HKS

Designing for Health: WELL-certified Chicago Living Lab

Contents

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Introduction

Multi-year research from HKS Chicago office's relocation highlights the impact of WELL and the insights from a Living Lab culture.

The new office is more than a commercial office space - it is considered a *Living Lab*. Employees not only work in the space, but they also learn about how the role of design influences their behavior, health, well-being, and overall performance by adhering to *a culture of continued testing and evaluation.*

Applying health research to the process and practice of design allows for an understanding of how design affordances and decisions affect human outcomes.

- How do ventilation and lighting design strategies affect energy expenditures and environmental comfort?

- How can the behavioral use of a space be altered to better match with its intended program?

- How can access to nature in the indoor environment be improved in an urban high-rise building?

By addressing the well-being and occupational needs of the people in a space, occupants' experiences can be elevated.

Toward this end, the WELL Building Standard[2] was utilized to help establish a framework to guide HKS Chicago's commitment to incorporating research on health and human experience in every step of the design process.

The HKS Research team led a multi-year longitudinal research study of the HKS Chicago Living Lab, focusing on creating a place where people's health and well-being were key outcomes driven by the design process, and measured and tracked over time.

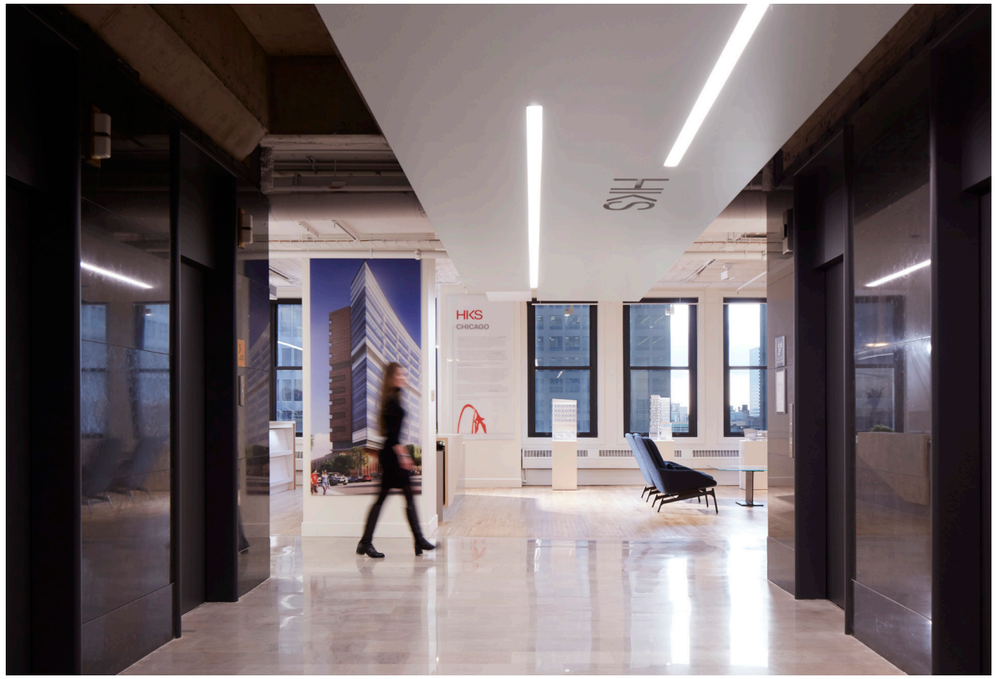
First, the HKS Research Team layered qualitative and quantitative methods to meet human, business and building performance goals. This meant monitoring ambient conditions through sensor technology while also collecting subjective measures of experience from employees (in the previous office and in the new office) through the Building Wellness Survey[3] and experience sampling. Once this was done, further data was layered by collecting real-world behavior mapping data on how the space was being used by its occupants, energy use, as well as financial returns on investment for specific design decisions. As a result, this case study aimed to tell the story of lessons learned by integrating research into the design process and measuring impact.

The office earned both LEED Platinum for Commercial Interiors v4 (April 2018) and WELL Gold for New and Existing Interiors v1 (December 2020) certifications.

> *When you start with curiosity and a focus on sustainable solutions for occupant health, there is inherent resilience in the design.*
>
> **Kate Davis, NCIDQ, LEED AP, HKS Global Practice Director**

[2] Visit https://v2.wellcertified.com/en to learn more about the WELL Building Standard.
[3] Visit https://v2.wellcertified.com/en/v2.1/community/feature/3 to learn more about the WELL survey requirements.

Previous Office *111 West Washington*



New Office *125 South Clark*

Executive Summary:

How our Chicago Living Lab office adapted to a new WELL-certified design and a new location.

Air Quality.

Displacement ventilation and low-emitting materials led to increases in both objectively measured air quality and employee satisfaction.

90%
of employees reported being satisfied with the air quality in the new office

Lighting.

High-efficiency LED circadian lighting design allowed for energy savings and higher employee satisfaction with lighting conditions in the new office.

