remind all parties** of the POE
- Inform participants **what will be required** from them during the post-occupancy stage.

5. In Use

Time for the **POST-occupancy evaluation study:**

- Undertake your data collection methods again to get updates on the **building's performance, feedback** from occupants and to **observe** how the newly designed space is functioning.
- Now is the moment you've been waiting for - you can make **comparisons** between insights from each stage, such as:
  - How has the space improved?
  - Have any new issues been raised?
  - What else needs to be changed/improved?

Feedback your findings to all those taking part. Consider how to take on board the **lessons learnt** to aid in future designs/projects:

- If something worked well, you'll want to do it again.
- Improve something that didn't quite work next time!

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THE POE PROCESS FROM AN ARCHITECT'S PERSPECTIVE

"

Survey questions are created to match goals and are compiled into a database. We believe a POE survey yields the most successful result when conducted one, five, and ten years after project completion. This duration offers the client time to settle in and acclimate to their new surroundings, experience the functionality of the space and receive feedback from all occupants.

TKD (Tsoi Kobus Design) implements a variety of information gathering tools in the survey phase. These tools include direct email survey, third party services such as Survey Monkey, and in person interviews. Pure survey has limited value—we believe that speaking directly with the client and users produces the best response… This allows the user the opportunity elaborate and clarify their responses.

The data from the survey is then analysed internally and presented to the client… POE becomes lessons learned for the design team and client, and precedent for future design."

Richard L. Kobus, FAIA, FACHA, Tsoi Kobus Design
(Architecture, Design, Planning & Development Practice, Boston USA)

TAKE-HOME ADVICE ABOUT THE POE PROCESS FROM AN ARCHITECT'S PERSPECTIVE

"

1. Work with your client to define what the factors you are trying to achieve are and how can they be measured; develop the framework for how these goals will be measured early in the development of the POE process.

2. Ensure client cooperation. If your client is not on board, you will not be able to complete POE.

3. Ensure buy in from the user groups. If your client has committed to POE but the user groups are not into working with you, you will not get valuable data."

Richard L. Kobus, FAIA, FACHA, Tsoi Kobus Design
(Architecture, Design, Planning & Development Practice, Boston USA)

CHAPTER 5: WHAT TO DO WITH ALL THE INSIGHTS

USING THE DATA

The data has been collected, so now what? The next stage will be to figure out **how** you're going to use the data and **understand** what it all means. How the data is analysed depends on the information you have gathered, which in turn depends on the **techniques used** and **who collected it.**

> " Analysing the data is the coolest part! Because that's where you find out, "Wow, I never knew that those two things might be related to each other." It's in analysing the data, and comparing and contrasting, where we learn what we didn't know before. When you have data, you can have a lot of fun and you can start to build hypotheses and open up the door for all kinds of new findings."
>
> Paige Hodsman, Concept Developer for offices, Saint-Gobain Ecophon

If you used a **specialist,** they'll do the analysis for you, but you may want to ask them to explain **how** they do that to give you a clearer insight into the results and help you explain the findings to your client.

If the **project team** has gathered the information, you will hopefully have a combination of **qualitative** (text based) and **quantitative** (numerical) data that **complement each other.** So, what do you do with it?

- The **quantitative** data can be analysed to give you **before and after statistics** to compare and draw conclusions from (i.e.: if 25% of occupants were happy with the space pre-design, and 80% of occupants are happy now, you can give yourself a pat on the back!). If you have employed survey services or apps, they'll do this part.

- The **qualitative** data will be more time consuming to interpret, as there is usually a lot of text to go through. We've found **colour coding** qualitative feedback such as interview responses (using a highlighter or changing the text colour) can help identify and group themes together (i.e.: green for spatial issues, orange for thermal comfort, blue for acoustics and red for anomalies). You could also look for key words that keep coming up from different interviewees, such as 'lunch' – what are they saying about lunch? That they have to eat at their desks? That they don't get a long enough break? These themes can help paint a picture of what needs to be addressed. Hopefully, by the time you get to the post-occupancy, the only mention of lunch will be that they have a beautifully designed area where they can sit, unwind and eat with their colleagues…

Whatever information you may have, it is important to keep in mind the **purpose of the POE** when you get to the analysis stage. For example:

- **What** are you trying to learn and **why?**
- **What** will be done with the information gathered?
- Are you intending to make **changes** to the existing building based upon information gathered?
- Are you gathering data to **inform decision making** on new projects?
- Is the data being gathered to measure whether existing **targets are being met?**
- Are you making **comparisons** between buildings, departments or over time?

SHARING THE INSIGHTS

Once the analysis has been carried out, the findings are usually collected and summarised in a **report.** POE reports typically include:

- Basic building information
- Findings illustrated with charts, photos, quotes and graphics (see examples in Chapter 6 case studies).

Thankfully, there has been a move away from producing long formal reports (which can be wordy and complicated) to providing a **summary** in infographic or presentation format, with the option of a full report available if more detail is required. New **digital methods** can also be used to **visualise** the findings to make them more user friendly for both the project team and the client. For example, Architecture firm Payette use "word clouds and selected quotes" as "graphic techniques to bring the story to life."[22] This makes the findings much more **accessible** to all users, not just the technical experts, and is of course nicer to read!

A key part of this report should be identifying **what has been learned** through doing the POE and any recommendations for improving the building's performance. These **insights** will help you create an action plan.

TURNING INSIGHTS INTO ACTIONS

To stop the POE being carried out as a 'tick box exercise' and get the most out of it, you should work out how the lessons and recommendations will be applied to the project at hand and follow through with action. That is the point, after all…

These actions may include:

- Adjustments to temperature set points (if people are feeling too hot or too cold)
- Changes in layout (if a more flexible layout is suggested to support new ways of working and provide opportunities for collaboration)
- Changes to products or materials (if a particular product or material has been identified as performing worse than expected)
- Better information and training for operators of the facility.[23]

If the information is to be used to inform the decision making for the **design and planning of future facilities,** actions may include the development of recommendations to **inform the brief, planning, design and construction processes.** For example, if a product or material has been identified as performing particularly well, then you'll want to use it again!

It is important to involve the building users, including the Facilities Management team, in the action planning process. Keeping everyone in the loop makes POE a **collaborative process** with **better outcomes.** They should also be provided with **regular feedback** on progress. For example, make it clear if actions or suggestions have been implemented, and if they have not, make sure you fill them in on the reasons why. You don't want them to think you are ignoring their suggestions, when really you may have been faced with something like cost or space constraints.

So, that's it! The process from start to finish. We hope you aren't feeling bogged down with information, but instead inspired to take all you have learnt on board in your next project. Take a look at how others have approached POE in the next chapter to give you some more ideas.

"

I would recommend every time, use the data to inform your workshop and play it back to the employees… They will have a better experience at the end if they have somehow been involved in the process and have been asked what they think, and they know it's being designed for them and not based on someone else's opinion."

– Peggie Rothe, Development Director at Leesman

CHAPTER 6: WHO'S DOING IT? CASE STUDIES

We have brought together **three case studies** that illustrate what we've been talking about so far. Each example offers a different approach to POE, which we hope will inspire you and demonstrate how you can adapt the knowledge you've acquired from reading this guide according to the type of project.

Firstly, we look at **Spacelab,** a research led design studio who offer evidence-based consultancy, interior design and architecture services, and focus on carrying out a POE on all projects. The Spacelab case study is an example of a POE that was used to help the client work out what they needed from a **new office.**

Next, we move onto a **BRE** (Building Research Establishment) case study of a project on their Watford office. The BRE case study demonstrates how occupant feedback can be used to make decisions on how to improve an office space during a **refurbishment** and to measure the success of the project.

