THE EFFECT OF SPATIAL DESIGN ON COMFORT AND ENGAGEMENT IN THE WORKPLACE

MASTER’S THESIS BY
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2018 | Lawrence Technological University
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ABSTRACT

There is a significant relationship between individuals and their environment crucial to determining how they feel, perform, and interact with others. Making room for the different ways employees work and teams collaborate is a key to effective workplace design.

With over 200 employees surveyed in seven architectural firms in Michigan, this study explores how a gap between spatial design and space preferences in an office affect physical and cognitive comfort of its employees- highlighting gaps between what employees have and what do they prefer/ need. What design factors contribute to the feeling of physical discomfort and disengagement from work? Does workplace culture or technological availability affect the way employees work in an office?
The feeling of comfort and engagement in the workplace is driven by design to an extent that it affects the overall satisfaction of working within the environment and ultimately affects the wellness of an employee.

91% of highly engaged employees report higher satisfaction level
35% of less engaged employees report higher satisfaction level
KEY CONTRIBUTORS IN THE FIELD OF WORKPLACE RESEARCH

GALLUP
Performance & Engagement

Gensler
Design, Business, Occupant behavior
Workplace surveys since 2005

Knoll
Design, Behavior, Ergonomics, Health, Performance

EYP
Health & Well-being, Culture, Engagement, Performance

Steelcase
Design, Creativity, Well-being, Collaboration, Innovation, Biophilia

HOK
Productivity, Financial development, Technology, Flexibility

WORLD GREEN BUILDING COUNCIL
Health, Well-being, Productivity, Sustainability

Corporate culture and trends, Heath

Colliers International
Real estate development, Workplace survey

Terrapin
Design, Health, Well-being, Biophilia
WHAT IS ENGAGEMENT?

Engaged employees as those who are involved in, enthusiastic about and committed to their work and workplace.

Law firm- Fish & Richardson’s Boston office

Quantum Workplace office, Omaha, Nebraska
WHAT IS ENGAGEMENT?

PERCENTAGE OF ENGAGED WORKERS IN THE U.S. SINCE 2014


Studied by evaluating

Performance development needs in an office
CASE STUDY 1
STEELCASE INNOVATION CENTER
GRAND RAPIDS, MICHIGAN
WHAT IS WELLNESS?

Wellness is a sum of one’s positive physical, mental, and social state

Based on O.C. Tanner Institute research, 2015
Percent of respondents who reported their office incorporated following **design features that contribute to employee wellness**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to natural light (daylighting)</td>
<td>100%</td>
</tr>
<tr>
<td>Ergonomics</td>
<td>100%</td>
</tr>
<tr>
<td>Restorative spaces (quiet rooms/areas)</td>
<td>78%</td>
</tr>
<tr>
<td>White noise (active noise reduction)</td>
<td>78%</td>
</tr>
<tr>
<td>Tall ceilings</td>
<td>67%</td>
</tr>
<tr>
<td>Interior walls made of glass</td>
<td>67%</td>
</tr>
<tr>
<td>Access to healthy food options</td>
<td>67%</td>
</tr>
<tr>
<td>Indoor air quality standard</td>
<td>56%</td>
</tr>
<tr>
<td>Walking encouragement through design (attractive stairs between conference rooms, etc.)</td>
<td>56%</td>
</tr>
<tr>
<td>Sit/stand desks</td>
<td>56%</td>
</tr>
<tr>
<td>Anti-microbial surface protection or special cleaning standards</td>
<td>44%</td>
</tr>
<tr>
<td>Multi-spectrum lighting (or circadian lighting controls)</td>
<td>33%</td>
</tr>
<tr>
<td>Greenery (plants in the workplace)</td>
<td>22%</td>
</tr>
<tr>
<td>Treadmill desks</td>
<td>11%</td>
</tr>
</tbody>
</table>
CASE STUDY 2
ASID HEADQUARTERS
WASHINGTON, D.C.

There are a variety of spaces available

I have access to casual spaces when I need to re-energize.

I have access to quiet, more secluded places for focused work.
According to the EPA (Environmental Protection Agency), the average American spends 87% of their life indoors in a space.