328
Equivalent Melanopic Lux (EML) measured in the new office (150 EML min. requirement by WELL)

Acoustics.

Acoustic treatments in the new office resulted in lower ambient noise compared to the previous office, and higher acoustic satisfaction among employees.

9 **dBA decrease in the new office**

Access to Nature.

Employees were engaged in the greenery selection process, leading to an increase in satisfaction with access to nature in the workplace compared to the previous office.

90%
of employees reported being satisfied with access to nature in the new office

Designing for a Variety of Work Experiences.

An increase in the amount of shared office spaces that are unique to the office and organization resulted in an increase in satisfaction on several key productivity items.

40%
increase in employees' agreement that the new office supported thinking and analytical work

Space Usage and Adaptation.

The shift in office space programming in the new space did not always affect behavior as intended. As a living lab culture, the office was able to adapt and activate underutilized spaces once behavioral mapping data was collected.

Water Quality.

Water accessibility and employee satisfaction increased in the new location while exceeding WELL-specified requirements for testing qualities.

81.5% **decrease in water turbidity**

Triple Bottom Line Analyses.

By balancing design strategies with health, productivity, and operational energy use, the new office managed to calculate projected savings in financial, social, and environmental impacts.

$4.6M
estimated savings in Triple Bottom Line (TBL) -Net Present Value (NPV) over 10-year cycle

> *This multi-year research study provides definitive proof of why investing in people and places matters. We need to look at cost-per-person versus cost-per-square-foot when accessing the value of healthy buildings. HKS leadership in pursuing WELL and LEED provides a roadmap for all organizations to scale these strategies, and proof that investment pays off in the form of workers who report feeling more comfortable, satisfied, healthier, and more productive in their offices.*

Whitney Austin Gray, PhD, LEED AP, WELL AP, WELL Faculty

Senior Vice President, International WELL Building Institute

Methods

In 2011, the HKS Chicago office opened in a 9,041 square foot LEED Platinum (v4) space on the 17th floor of a 21-story building (111 West Washington Street) in the Loop—the central business district and heart of downtown Chicago. After years of growth, they moved to their new location in September 2017, a 13,412 square foot office on the 11th floor of a nearby 20-story building, *The National* (125 South Clark Street), in the Loop.

HKS conducted a pre- and post-occupancy evaluation, collecting data on employee experience, environmental outcomes, and business impacts as they related to the design goals. The overall research goal was to understand the impact of implementing both WELL and LEED design strategies by collecting (1) subjective experiences of environmental conditions, productivity, and general health and well-being outcomes, (2) objective measurements of ambient condition and energy use (3) observations of employees in the office via behavior mapping, (4) analysis of the ratios of different spatial programming square footage of the floor plans, and (5) business impact data via logging visibility through visitor data and Triple Bottom Line (TBL) Cost Benefit Analysis of the ventilation and lighting schemes.

Surveys included psychometrically validated scales and testing equipment and instruments were used for taking environmental measures. Additional details are listed in the Appendix.

Timeline

Methods

Previous Office

March

March 2017

Building Wellness Survey[4] (n=38)

Perceptions of space, health, and well-being through four domains: environmental conditions, productivity, workplace well-being, mental and physical health

April

April 2017

Employee Experience Sampling

Employee perception in the moment focused on location, mood, environmental satisfaction, and activity

Duration: Two Weeks

Ambient Condition Sensor

VOC, CO_2, lux, and T/RH conditions

Duration: Two Continuous Weeks

August

August 2017

Employee Experience Sampling

Employee perception in the moment focused on location, mood, environmental satisfaction, and activity

Duration: One Week

Ambient Condition Sensor

VOC, CO_2, lux, and T/RH conditions

Duration: Two Continuous Weeks

New Office

September

September 2017

Move into new office

January

January 2018

Employee Experience Sampling

Employee perception in the moment focused on location, mood, environmental satisfaction, and activity

Duration: One Week

Ambient Condition Sensor

VOC, CO_2, lux, and T/RH conditions

Duration: Two Continuous Weeks

April

April 2018

LEED Platinum Certification for Commercial Interiors v4

June

June 2018

Employee Experience Sampling

Employee perception in the moment focused on location, mood, environmental satisfaction, and activity

Duration: One Week

Ambient Condition Sensor

VOC, CO_2, lux, and T/RH conditions

Duration: Two Continuous Weeks

Building Wellness Survey (n=40)

Perceptions of space, health, and well-being through four domains: environmental conditions, productivity, workplace well-being, mental and physical health

December

December 2020

WELL Gold Certification for New and Existing Interiors v1

October

October 2022

WELLv2 recertification survey (ongoing every six months with HKS developed survey tool)

[4]The Building Wellness Survey is a pre-approved survey provider under WELL Feature 86. More details included in the Appendix. Psychometrically validated scales have been used for tens of thousands of people globally. Ildiri, N., Bazille, H., Lou, Y., Hinkelman, K., Gray, W. A., & Zuo, W. (2022). Impact of WELL certification on occupant satisfaction and perceived health, well-being, and productivity: A multi-office pre-versus post-occupancy evaluation. Building and Environment, 224, 109539.