Lastly, we will talk you through an experiment carried out by **CBRE,** a commercial real estate firm who have developed their own evaluation tool. The CBRE case study demonstrates how a multi-disciplinary approach to POE can be used to measure the impact of **small changes to an office.**

So, let's get inspired…

CBRE, Photographer: Stijnstijl

SPACELAB

Project: Haymarket Media Group
Research team: Spacelab
Design Team: Spacelab

OVERVIEW

In order to release capital, maximise value and increase spatial efficiency, Haymarket Media Group were looking to sell their existing office and lease a new property. They also wanted to bring together their many internal brands, which had been working in very segregated areas of their existing building, to create a **collaborative and creative business environment** which could **evolve and adapt** as time went on.

They approached Spacelab with this vision and tasked them with producing a detailed brief to **aid in their search for a new office,** based on in-depth research into how the business could work better in the future. Once a property was found, Spacelab **designed and created their new workplace** to reflect and support the organisation's desire to work more collaboratively and creatively.

OVERALL METHODOLOGY USED:

- Workshops
- Interviews
- Online survey
- Social network analysis
- Ethnographic observations
- Utilisation / occupancy study
- Spatial analysis of connectivity

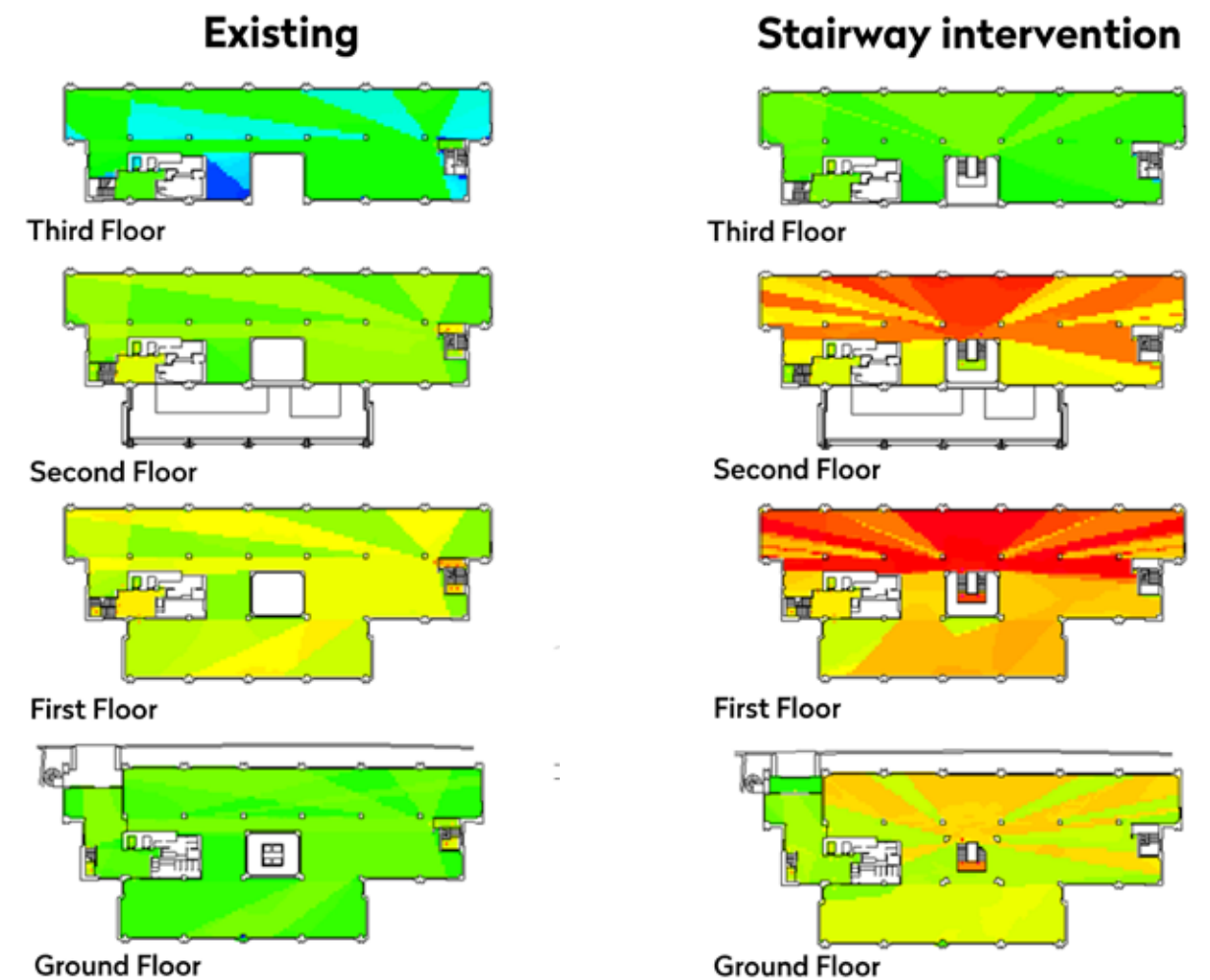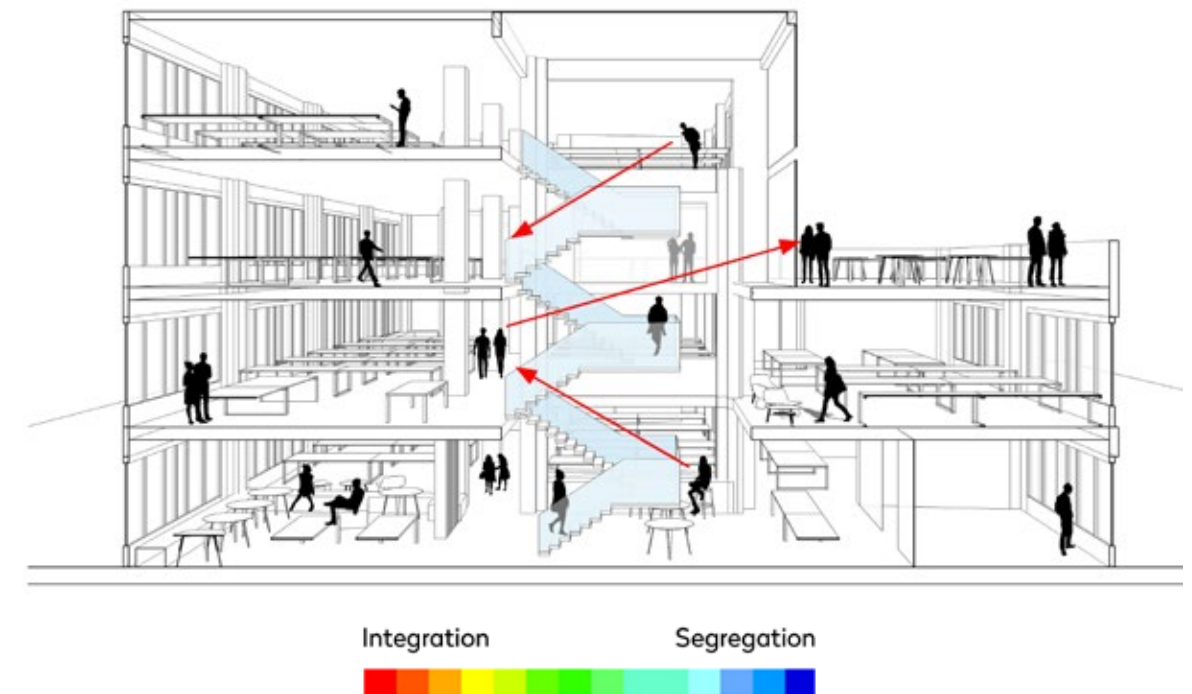© Haymarket Media Group