According to a 2014 survey by Gallup, the new average for most full-time workers has risen to 46-47 hours per week.

According to the IFMA (International facility management association), the size of their individual workspaces is shrinking.

According to a 2016 report by Gallup, less than one-third of U.S. employees feel engaged in their workplaces (tracked since 2000).
SCOPE OF THIS RESEARCH

Exploring the impact of physical metrics on overall satisfaction using perceptual metrics – *a workplace environments survey* – by self reporting attitudes on various aspects
Methodology: An online perception survey

Participants:
Mid - Large size architectural offices in Michigan
- Albert Kahn associates Detroit
- Gensler Detroit
- Hamilton Anderson Associates Detroit
- Harley Ellis-Devereaux (HED) Southfield
- HKS Inc. Northville
- NORR group Detroit
- Neumann/Smith Architecture Southfield

Survey tool used: Survey Monkey

Timeframe: 2 weeks from the date deployed (in March 2018)

RESEARCH QUESTIONS

1. How does spatial layout in the office affect comfort, engagement, and satisfaction of its employees?

2. What physical, visual, thermal, or acoustic factors contribute to the feeling of discomfort or disengagement from work?

3. Does increased technological flexibility and/or mobility increase overall satisfaction of working within the space?

4. Does workplace culture affect the way employees work in an office?
### RESEARCH METHODOLOGY

#### SURVEY DESIGN and EVALUATION SCALE

**Context, Culture and Demographic questions**

- **Type of work space**
- **Time spent in office**
- **Working culture in office**
- **Gender and Age**

**Sections 1 and 4**

**WORKPLACE and ME**

1. What type of space closely resembles your assigned work desk in the office?
   - Open plan office (any view)
   - Individual office
   - Cubicle
   - Other (please specify)

2. How much time do you spend within your workplace in a typical week?
   - Part-time (usually less than 20 hr/week)
   - Full-time (40 hr/week)
   - Less than weekly (rarely visit office. On-site work, etc.)
   - Other (please specify)

**3. On a typical day, how much time do you spend working at spaces OTHER THAN YOUR OWN DESK?**
   - Less than 1 hr
   - 1 to 2 hr
   - 3 to 4 hr
   - 5 to 6 hr
   - More than 6 hr

**4. Please rate the following in context to the working culture you have in your office.**

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**5-Point Likert scale**

**Multiple choice/Dichotomous scale**

**Demographics**

- 17. What is your gender? (Required for comparative study only)
  - Male
  - Female
  - Non-binary
  - Other (please specify)

- 18. What is your age? (Required for comparative study only)
  - 18-24
  - 25-34
  - 35-44
  - 45-54
  - 55-64
  - 65 or older
  - Prefer not to answer
Physical characteristics within the workplace

5. Please rate the following in context of your OFFICE FURNITURE (if relevant images only): [Blank]
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

6. Please rate the following in context of your ASSIGNED DESK WORKSPACE - if you have your own workspace: [Blank]
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

RESEARCH METHODOLOGY

Physical characteristics questions

Office furniture | Assigned desk | Lighting and views | Acoustic and Thermal comfort

7. If you could change one thing about your office furniture layout, what would it be and why?

8. If you rate the following in context of LIGHTING & VIEWS you have in the office: [Blank]
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

9. Please rate the following in context of your ACOUSTIC COMFORT you have in the office: [Blank]
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

10. Please rate the following in context of your THERMAL COMFORT in the office: [Blank]
    - Strongly agree
    - Agree
    - Neutral
    - Disagree
    - Strongly disagree

11. If you could change anything about your visual, acoustic, or thermal comfort in your office, what would it be and why?