Results

- Air Quality
- Lighting
- Acoustics
- Access to Nature
- Designing for a Variety of Work Experiences
- Space Usage and Adaptation
- Water Quality
- Triple Bottom Line Analyses

RESULTS: AIR QUALITY

Displacement ventilation was integrated into existing spaces typically used for VAV systems.

HKS recognized the synergies between displacement ventilation (WELL v1 Feature 21: Displacement Ventilation) and low-emitting materials (WELL v1 Feature 4: VOC Reduction) during design, and this became a major focus and priority to improve health through better air quality. Through measurement and verification of pre- and post-occupancy air quality tests, where Particulate Matter (PM2.5) and Total Volatile Organic Compounds (TVOC) are used as indicators for respiratory health, air quality in the new Chicago office space improved by more than 27%.

The displacement ventilation system, in contrast to the traditional mixing ventilation system at the previous office, has a higher efficiency of conditioned air delivered, permits more outside air (a 30% increased above ASHRAE 62.1 requirements), and separates the fresh and polluted air (i.e., contaminants) from the occupant through stratification, thereby improving both energy efficiency and employee health. Adding to the increase in overall air quality was the specification of low-emitting materials influenced by WELL and LEED guidelines (HKS was able to reuse 20% of the furniture, by cost, from their previous office).

The Building Wellness Survey found satisfaction with air quality in the workplace significantly increased: 90% of the employees reported being satisfied with the air quality in the new office.

Health Impact of CO_2 (ppm) and TVOC (ppb):

		Previous Office	New Office
9.9%	Decrease in CO_2 Levels	514 ppm	463 ppm
27.2%	Decrease in TVOC Levels	534 ppb	389 ppb

Employee Satisfaction

90% of employees reported being satisfied with the air quality in their new office

RESULTS: LIGHTING

The high-efficiency LED circadian lighting design bolsters productivity through the use of strategically placed linear fixtures and task lighting.

Without standard ductwork on the ceiling, more daylight is allowed to penetrate the office space. Symmetrical workstation splines were strategically placed to maximize the full use of the daylight, where 92% of regularly occupied workstation areas are located within 25 feet of a window.

A combination of task lighting and LED lights centered over workstations enable high, yet energy-efficient, vertical illumination for circadian lighting. Overhead LED lighting is trimmed to further conserve energy via daylight harvesting practices. In all, the lighting full-load power is 43% below ASHRAE requirements, and 73% lower still in actual day-to-day use.

Though much more efficient, the lighting system at the new office can provide twice the amount of illumination compared to the previous office space, and this difference was evident in an observed, significant increase in satisfaction ratings: 88% of the employees reported being satisfied with the lighting in the new office.

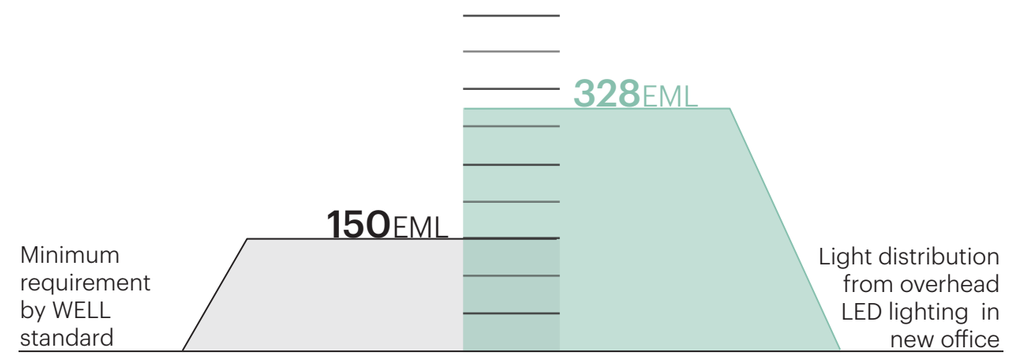
Energy Usage

43% below ASHRAE requirements

Employee Satisfaction

88% of employees reported being satisfied with the lighting in the new office

EML (Equivalent Melanopic Lux)



RESULTS: ACOUSTICS

Traditionally, ductwork is installed along the office ceiling. Because HKS Chicago utilized a displacement ventilation system, the unobstructed ceiling provides more area for acoustic treatment.

Absorptive tectum panels were placed along the ceiling to lower background noise levels throughout the office. The low pressure and velocity of displacement ventilation reduces structure-borne noise and diffuser breakout noise.

The relative difference in ambient noise is two times quieter in the new office (range of 1 kHz to 4 kHz) compared to the previous office. Ambient background studio noise in the previous office was measured at 48 dBA, compared to 39 dBA in the new office. Moreover, the measured Noise Criteria values indicated that conditions in the new office provide for optimal speech communication.

Satisfaction with acoustics in the workplace significantly increased: 64% of the employees reported being satisfied with the acoustics in the new office.