THE PROCESS

Forming the brief (pre-occupancy): Qualitative and quantitative data was gathered in a very **people-focused** 'discovery' process. After the data was gathered, it was clear to Spacelab that a more **agile** way of working could be achieved. This led them to develop a strategy for a consolidated and connected building, resulting in a more **spatially efficient, inclusive and integrated space.**
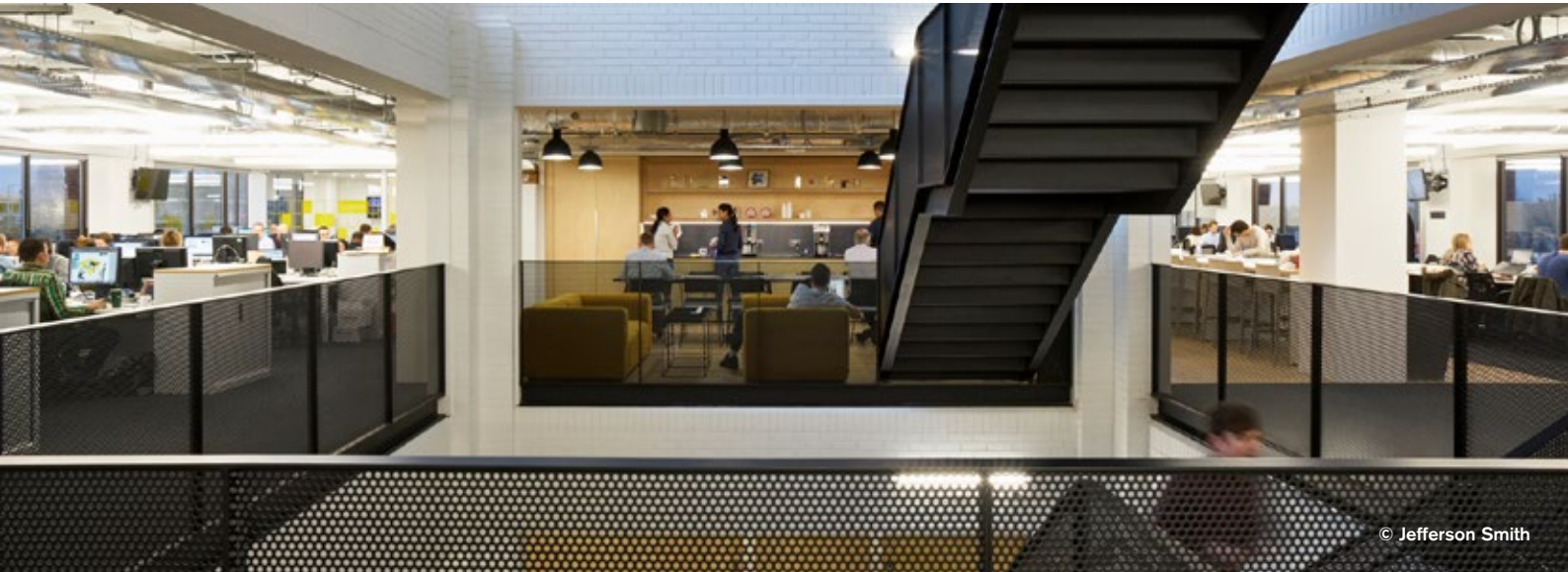
Property search: the above brief was used as a basis to help with the search for a perfect new space that had the potential to facilitate what was needed. The original office was 90,000sqft, and the aim was to reduce this down to 70,000sqft. However, Spacelab were able to prove that they could fit within just 45,000sqft. Using their specialist spatial analysis software to model and analyse how spatial interventions could **optimise the building's functionality,** the team identified an opportunity to connect the whole building by creating a new central staircase through what was previously an external courtyard in the heart of the floorplate. The specialist software was then used to **visualise the impact** this would have on the space, enabling the client executive team to see the change for themselves and **realise the value** of investing in the work.

Post-occupancy evaluation: a year after the business had moved into the new building, Spacelab carried out their post-occupancy evaluation to analyse and evaluate how **people were adapting** and how the building was **supporting the business.**

What they did:

- **A one-week utilisation/occupancy study** to understand how people were adapting to the new way of working, and which spaces were either successful or needed to be tweaked to better support staff.
- Another **online survey,** which echoed many of the questions asked in the original survey during the data gathering process at the beginning of the project, to gauge how perceptions and feelings had changed through the move, and whether satisfaction levels had increased or decreased.

© Jefferson Smith

Integration   Segregation

Existing

Third Floor

Second Floor

First Floor

Ground Floor

Stairway intervention

Third Floor

Second Floor

First Floor

Ground Floor

© Jefferson Smith

© Jefferson Smith

FINDINGS

Overall, it was found that the move had been hugely successful, in terms of **appropriate desk to head ratios** and **positive staff satisfaction.** They were also able to identify some **opportunities for further optimisation.**

Some of the **key findings** include:

- **Huge spatial efficiencies** achieved: 52% reduction in total Net Internal Area (NIA), whilst also increasing the provision of shared facilities in the building and providing a **10-fold increase** in the number and variety of 'alternative' workpoints (such as sofas, soft seats and high tables) compared with the previous building.

- People embraced the new way of working and **'non-allocated desking':** the business now has **7 desks for every 10 people,** as well as **6 'alternative workpoints' for every 10 people** (1.3 total workpoints per person), and yet average desk occupancy remained at **46%.** In other words, despite the reduction in desks per head, desk occupancies remained the same as before – indicating **opportunities to accommodate even more people as the business grew.** Also, the usage of the desks evolved to a more 'agile' profile, with people using them for shorter periods of time, for certain tasks, as well as using other types of workpoints for other tasks.

- **Increased visual connection** through the building **(94% increase)** brought **greater collaboration** between the teams: there was a **20% increase in face-to-face communication** with colleagues **within departments,** and a **27% increase in face-to-face communication** with colleagues from **other departments.**

- **Decreased dependency on meeting rooms:** there was a **48% decrease** in the number of staff that thought bookable meeting rooms were 'quite or very important', as the culture had shifted to one where people met more informally and in more open spaces.

- Staff were very **positive and satisfied** with the new office, especially those who were employed after the move: the proportion of staff reporting that it was an **enjoyable place to work** went up by **21%.**

- People were **adopting the new way of working** so well that there was a need to install additional plugs throughout the café / 'social hub' area, to allow even more people to work in these 'alternative workpoints', and for longer periods of time.

ADVICE ABOUT THE POE PROCESS FROM ROSIE HASLEM, DIRECTOR AT SPACELAB

"

If you can get a hold on what the vision is for the future of the business… ask, 'Why are they investing in the project? What are the key drivers?'

That's where the post-occupancy is able to touch back on, 'This is what you wanted to achieve with this space, have we reached it?'"

Consider "Why are you doing a post-occupancy, what are you getting out of it and what are you going to do with that data? There's nothing wrong with it being a success story, that's great, but if there are learnings, what are you going to do with them? Is there time, money and openness to make the changes that are needed?"