Open-ended responses
16. Please rate the following in context to CHOICE & CONTROL, you have in your workplace: How & Where to work in the office. (Please rate only)

Overall perception of office environment on a scale of 1 to 10

1    2    3    4    5    6     7    8   9   10

LOW           MODERATE         HIGH

Open-ended responses

RESEARCH METHODOLOGY
SURVEY DESIGN and EVALUATION SCALE
Changes requested by Office A:
1. Q4 AND Q5 Rewording
2. Adding question added on availability of space and technology
3. New section 5: Questions on Meeting Spaces

Section 5
Questions on Meeting Spaces

*Most effective size of meeting rooms* | *Factor determining usefulness of a meeting room* | *Frequency of use*
PROCEDURE
TEST SURVEY AND DEPLOYMENT

1. BETA SURVEY
   Conducted to test for any errors, overall time taken, data visualization

   Participants:
   1. Individual respondents
   2. FCA employees (unofficial)
   3. S3 Architecture employees
   4. Tiseo Architects employees

2. IRB APPROVAL
   Approval taken from LTU's Institutional Review Board as human subjects were involved

3. SITE VISIT AND DEPLOYMENT
   Each office was visited for:
   1. Observations
   2. Photographs
   3. In-person discussion the firm's office design
   4. Survey deployment

4. ANALYSIS AND FEEDBACK
   After detailed analysis of the survey, feedback from participants was taken
SURVEY RESULTS
RESPONDENT CATEGORIES (all offices)

- OFFICES SURVEYED: 7
- TOTAL RESPONSES: 241
- COMPLETION RATE: 82%
- COMPLETE RESPONSES: 198

Survey analysis is based on 198 complete responses only.
### SURVEY RESULTS
#### OFFICES COMPARISON

#### OFFICE AREA vs STAFF SIZE

<table>
<thead>
<tr>
<th>Office</th>
<th>No. of Employees</th>
<th>Approx. Area</th>
<th>Setting</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>80 – 85</td>
<td>27000 SF</td>
<td>Historic office space</td>
<td>50 (66%)</td>
</tr>
<tr>
<td>B</td>
<td>115 – 120</td>
<td>20000 SF</td>
<td>Modern office center</td>
<td>40 (35%)</td>
</tr>
<tr>
<td>C</td>
<td>35 – 40</td>
<td>12000 SF</td>
<td>Reused industrial</td>
<td>19 (54%)</td>
</tr>
<tr>
<td>D</td>
<td>70 – 80</td>
<td>19000 SF</td>
<td>Reused residential</td>
<td>32 (43%)</td>
</tr>
<tr>
<td>E</td>
<td>35 – 40</td>
<td>11000 SF</td>
<td>High rise office space</td>
<td>20 (57%)</td>
</tr>
<tr>
<td>F</td>
<td>80 – 85</td>
<td>17000 SF</td>
<td>High rise office space</td>
<td>20 (28%)</td>
</tr>
<tr>
<td>G</td>
<td>75 – 80</td>
<td>18000 SF</td>
<td>Modern office center</td>
<td>17 (27%)</td>
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</table>
KEY FINDINGS
WORK SPACE AND OFFICE CULTURE (all offices)

**TYPE OF WORK SPACE**
- Cubicles: 25%
- Open-plan (desks with low-height partitions): 48%
- Bench seating (desks with no partitions): 21%
- Private office: 6%

**WORKPLACE CULTURE**
- 73% say they *often communicate with others in corridors*.
- 44% say they *attend many team meetings on a typical work day*.
- 22% say they do not have the freedom to work when, where & how they want to.
KEY FINDINGS
OVERALL PERCEPTION OF THE WORKING ENVIRONMENT (all offices)
Based on 196 responses

- FEEL SATISFIED: 64% (16% Low, 20% Moderate, 28% High)
- FEEL PRODUCTIVE: 71% (8% Low, 21% Moderate, 42% High)
- FEEL INNOVATIVE: 41% (29% Low, 30% Moderate, 42% High)
- FEEL ENGAGED: 55% (20% Low, 25% Moderate, 50% High)
- FEEL COMFORTABLE: 58% (18% Low, 24% Moderate, 56% High)

RATING RATING RATING
MULTIPLE, SMALL Sized, AND SCATTERED MEETING SPACES SERVE WELL

Out of 36% of respondents who say they need to meet with others outside of their desk more than 3 times a day, 67% say that they spend less than 2 hours working at a space other than their assigned desk.

Over 90% of them say that the office lacks enough conference rooms and would prefer to work in an enclosed-private room for collaborative team meetings.

80% respondents say that a meeting space good for 3-8 people works best.