Employee Satisfaction

64% of employees reported being satisfied with the acoustics in the new office

Environmental Impact Interior Background Noise (dBA Levels):

	Previous Office	New Office
dBA Levels	48 dBA	39 dBA

45 dBA maximum allowed by WELL standard

RESULTS: ACCESS TO NATURE

HKS Chicago has incorporated elements of nature in the space, including a plant wall and biophilic artwork.

Incorporating nature, including plants and fresh herbs, can be found throughout the space. As part of the design process, HKS staff preferences and expertise were utilized instead of relying on an external consultant. One of the key goals of this process was to create a studio space that felt more comfortable and homier, rather than more sterile and disconnected. Moreover, the views, biophilic artwork, and plant wall were part of an integrated design strategy that aligned with WELL feature calculation and verification.[5]

Satisfaction with access to nature in the workplace significantly increased: 90% of employees reported being satisfied with the access to nature in their new office. Part of this increase in satisfaction may be due to the intentional agency afforded to the employees regarding plant selection and placement throughout the studio.

[5] Visit https://v².wellcertified.com/en/wellv²/mind/feature/⁹ to learn more about the WELL feature.

> *It is a beautiful setting with excellent natural light.*
>
> HKS Chicago Employee

> *The daylight is relaxing.*
>
> HKS Chicago Employee

RESULTS: DESIGNING FOR A VARIETY OF WORK EXPERIENCES

The new location shifted how flexible spaces are utilized.

HKS's location in the heart of Chicago's Loop served as inspiration for the design of the office. In crafting the interior layout, the team was inspired by the design of the city of Chicago itself. The combination reception and large conference room is known as "The Plaza," welcoming guests into the office with a place to mingle, meet or unwind. The studio offers employees a choice of where they would like to work based on the needs of the task at hand. Seating is unassigned and private break-out areas. A large multipurpose room is known as "The Park," because it is where designers come to mingle and relax at the café counter, but also affords resources via its maker space and materials library.

The floorplan is open, allowing employees to see each other. Employees report being in motion throughout the day, moving away from their desk for team meetings and various tasks. There are multiple, alternative workstations throughout the office including tall collaboration tables and private focus rooms in the studio. Workstations include sit-stand desks and adjustable seating to increase occupant comfort and focus.

Satisfaction with physical comfort in the workplace significantly increased: 85% of the employees reported being satisfied with the physical comfort in the new office.

The new HKS Chicago studio has a markedly different makeup of space proportions and programming intent compared to the previous space. The studio utilizes the framework of 'Me' spaces (individually controlled spaces, such as workstations), 'We' spaces (shared amenity areas not unique to the organization, such as conference and huddle rooms), and 'Us' spaces (shared amenity spaces that are unique to the office and organization). As seen in the Me-We-Us Distribution bar graph, the square footage of the previous studio consisted of 25% 'Us' space type, while 49% of the new studio square footage consists of 'Us' space.

Survey Findings: New Office Improvements

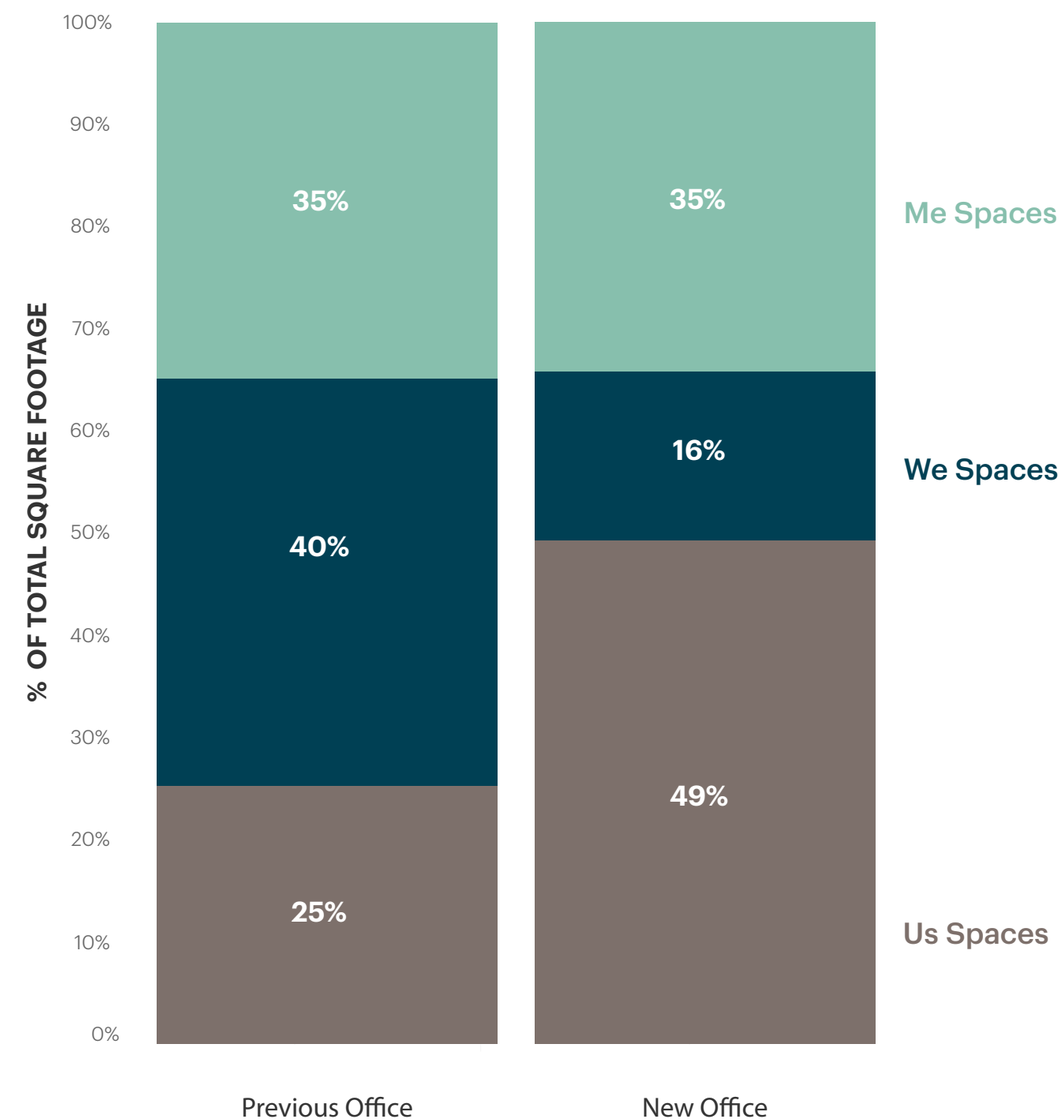
66% Agree the workplace supports my thinking and analytical work
26% agreed in the previous office