"Are there any small things we can to do that might make everyone's lives better, simply? That's really what it's about. It's about creating a space that works for everyone using it."

"Do some further research to better explain what you're observing – such as qualitative feedback on quantitative occupancy data. Personal insights in to why people don't sit in a particular area enrich the picture of how a space is actually working and point to potential 'quick wins' to solve a problem."

"We should challenge a simple conception of what 'post'-occupancy means. We have to ask ourselves, 'At what point is a project finished?' as a space is an ever-evolving thing. We should really be thinking of ongoing analyses post-move in, rather than just focussing on a single snapshot."

BRE

Project: Building 18 Refurbishment Post-Occupancy Evaluation
Research team: BRE POE Team
Design Team: BRE in-house design team

OVERVIEW

In 2014, the BRE completed their **4-month refurbishment** of Building 18, a three-storey purpose-built building constructed in 1978, situated in the Watford HQ site.

The key objectives of the project were to provide a modern, up to date working environment that would **support new ways of working in the 21st century;** the previous layout of cellular offices lining a central corridor did not support team working and collaboration, and the look and feel of the space was very dull and uninspiring. The refurbishment needed to be as **sustainable** as possible in line with BRE's ethos whilst **improving the health, well-being and satisfaction of staff.**

OVERALL METHODOLOGY USED:

- Workshops
- Interviews
- Observational walk through
- Questionnaires
- Focus groups

THE PROCESS

Forming the brief (pre-occupancy): Although no formal pre-occupancy evaluation was carried out, workshops and interviews were carried out with staff and managers who were going to move into the building to inform the brief and design.

The refurbishment process: There was an extensive refurbishment of the entire top floor of the building. The work included:

- Removing partition walls to make an entirely open plan office space (apart from around toilets, kitchen and the plant room)
- Creating two conference style meeting rooms, a single office space for the group director and a break out area for informal meetings within the office space
- General work and redecoration (new carpeting, refurbishing the kitchenette, repairing the roof and stairwells, installing new lighting, creating an accessible toilet facility etc.)

The project used the BREEAM UK Refurbishment and Fit Out Manual for non-domestic buildings, which facilitated carbon and cost saving behaviours such as:

- Energy saving LED lighting
- Waste minimisation
- Reuse of existing furniture
- Responsible sourcing of materials
- Specification of water efficient sanitary equipment and taps in the toilets and kitchen

The health and well-being credits in BREEAM seek to improve the quality of life in the building by recognising refurbishments that encourage a healthy and safe internal environment. This was prioritised by providing:

- Large windows and internal glazing on meeting rooms and offices to maximise daylighting and views out, with blinds to control glare where necessary
- Natural ventilation via openable windows
- Good indoor air quality and appropriate levels of acoustic performance

Post-occupancy evaluation: The BRE POE team carried out a study of the project 12 months after handover, which included:

- **Reviewing relevant project data** including floor plans, BREEAM reports, and cost information
- **Interviewing** key project team members including the BRE Estates team, QS, and the BRE Director, who was the 'client' for the project
- **Focus groups with occupants of the refurbished offices:** All occupants were invited to attend a session at lunchtime via email, with lunch being provided to encourage attendance. The aim of the focus groups was to feedback occupant questionnaire findings to validate them and provide more detailed qualitative information to explain the results
- **Focus groups with other occupants** working in the building (but not this office) during the refurbishment who may have been affected by the works, to see how successful the measures used to mitigate disruption and disturbance had been

- An online **occupant questionnaire** – BRE's standard POE questionnaire was used, which covers:
  - Working patterns
  - Satisfaction with the indoor environment
  - Personal control
  - The look and feel of the space
  - Facilities and amenities
  - Impact on work performance and working culture
  - Health and well-being

BRE uses a questionnaire software platform, Qualtrics, to develop and distribute their POE questionnaires. Respondents are sent an email containing a web link which takes them directly to the form. All responses were anonymous – no names or other identifying information were requested, encouraging respondents to give honest replies (and staying in line with ethical considerations). The questionnaire achieved a **high response rate of over 75%.**

FINDINGS

Overall **high levels of occupant satisfaction** were measured amongst their 160 members of staff, and **very good environmental performance.** BRE's SmartWaste tool was used to record and manage project impacts such as water, energy and materials. It found that **4.4 tonnes of construction waste per 100m²** of floor area was produced. This is **24% less than the average** for commercial office refurbishments.

The **occupant questionnaire** revealed:

- Most found the i**ndoor air quality acceptable and comfortable**

- **Daylight is bright enough** to not require electric lighting most of the day

- Occupants reported a high level of **satisfaction** with the **ventilation** and the amount of **daylight** (See Fig. 5)

- 15% of respondents reported being **unhappy with the amount of glare** they experienced, however the majority found the **shading provided** by the venetian blinds was enough to **address this**

- The highest level of **dissatisfaction was with the level of noise,** however effort was put into **optimising the acoustic performance** of the (open-plan) space and also the **behaviour of occupants** to keep dissatisfaction to a minimum. Further, since the survey took place, acoustic desk dividers have been installed to **reduce the auditory and visual distraction** (a good example of doing something with your findings!)

- 56% of occupants reported that they experienced an **improved sense of belonging** in the new offices

- 44% said that there had been **improvements in their health and well-being** (See Fig. 6)

> **"**
> The best thing about the office is the interaction with colleagues, often visual - the knowing that they are around."
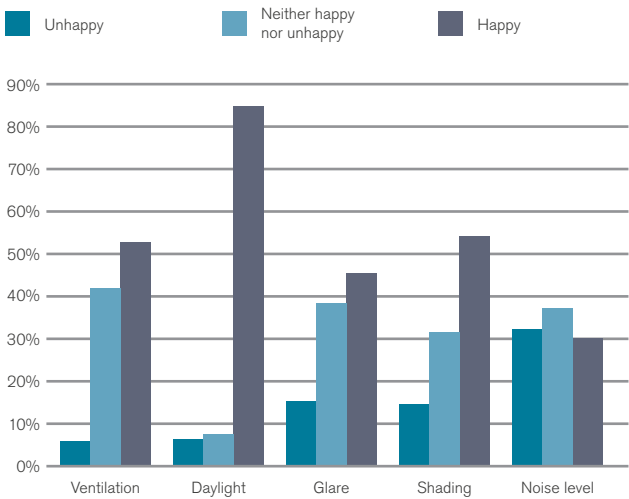>
> Occupant

Legend: Unhappy | Neither happy nor unhappy | Happy

Figure 5: Occupant satisfaction with health and wellbeing issues

Legend: Worse | The same | Better/much better
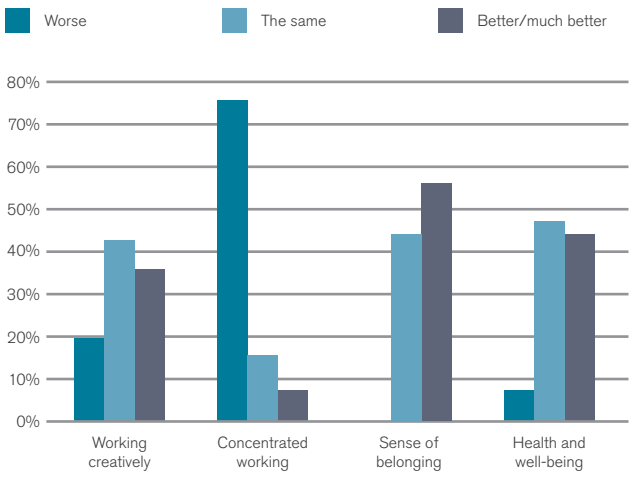
Figure 6: Impact of move on other aspects of work performance

Legend: A little worse | The same | Better/much better
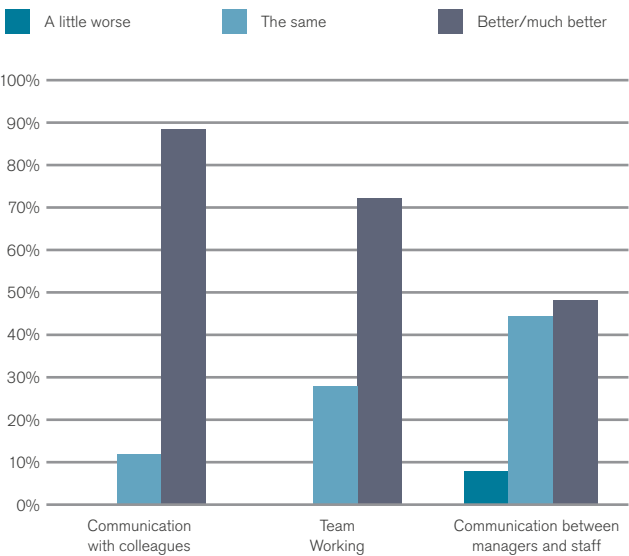
Figure 7: Impact of new offices on communication and team working

WORKING CULTURE:

One of the most striking findings was the impact of the new office on the working culture:

- **90%** of the occupants reported an **improvement in communication** with colleagues

- Over **70% improved team working** (See Figure 7)

- Almost **50% improved communication** between **managers and staff**

LOOK AND FEEL:

- Occupants rated aspects of the character of the office such as the **décor, layout and overall look very highly** (See Figure 8)

- Were happy with the amount of space overall

- Pointed out that the office felt **airy, light and spacious** making it a good and comfortable place in which to work

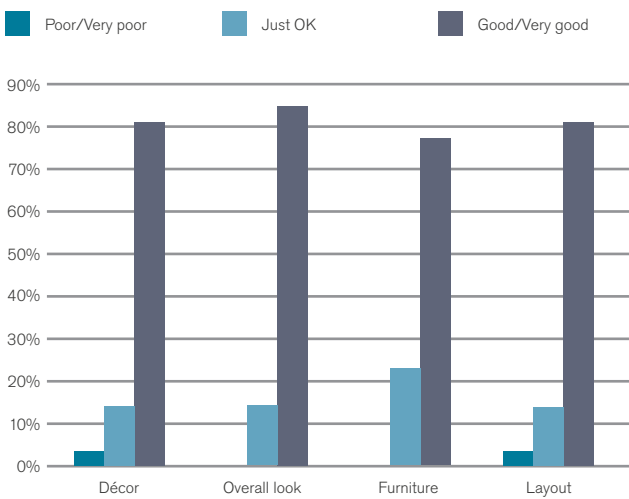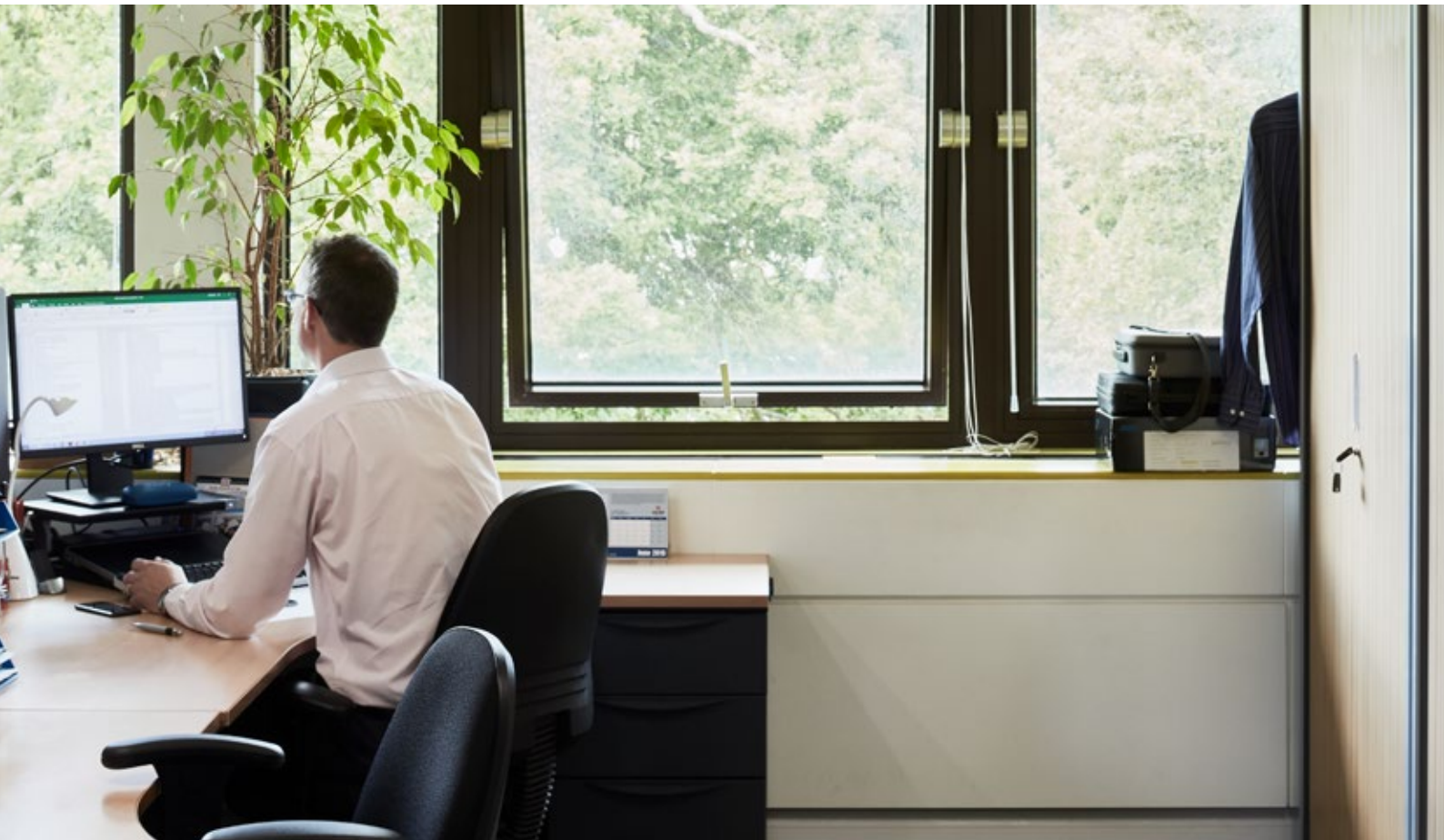- Reported a high level of satisfaction with the **quality of the furniture**

Legend: Poor/Very poor | Just OK | Good/Very good

Figure 8: Look and feel of the office

ADVICE ABOUT THE POE PROCESS FROM MINDY HADI, PRINCIPAL CONSULTANT AT THE BRE

"

Temperature, ventilation, noise, views and lighting have the greatest impact on occupant satisfaction, health and wellbeing – pay particular attention to them!"