91% Agree the workplace supports my ability to retreat and have private conversations
9% agreed in the previous office

91% Agree it is easy to work collaboratively with others
47% agreed in the previous office

78% Agree the workplace created an opportunity for chance meetings, helping us to reveal opportunities
32% agreed in the previous office

Me-We-Us Area Distribution



RESULTS: SPACE USAGE AND ADAPTATION

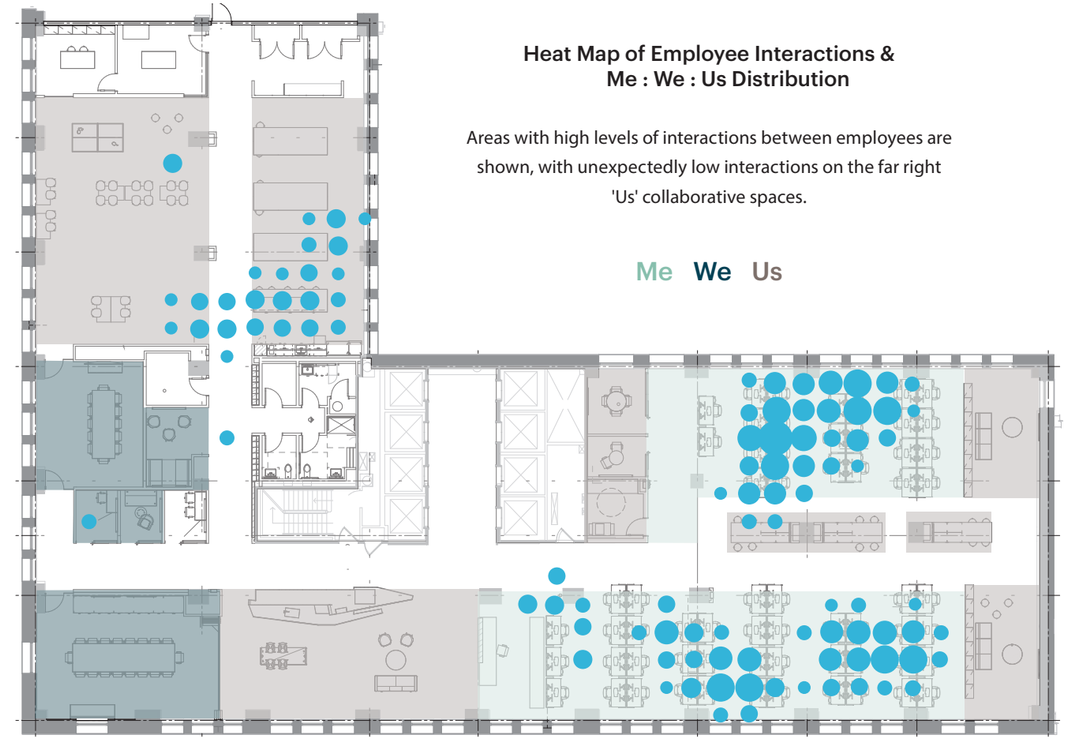
The new shift in space programming did not always result in intended behaviors.