"When planning any open plan office layout, it is a good idea to carry out a job/task analysis to find out the need for additional specialist spaces for different types of work tasks: Open plan working can clearly aid organisational collaboration, communication and team working. However, provision needs to be made so that occupants can break away for privacy and concentrated work, such as non-bookable meeting rooms and 'quiet booths.'"

"Focus on the look and feel of the office: the décor, furniture and layout of space can have an impact on factors such as staff mood, job satisfaction and mental health and wellbeing that, in turn, effect work performance."

"When undertaking a refurbishment in an occupied building, there is bound to be a certain amount of disruption for the existing occupants and/or those in neighbouring premises. Involving them in pre and post-occupancy evaluation makes them feel that their needs and feelings are being considered and enables the success of mitigation measures to be monitored and lessons learned."

CBRE

Project: 'The Snowball Effect of Healthy Offices'[24]
Research team: Elizabeth C. Nelson (head of healthy offices research team),
Wouter Oosting (Senior Director, EMEA at CBRE), Maaike Boné (Senior Director,
Advisory & Transaction Services, Occupier at CBRE), and others.
Design Team: CBRE

OVERVIEW

CBRE carried out a multidisciplinary study in their own
Amsterdam office, alongside the University of Twente, on
the **effects of the working environment on employee
performance, health and wellbeing.** The changes were
not permanent, but for the sake of a study to identify which
features are most beneficial to employees, which makes
this is a good demonstration of the process of carrying out
longitudinal research methods and implementing healthy
changes into an office environment.

Over a period of 7 months, CBRE's Amsterdam office went
through 5 changes, the effects of which were **measured and
analysed.** The findings of this study were used to inform the
design, by CBRE and MOSS (Makers of Sustainable Spaces),
of 'The Core' – CBRE's new headquarters in Amsterdam
(see images).

"

Our research goal was to see if it was possible
to create an office ecosystem that used healthy
environments, healthy choices, and technology, to
optimise an employees' performance."

Elizabeth Nelson

OVERALL METHODOLOGY USED:

Overall, there were over **100,000 data points** collected. The
research techniques used were:

- Surveys

- Biological data

- Movement tracking (to measure both activity level
  and space utilisation, using beacons which detected
  movement in those wearing the wristbands)

- Interviews

- Task performance experiments

- Daily ratings (to reveal insights such as organisation
  culture, pressure felt by employees, and effect of
  interventions)

"

To see the true effects, a control group always
needs to be in place."

Geert Stam, Senior Consultant at CBRE.

CBRE, Photographer: Stijnstijl

THE PROCESS

Forming the brief (pre-occupancy): Before any intervention took place, **observations** were made for **two months,** such as caffeine and soda consumption, time spent sitting down, light levels, amount of existing planting; the **'pre-occupancy'** part of the study.

THE STUDY

Next, 124 participants were spread over three groups at varying levels of intervention. **Activity trackers** were used in the form of **wearable technology wristbands,** which monitored health data, provided feedback, regulated activity and sleep, showed daily progress, encouraged participants to meet goals, and advertised competitions with friends and family.

CBRE, Photographer: Stijnstijl

Five **human centred changes** were made to the test zone of the office, known as the **'healthy spot.'** Each month, one change was made to see how it would individually affect the occupants (changes were implemented one at a time). These changes were:

1. Natural Space

- Wall murals of plants
- Real and fake plants within view of every work space

2. Right Lighting

- Circadian lighting (yellow tint in the morning, to blue tint in the afternoon, then back to yellow)
- Decreased glare
- Doubled brightness

3. Healthy Nutrition

- Healthy snacks
- Water pitchers filled with mint, cucumber and fruit
- Decaf tea added to the tea selection
- Individualised tips provided in the activity tracker app

4. Mental Balance

- Two rooms for mindfulness, meditation, yoga and naps
- Weekly massages offered
- Silent headphones made available

5. Physical Exercise

- Medicine balls as chairs
- Standing conference tables
- Bicycle seats
- Balancing boards
- Lunchtime walks and walking meetings promoted with a map of nearby walking paths (along with estimated time per walk)

Task performance was tested every month in various ways:

- After each human centred change, participants completed a test in four different environments (two healthy, two unchanged) to compare performance.
- Employees made **daily ratings** of their perceived performance and task difficulty using **Zijlstra's Assessment scale of mental effort (RSME).**
- Participants **measured the effort levels** on a scale from 'little effort' to 'a lot of effort.' **11,000 responses** were collected over the duration of the study.

"

One of the biggest shocks to the organisation came when the research team took away the sodas from the fridge - never to return. But it also really pushed the team into providing appealing alternatives to caffeine and sugar products."

Elizabeth Nelson

CBRE, Photographer: Stijnstijl

CBRE, Photographer: Stijnstijl

FINDINGS

Over the course of the study, from start to finish, **improvements in task performance, work performance, energy levels, happiness and health** were found through comparing data from the beginning of the study period to the end. These were:

Human Centred Changes	1. Natural Space	2. Right Lighting	3. Healthy Nutrition	4. Mental Balance	5. Physical exercise
Improvement In Task Performance	10%	12%	45%	30%	12%
Improvement In Perceived Work Performance	10%	18%	20%	16%	12%
Improvement In Energy Levels	76%	71%	78%	66%	65%
Improvement In Reported Happiness	78%	76%	66%	63%	36%
Improvement In Reported Health	65%	50%	52%	53%	71%

This study demonstrates the value in testing **both before and after** implementing any changes to an environment, to see the improvements your design has made on the health and wellbeing of the building occupants. If statistics like these won't add to your portfolio, we don't know what will!

*For a more in-depth write up of this study, we found Elizabeth's chapter in 'The Healthy Office Revolution'[25] to be very informative.

ADVICE ABOUT THE RESEARCH PROCESS FROM GEERT STAM, SENIOR CONSULTANT AT CBRE

Be prepared for response rates to be lower than you hoped for! Getting people to respond might not be as easy as you think, no matter how exciting the study. "It's difficult. You start with maybe a sign up of 50%, then you have a response rate of 70% of those." So, it's good to start with as many people as possible. Organisations don't always like being told that they might not be taking enough steps to ensure the health and wellbeing of their employees. "The natural response from a lot of organisations is, "Well, we are ready do something. We already have some food, we get people going, we already ask people what they think of the workplace." Convincing your client that they should allow time for investigation to get the most out of your design could be tricky (which is why you should use all that you've learnt from this design guide to convince them otherwise…).

There's a lot to think about! "A third of our costs at this moment are into data collection, data privacy protection, and having analysis tools on that data. Because you work specifically with people data, those are very sensitive and really need a lot of attention, so then you get into making contracts which took quite a bit of time."

If this level of research sounds overwhelming to you, CBRE have developed a 'Healthy Offices Quickscan' (https://www.cbre.nl/en/services/ tenants-and-occupiers/healthy-offices-quickscan), a diagnostic tool to help organisations evaluate their existing workplaces, which has derived from their research. They look at all of the same factors as they did in their own office study over a 6-week period. The aim is to help other office environments realise where they might be falling short and envision their potential.

In each of these case studies, carrying out the POE gave the projects team insights into the **human-centred needs** in order to create **Positive Spaces for each business and their occupants.**

Whilst CBRE made changes to their office space based on existing research, using a POE process meant they were able to **test the theory in practice and measure** exactly how effective the interventions could be. BRE and Spacelab were able to **create the briefs** for their projects using pre-occupancy evaluation methods. This enabled both to make **informed decisions** in the projects: for Spacelab this enabled them to develop a design proposal for how the new office could meet the client and occupant needs, with some creative thinking about the layout, whilst the BRE were able to refurbish their office with an understanding of the occupant needs at the forefront whilst ensuring that the organisational priorities were achieved.

Both BRE and Spacelab went on to use the post-occupancy evaluations to make **further changes** and **adjustments** once the occupants had settled into their office spaces. For example, Spacelab installed more plugs in 'alternative workpoints' and BRE introduced acoustic desk dividers in response to feedback.

Without the POE, assumptions and generalisations could easily have been made in each of these cases that not only would have **wasted resources and money** but could also have left the **clients and occupants** feeling **dissatisfied** with the results. Why not find out what the people who will inhabit the spaces you spend so much time designing really need before jumping straight in? It seems like the rational way forward to us.

CHAPTER 7: WHAT NEXT?

> " Why is it happening now? I think it's probably three-fold. The first one is that RIBA have now acknowledged feedback and POE as the final stage of their Plan of Work. The second thing is that work space is now quite different to what it was a few years ago. It's always evolving; agile working, flexible working, new ways of working etc. And the third element is probably the wellbeing agenda, because the focus there is definitely on the end user and making them more productive and healthier long-term. If you're not regularly evaluating how your building fulfils the requirements of the staff, then how do you know whether or not you are actually enhancing their wellbeing and performance?"

Nigel Oseland, Environmental Psychologist & Workplace Strategist

As the examples in this guide show, there are more and more buildings being designed to enhance occupant wellbeing. We see this development continuing in **five main directions:**

1. MARKETISATION

There are **two exciting service business models** that are developing as project teams get better at communicating and demonstrating the value of POE to clients:

- The first is for conducting the POE – we are seeing new **tools and services** developing all the time that can offer project teams the support they need to undertake POE.

- The second is the **ongoing services** project teams can offer that ensure buildings continue to support the needs of their occupants.

What can I do?

Take a look at Appendix 2 for our tips for getting started if you are ready to begin offering POE services in your projects.
You never know, by conducting POE in your projects you may notice opportunities for new services that you could develop.

> " It's an emerging market where people don't just sell the tools, but they sell their content on how to ask questions, and this might actually be a big market. This might also be interesting for architects to slowly work together on, as you can tell this is all still very young."

Geert Stam, Senior Consultant, CBRE

2. EDUCATION

In 2015, the Standing Conference of Schools of Architecture held a conference where they asked, *'How can we educate architects to evaluate their built work?'* A resolution was made by participants to **embrace POE and BPE** (Building Performance Evaluation) **in education.** Additionally, architecture schools are incorporating **POE modules** and live projects in which students work with practices to carry out POEs.[26]

As POE becomes a normal part of architectural and design training, it will become an **industry standard.** Those who are currently in industry will need to embrace it in order to compete with the services offered by up and coming project teams.

3. COLLABORATION

Collaborations between **architectural practices and academic researchers** are proliferating. This is helping architects to carry out POE in projects with those who have the **resources and expertise** to conduct them. According to RIBA,[27] these 'include small scale partnerships with individual research projects or PhD students, to larger research council funded consortia,' whilst an 'increasing number of practices have designated research leaders, with larger offices appointing research specialists to carry out POE work and dissemination'.

4. DISSEMINATION

Sharing projects and findings will mean we can **learn from each other as a community** practicing evidence-based design and **moving the POE conversation forward.** The more project teams, institutions, buildings associations and industry bodies that support and share their experience of POE, the greater the momentum. Small changes in the way we individually approach building design can have a big impact on the industry as a whole. It's already happening, but not nearly enough.

5. CERTIFICATION

There are many reasons for gaining building standard certification beyond simply improving practitioners' portfolios and profiles. And whilst WELL and Passivhaus **depend** on POE for certification, BREEAM, LEED, Green Building Council of Australia Green Star **give credit** for using POE.[28]

We foresee it becoming increasingly important for project teams to embrace POE. The Australian government has created the National Australian Built Environment Rating System (NABERS) which requires building owners to carry out some sort of POE on their buildings.[29] Does this mark the beginning of POE becoming mandatory?

What can I do?

Consider whether you would like to explore more on this topic with your team. If so, please contact Interface via designlab@interface.com.

What can I do?

Find researchers you can collaborate with - you could approach your local university and see if anyone there would be interested in working with you.

What can I do?

Follow up this call to action and share any of your POE experiences, big or small, in the public domain. You can also let us know about your POE projects by emailing designlab@interface.com

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What can I do?

Consider whether you want to go for certification for any of your projects, e.g. BREEAM, LEED and WELL. Read our Guide to the WELL Building Standard (interface.com/whitepapers) and perhaps consider contacting a WELL AP for advice. Interface also have a WELL Building Standard RIBA accredited CPD. Please get in touch to find out more via designlab@interface.com

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" **I think Architects and Designers should be introduced to POE so that they're not afraid of it. If you know what it is, how it works and how it can help you, then you're less adverse. You have to go and take a class, do a workshop and engage with the tools that are available."**

Paige Hodsman, Concept Developer for Offices, Saint-Gobain Ecophon

" **We'd love to work even more with Architects and Designers, pulling us into their projects – and if they get a brief saying, 'This is what we want,' I would encourage them to put their foot down and say, 'Look, we need more data than this, we can't design based on this, we don't know whether this is actually what you need or not, we need to take a step back and first do an assessment of what is it that you actually need.'"**

Peggie Rothe, Development Director at Leesman

" **One of the most valuable elements of POE is capturing lessons learnt and communicating them with the project team and disseminating them to the wider industry where possible."**

Dr Michelle Agha-Hossein, Sustainable Building Consultant, BSRIA Sustainable Construction Group.

WATCH THIS SPACE...

At the time of writing, Oliver Heath Design are collaborating with BRE and Interface, among many other forward-thinking contributors, on an innovative and ambitious evidence-based design project. We are over a year into *The Biophilic Office* project at the BRE Watford Campus, where we are designing 650 m² of a 1980's office using varying scales of Biophilic Design principles.

The aim of this project is to provide both qualitative and quantitative Pre- and Post-Occupancy Evaluation data to better understand how we can benefit from an improved connection to nature in the workplace. As such, over the last year BRE collected quantitative and qualitative data through a variety of methods including surveys, focus groups, room sensors and wearable technology. This baseline information (which is being collected for a whole year before the refurbishment) covers characteristics such as light (daylight and electric), acoustics, indoor air quality, thermal comfort, materials and facilities, as well as occupants' health and wellbeing.

Over the next few months, Oliver Heath Design will move forward with the technical detailed design and full specifications. Post-occupancy evaluations will be conducted for a full year after project completion to account for any skewing of feedback due to the 'honeymoon period' which we talked about earlier. The results of this research will be shared broadly through buildings and design industries in order to encourage others to promote the use of POE in practice and to share our learnings.

We hope more projects like this will take place that will add to the knowledge around how to create human-centred Positive Spaces and encourage collaboration between Architects, Designers and Researchers in undertaking evidence-based design.