The shift in space programming was in part a result of creating spaces that could later be repurposed into new workstations as the office grows. It was also a result of establishing a higher proportion of areas in the office that exemplified the specific culture and personality of HKS Chicago, such as a large library space dedicated to the project expertise of the Chicago studio, and collaborative, highly visible pin-up areas directly adjacent to the open workstations.

Because of the shift towards more 'Us' spaces (shared areas that are unique to the office and organization), it was critical to utilize behavioral data collected and mapped onto the floorplan. This data showed where and how people spent their time while in the new office. The first floorplan on the right is a heat map showing areas with higher levels of interaction between employees. Some of the spaces designated for collaboration weren't used as much as was expected. As a Living Lab, this finding presented HKS Chicago with an opportunity to implement new changes in the design and operations. Anecdotally, one successful change has been the reassignment of leadership workstations closer to an underutilized pin-up space, resulting in more collaborative activities.

Another successful strategy has been to showcase employee artwork in lobby areas, with the intent to increase place attachment and representation of all employees.

Job performance ratings were 8% higher in the new office but overall productivity findings were not significant across the population.



Heat Map of Employee Interactions & Me : We : Us Distribution

Areas with high levels of interactions between employees are shown, with unexpectedly low interactions on the far right 'Us' collaborative spaces.

RESULTS: WATER QUALITY

Clean and odorless water was made more accessible to HKS employees.

Clean and odorless water was made more accessible to HKS employees by providing two sink faucets and one rapid water bottle filling station. HKS observed that this single rapid water bottle filling station was the most widely used fixture for hydration because of its proximity to most of the workstations (meeting 100-ft dispenser requirements for access). All WELL-specified contaminant limits and requirements were met, including those for inorganic and organic agricultural contaminants, and public water additives to account for any fouling that may happen during distribution within the building.

Satisfaction with water quality in the workplace significantly increased from the previous office: 100% of the employees reported being satisfied with the accessibility and quality of drinking water in the new office. Hydration comes with many health benefits.[6]

[6] Visit https://v².wellcertified.com/en/wellv²/water to learn more about the WELL Water concept.

Environmental Impact Water Turbidity (Nephelometric Turbidity Units):

81.5% **Decrease in Water Turbidity**

Previous Office 0.880 NTU

New Office 0.163 NTU

RESULTS: TRIPLE BOTTOM LINE ANALYSES

An early objective of HKS was to balance the cost of enhanced design strategies with what could be gained in terms of health, productivity, and energy savings.

Triple Bottom Line

Utilizing Autocase to translate the design impact of integrating the displacement ventilation and circadian lighting (in isolation), HKS was able to estimate the Triple Bottom Line Cost Benefit Analysis (TBL-CBA) for their Living Lab (includes financial, social, and environmental impacts). The total TBL-NPV (net present value) for a 10-year lifecycle amounted to over $4,609,600 where $40,900 is associated with environmental, $34,300 is associated with financial, and $4,534,400 associated with human and social impacts. Design specific, the displacement ventilation system contributes approximately 16% to the TBL-NPV while the circadian lighting contributes 84% to the TBL-NPV. Because HKS Chicago embraced an integrated design process, they leveraged workplace design, daylighting and the associated LED lighting systems and controls in way that resulted in advancing human health and performance while staying cost neutral.

Energy + Cost + Carbon Savings

When compared to the previous office, the design of the new HKS Chicago office has realized a 44% reduction in energy consumption, a 26% operational (utility) cost reduction and a 19% reduction in Greenhouse Gas Emissions as a result of the enhanced design strategies highlight herein (benchmarked in 2019).

Building the Brand

From October 2017 through September 2018, HKS hosted public events that welcomed 2,564 visitors to their office – an increase of 2,489 people compared to the previous office – showcasing how a studio with a Living Lab culture can serve as a highly visible case study for clients and other guests.

TPL-NPV 10 Year Live-Cycle Impacts due to Ventilation and Lighting Interventions

$40,900	is associated with Environmental Impacts
$34,300	is associated with Financial Impacts
$4,534,400	is associated with Human and Social Impacts

Conclusions

An early objective of HKS was to balance the cost of enhanced design strategies (particularly those associated with WELL) with what could be gained in terms of promoting and enabling overall occupant health and well-being.

The Building Wellness Survey revealed several significant improvements in rated satisfaction in the new Chicago office compared to the previous office. For example, satisfaction with air quality, acoustics, thermal comfort, lighting, access to nature, and cleanliness were all rated significantly higher in the new office space.

Experience sampling data taken to track employee's satisfaction in the moment did not reveal any significant changes between experiences in the previous office compared to the new office.

By engaging the staff early in the design process, employees were able to have agency over the process of selecting plants and their placement throughout the office, thus having more personalized access to nature.

Behavior mapping data was also collected before and after the move, revealing a handful of key areas of the new office that were not being utilized to their intended role. The Living Lab culture of the office allowed for this finding to be an opportunity for the introduction of both policy and design elements to activate these spaces, both in the common areas where clients and visitors would occupy, and in the studio spaces where the design staff can pin up work and collaborate.

The total TBL-NPV, in particular for the displacement ventilation system and circadian lighting, demonstrated that by embracing the integrated design process that promoting human health and productivity could be cost neutral even at a lower environmental footprint. The first two years (2017 - 2019), resulted in reducing the energy use intensity (EUI) of the HKS Chicago office by more than 44%, energy costs were reduced by more than 26%, and carbon footprint (MT-CO2e) was reduced by nearly 19%.

This exploratory case study highlights the benefits of WELL. In order to provide more generalizable results, HKS is continuing to collect people and building data in the Chicago office as well as their other Living Lab offices that are currently pursuing WELL. Using the data collected, HKS looks to further understand and share the impact of WELL on employee environmental satisfaction, health and well-being, and productivity.

> *This project exemplifies the impact of design on fostering health and well-being, sparking creativity, and conserving the earth's limited resources.*
>
> **Upali Nanda, PhD, Assoc. AIA, EDAC, ACHE**
> **HKS Global Director of Research**

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General Contractor: Clune
MEP Engineer: IMEG
Acoustical Consultants: Cerami & Associates
Lighting Consultants: Plume
Commissioning Agent: CERx Solutions

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APPENDIX

Building Wellness Survey

The Building Wellness Survey, a pre-approved survey for WELL v1 Feature 86: Post-Occupancy Surveys, was created by Delos to analyze pre- and post-occupancy data from WELL-certified projects in order to assess the impact of the transition to a WELL-certified space on employees' health, well-being, satisfaction, and productivity. The survey was distributed online both pre- and post-occupancy to all HKS Chicago employees who regularly occupied the new and old offices. Basic demographic and background information (gender, age, hours worked weekly, duration of current employment) were collected and used to identify potential confounders. At the end of the survey, employees were asked to provide their email address so their responses could be tracked pre to post occupancy, and informed that their identity would remain confidential. A pre-post statistical analysis was conducted using the survey results from both the full sample as well as the matched-pairs sample (i.e., those who completed and provided their email address for both pre- and post-occupancy surveys).

The Building Wellness Survey aims to capture occupant perceptions of space, health, and well-being through questions in 4 primary domains:

1. Environmental Conditions: This section asks participants to report environmental satisfaction including indoor air quality, thermal comfort, physical comfort, light quality, and access to nature and natural environments. Environmental conditions satisfaction scores for each condition were scored on a 7-point Likert scale. Mean differences in satisfaction scores were compared across pre- and post-occupancy spaces.

2. Productivity: This section uses the World Health Organization's (WHO) Health and Work Performance Questionnaire (HPQ). The HPQ, developed by Harvard Medical School, contains a psychometrically validated scale comprised of 11 items on productivity, work performance, and leave from work. Presenteeism scores are interpreted as actual performance in relation to possible performance. Scores range from 0-100.

3. Workplace Well-being: This section asks participants to rate their agreement with statements intended to measure organizational satisfaction including workplace pride, motivation, employer support, health and wellness, culture, and workstyle accommodation. Workplace well-being items were scored on a 5-point Likert scale.

4. Mental and Physical Health: This section assesses occupant perceived mental and physical health as separate constructs using the Medical Outcomes Study 12-Item Short-Form Health Survey (SF-12v2). The SF-12v2 is an international psychometrically validated questionnaire used extensively as a health-related quality of life measurement tool. Perceived mental and physical health were scored with a range of 0 to 100, with a score of 50 representing the US national average score.

Principal Investigator: Whitney Austin Gray, PhD
Pre-Occupancy Data: March/April 2017
Post-Occupancy Data: June 2018

Employee Experience Sampling

In addition to the Building Wellness Survey, employees were pinged twice a day (morning and afternoon) throughout two continuous work weeks in April 2017 and one work week in August 2017 before the move to the new studio, and during one work week in January 2018 and one work week in June 2018 after the move. This experience sampling method added a layer of data to the overall study that captured how employees felt in the moment. Questions focused on location, mood, environmental satisfaction, and activity. Questions regarding thermal comfort and activity level were drawn from ASHRAE measures, and all others were created by HKS for the intent of this study. Thermal, auditory, and visual comfort were gauged on a 7-point Likert scale. Participants also rated their current mood on a 7-point Likert scale ranging from 'negative' to 'positive,' their activity level on a 6-point scale ranging from 'reclining' to 'high activity,' and how focused on task they felt on a 7-point Likert scale ranging from 'low' to 'high.'

Principal Investigator: Upali Nanda, PhD
Pre-Occupancy Data: March/April 2017
Post-Occupancy Data: June 2018

Ambient Condition Sensors

A combination of handheld and stationary environmental sensors was deployed concurrently with the employee experience sampling data but for 2 continuous weeks for each time of data collection (twice before the move to the new space and twice after occupancy). Handheld volatile organic chemical (VOC) meters were used to spot check conditions, while carbon dioxide (CO_2) sensors, lux meters, and temperature / relative humidity (T/RH) sensors were distributed across studio spaces.