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APPENDICES

APPENDIX 1 – PROS AND CONS OF POE METHODS

Method	Advantages	Disadvantages
Observations e.g. space use audits, energy walkabouts	• Requires few staff resources • Can be carried out without any end user involvement or inconvenience • Can provide quantitative data if designed appropriately • May reveal a problem that has not previously been noticed • Can be carried out in one area in detail over a specified period, e.g. a canteen over lunchtime; or over a whole building • The team can observe occupant behaviours, check they are using the building as designed and identify any adaptations they have made.	• Comparison can be difficult unless observer is given guidelines • Can provide a biased viewpoint if carried out by a building manager
Occupant Consultation -Questionnaires	• Obtains detailed quantitative, subjective data • Enables a large number of people to participate • Allows performance benchmarking • Enables a problem to be geographically pinpointed • Obtains a broad-based opinion • Can be re-administered easily to ascertain trends or respond to any remedial actions	• Requires skilled design to ensure questions are clear, unbiased and diagnostic • Requires staff time to complete, chase responses and analyse the responses received • Requires expertise in statistics and graphical presentation
Occupant Consultation -Interviews e.g. of the facilities staff, business managers	• Allows a range of aspects of an issue to be considered • Interviewees may bring up things you hadn't thought of • Rich source of in depth and anecdotal data, allowing for probing to ascertain the reasons underlying the responses from a questionnaire • Can be restricted by the time required to take part to key personnel who can be approached as part of their normal roles	• Obtains detailed qualitative data on selected issues • Removes the possibility of anonymity • Runs the risk of bias in responses • Unlikely to include any end user • Can be time consuming and thus costly
Organisational /business performance measures or project objectives	• Usually this data is already collected by companies e.g. HR data (absenteeism, turnover) helpdesk complaints, sales figures, etc. • Data should be in a form that is easy to analyse • Measures can be identified from the final business case documentation for the building	• Ethical issues in collecting or using this data e.g. confidentiality • Data needs to be at a sufficiently high level (organisation, department or group) • Often this data is not collected or collated • Obtaining/finding the keyholder takes time
Workshops/ discussions/ focus groups	• Takes minimal management time to prepare the focus group schedule provided that the purpose of the group is clear • Involves fewer staff (although for more time) • Particular issues can be explored by the group in detail • Can be flexible to allow unexpected avenues to be explored	• Requires expertise in facilitation to ensure a balanced discussion • Obtains qualitative data from a small number of staff - risk of bias • Removes the possibility of anonymity -which may affect the feedback • Can be time consuming and thus costly
Audits of energy & water consumption	• Should be easily accessible e.g. Energy Performance Certificate • Organisations should be collecting meter data as a matter of course to report against targets	• Not always easy to locate • Often regular meter, particularly sub meter, data is not collected. • Gaps in data due to problems with calibration, meter not functioning
Physical monitoring e.g. light levels, noise levels, air and radiant temperatures, CO_2 levels, air flow rates.	• Provides quantitative objective data • Enables a problem to be geographically pinpointed • Enables a problem to be pinpointed in time (e.g. by time of day) • May be taken as spot measurements or over the longer term • Can be combined with energy monitoring to assess overall building energy efficiency	• Requires expert measurement and interpretation of results • Suitable equipment may have to be hired or external consultants used • May require long term measurements and equipment being left in situ • Needs a level of acceptable environment to be defined for comparative purposes
Study of records e.g. Building Management Systems trend data, meter readings, energy bills	• Once data gathering systems are in place, studies can be carried out with few staff resources	• Requires expertise to interpret results and to set up initial systems • Requires personnel to be given specific responsibility to collect the data regularly • May require additional sub metering

Table adapted from 'Post Occupancy Evaluation – A Simple Method For The Early Stages Of Occupancy' D Jaunzens, BRE; R Cohen, ESD; Mike Watson, Faber Maunsell; Edward Picton, IBSEC http://www.usablebuildings.co.uk/fp/OutputFiles/PdfFiles/FR4p1POEFYCIBSEpaperOct02.pdf

APPENDICES

1. **Consider it early,** so you can prepare for costs, set aside a budget and be seen to prioritise an evidence-based approach to design.

2. **Collect the information,** so that it can be collated, filed & easily retrieved. This will save a lot of time, effort and stress later! This includes things like the health and safety file, user guides, building log book, energy and water consumption data, as well as existing organisational data regarding occupants e.g. HR data on staff retention, absenteeism, satisfaction and feedback.

3. **Set targets** to lay down a clear set of expectations, such as design and business requirements, to refer back to at the end. Ideally these would be discussed as part of the briefing process - the clearer these are the easier it will be to assess how far they have been achieved in the POE.

4. **Involve the stakeholders** in order to obtain a holistic picture of building performance. It would be good to include the client, FM team, project manager, business manager/owner, HR and staff from all levels of the business. Speaking to operational staff including cleaners, maintenance staff, security and reception can also be a source of valuable feedback.

5. **Engage participants;** the enthusiasm required to carry out a successful POE, for example obtaining the maximum response rate from a staff questionnaire, requires all those taking part to believe in the potential benefits of the exercise. Explain the benefits to them and communicate the value of their contributions. Ensure the contributions required from them is manageable, through things like good questionnaire design. Further, feedback the POE progress to them and any remedial actions taking place as a result of their participants, for example in an open workshop.

6. **Assign roles;** any POE requires a certain amount of time and resource from everyone involved. It is therefore important to assign responsibilities for these tasks to a named person or persons as otherwise they could be forgotten.

7. **Set the scene;** POE activities should be carried out in a spirit of mutual respect for all parties' opinions, openness, co-operation and collaboration – participants should be assured that the object of the POE is to learn and move forward. In this way they will be happy to provide and share information.

8. **Choose the right methodology;** see our section on 'choosing the right methodology for you', and their pros and cons in Appendix 1. The methods you chose will depend on the needs of the organisation, the purpose of the POE, the resource available and the characteristics of the building, but it is important to choose what will be most useful rather than just collecting data for data's sake.

9. **Look into new technology;** with the advent of new third-party services and technologies, carrying out a POE is getting easier. For example, we can now use online surveys and automated reporting (through email and phones), social media and even live video and photo sharing for walk throughs to gather data.

10. **Stay ethical:** If you're using any POE methodology that involves asking people to provide information about themselves, their opinions and views, such as questionnaires and focus groups, or collecting indirect data about people as individuals, for example HR data, you must ensure you do it ethically. These legal requirements involve confidentiality, anonymity and informed consent:

    - **Confidentiality:** no individual or personal information should ever be released to anyone involved other than your small team of data handlers. The Data Protection Act and GDPR (General Data Protection Regulation) take this very seriously… Ideally, you will even plan for how to store this information, and for how long before it is deleted.

    - **Anonymity:** any information provided by any participant must not be able to be traced back them.

    - **Informed consent:** the participants should be given enough information to allow them to decide whether, or not, they want to take part in the study. If they agree to participant, they need to sign a consent form which must be kept by you, and there also needs to be an opportunity before each questionnaire, or survey, for them to state that they still agree to their participation and make them aware that they have the right to withdraw.

11. **Make sure to remain impartial:** Try not to put words in people's mouths and look at 'negative' feedback as a learning opportunity instead of trying to brush it under the carpet. This can be hard if you are the designer, but it is essential to prevent emotions from getting in the way of the process and gaining accurate results.

12. **Share findings;** the lessons learned about what works and what doesn't should provide a shared learning resource to build on these to improve the evidence-based and human-centred design process and its uptake. Understandably, you might be reluctant to share any 'negative' results. However, no results are 'negative', but an indication of your striving to create the best building possible and apply learnings to future projects.

13. **Keep checking;** carrying out a review of building performance should not be a one off but repeated at intervals throughout the building lifecycle. After the initial POE, further regular checks should focus on the actions identified, setting performance improvement targets and measuring progress against these.

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