Principal Investigator: Upali Nanda, PhD
Pre-Occupancy Data: March/April 2017
Post-Occupancy Data: June 2018

Behavior Mapping

Behavior mapping was conducted to collect spatial data about activities pre- and post-occupancy in the new building. An on-site researcher collected the behavioral data using a handheld digital device in 15-minutes walking rounds. The pre-occupancy data was collected during a 4-day data collection period, and the post-occupancy data was collected during three 5-day data collection periods. The collected data was annotated with information about the location, activity, and the subject.

Principal Investigator: Upali Nanda, PhD
Pre-Occupancy Data: April 2017 (4/4/2017 - 4/7/2017)
Post-Occupancy Data: April/June 2018 (4/23/2018 - 4/27/2018; 6/4/2018 - 6/8/2018; 6/11/2018 - 6/15/2018)

Air Quality

All Building Wellness Survey satisfaction data reflect a 5 point scale (-2 to 2) with 0 being neutral (previous office (M = 0.08, n = 37) to new office (M = 2.45, n = 40), p < .001).

Lighting

The illumination levels within the office were calibrated such that employees can adjust the illumination at their workstations (either through preset lighting scenes and/or task lighting) to vary between 20 and 30 foot-candles for digital-based design work and to reduce eye fatigue. As measured in 2019, the energy savings compared to full load amounted to an additional 73% savings (driven by occupancy sensors, daylighting, and personal control). The total energy consumed by lighting was approximately 16.31 MWh, with 43.64 MWh in savings. The Building Wellness Survey found satisfaction with lighting in the workplace significantly increased from the previous office (M = 0.16, n = 38) to new office (M = 2.28, n = 40), p < .001. Because commercially available light sensor devices vary greatly in their measurement capabilities, HKS used both spectrometers and illuminance meters as spot measurement tools to ensure that the quality and intensity of light was optimal for productivity and wellness. The performance of the LED lighting system and associated controls are continuously being monitored through the lighting energy management system.

Acoustics

dBA: A-weighted average sound pressure level (taken in the open office workstations)

The Noise Criteria (NC), a single index to describe the noise level in a given space within a frequency range, at the previous office was measured at NC-40 while the new office was measured at NC-35. NC values indicated that conditions in the new office provide for optimal speech communication based on the balance of differential frequency sensitivity of the human ear (range of 63 Hz to 8 kHz). The Building Wellness Survey found satisfaction with acoustics in the workplace significantly increased from previous office (M = -0.92, n = 38) to new office (M = 1.05, n = 39), p < .001.

Access to Nature

Building Wellness Survey satisfaction with access to nature in the workplace significantly increased from the previous office (M = -1.05, n = 38) to new office (M = 1.63, n = 40), p < .001.

Designing for a Variety of Work Experiences

Furniture and Layout

The Building Wellness Survey found satisfaction with physical comfort in the workplace significantly increased from the previous office (M = -0.24, n = 37) to the new office (M = 2.03, n = 40), p < .001.

Space Usage and Adaptation

Employee Productivity

The Building Wellness Survey revealed presenteeism improved from the previous office (M = 74.86, n = 35) to the new office (M = 81.14, n = 35). Although the improvement was not found to be statistically significant, there was a reported job performance increase of 8%. Employees reported working at 80% of their possible job performance in the new office.

Water Quality

The Water Test Measurements noted below highlight the water quality results for the previous office and new office with and without remediation (i.e. water filtration). Quantitatively, water quality at the new office has improved by achieving preconditions such as WELL v1 Feature 30 Fundamental Water Quality, Feature 31 Inorganic Contaminants, Feature 32 Organic Contaminants, Feature 33 Agricultural Contaminants, and Feature 34 Public Water Additives. The most remediated contaminants addressed through filtration to improve water quality was turbidity, an 81% improvement, copper, not detected, dichlorophenoxyacetic acid, not detected, and nitrate, a 9% improvement.

The Building Wellness Survey found satisfaction with water quality in the workplace significantly increased from the previous office (M = 0.61, n = 38) to the new office (M = 2.62, n = 39), p < .001.

Triple Bottom Line Analyses

Additionally, financial and quantity metrics for the design enhancements include a 60.3% financial return on investment, an 81.9% benefit cost ratio, a financial simple payback period of 6.5 years, 13 potential days worked instead of absent and a 5.9% potential employee productivity increase. HKS continues to calculate the return on investment of all aspects of the workplace design as part of an ongoing research effort of the Living Lab.

Renewable Energy Credits have been purchased and applied to 100% of the space's energy utilization, facilitated through LEED Certification. thereby making it a Net-Zero Energy office space.

HKS

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ABOUT HKS

HKS is a global firm of architects, designers, advisors and makers driven by curiosity and devoted to creating places that combine beauty with performance. Our 1,500 people in 26 offices are united by our shared culture and sense of purpose. We value honesty, diversity and inclusion and we celebrate creative thinking across our firm. In partnership with each other, our clients and our partners, we craft powerful ideas and solutions. Together we create places that stand apart.

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