"An interview with office E representative revealed that though their office has more than 2 conference rooms for 35-40 people, only employees sitting close use the space often”

Multiple meeting rooms within close proximity are more likely to be occupied than large rooms away from the desk.
**OBSERVATIONS/ INFERENCES**
**CATEGORY: SPATIAL LAYOUT/ CHOICE OF SPACES**

**BASED ON OFFICE-B ANALYSIS**

**INFORMAL MEETING SPACES SUPPORT COLLABORATION AND ENCOURAGE DISCUSSIONS**

Out of 51% of respondents who say they attend many collaborative team meetings on a typical day at work, 40-45% say that they spend 2-4 or less than 2 hours working at a space other than their desk.

Moreover, 65% of them say they would prefer to work in a common lounge for collaborative team meetings.

“An interview with office B representative showed that group meetings take place in office’s central informal meeting area so as not to disturb the staff in the open-office”

**HIGH-CEILING LEVEL REDUCES THE FEELING OF CONGESTION IN THE SPACE**

Office B utilizes a reused industrial space because of which it has a very high ceiling level with exposed ducts. However, this increases the volume of the space reducing the feeling of congestion-as referenced by the representative of office-B.

While 100% of respondents have access to natural light in the space and 85% feel visually optimistic – 100% of the respondents say that they DO NOT FEEL CONGESTED within their office environment.

However, this also adds to the distraction by noise within the space, which is evidenced by 47% of respondents who say they do not have enough acoustic privacy while working.
OBSERVATIONS/ INFERENCES
CATEGORY: OFFICE FURNITURE

BASED ON OFFICE-A ANALYSIS

DESKS WITH LOW-HEIGHT PARTITIONS WORK BETTER THAN CUBICLES

While majority (62%) of respondents work in a cubicle, it is observed that respondents who work at desks having low-height partitions (26%) feel more positive about their working environment in all variables. Highest influence is found on the feeling of engagement/involvement while slight difference is found in productivity, innovation or comfortability.

BASED ON OFFICE-E and F ANALYSIS

ENCLOSED SPACES FOR PHONE CALLS ENHANCE PRIVACY

In office-E, while 63% of respondents say they go out of office to make private phone calls, more than 70% of open-ended responses attribute the reason to the lack of enclosed spaces/rooms for privacy within the office.

The same trend is observed in office-F, where 65% of respondents go outside of office to make private phone calls.

Office E and Office F are however in the same building with similar space types/layout.
**OBSERVATIONS/ INFERENCES**  
**CATEGORY: INDOOR ENVIRONMENTS (VISUAL)**  

**BASED ON all office's ANALYSIS**

**DAYLIGHT INCREASES MORALE**  
and ultimately well-being

Access to daylight affects the mental wellness which has also been evidenced in other studies*

In all office’s survey analysis, the results survey shows that **three-quarters** of the respondents who say the office environment feels visually optimistic, have **high rating on satisfaction and engagement** within the office

*WGBC Guide on Health, Well-being & Productivity

**DAYLIGHT**

- Low space between top of cubicles and ceiling level augments the issue
- High cubicle walls preventing visual transparency and light to penetrate further in

**OVERALL MORALE**  
**CIRCADIAN RHYTHM**  
**DARK ADAPTATION**  
**DAYLIGHT**

**Office-A example: Staff seating area (row of cubicles)**
OBSERVATIONS/ CONCLUSIONS
CATEGORY: CHOICE OF SPACES
CONTROL OVER TEMPERATURE & LIGHTING

(FLEXIBLE TECHNOLOGY) = (INCREASED SATISFACTION) VARIES BY AGE

70% of respondents feel restricted to their desk for work having access to technology only at their assigned work space AND more than half of them say they often communicate with others in corridors or circulation spaces.

In terms of the influence on overall perception of the environment, respondents within the age group of 45 to 64 feel more positive about their environment than the younger generation who prefer more flexible and mobile environment to be innovative and engaged.

Out of 73% of respondents who say they go outside the office for relaxation/disengaging from work temporarily, majority of them attribute the reason to having access to local market and/or a park next to the office in the open-ended answers. Access to a water body or natural vegetation helps them to re-energize or refresh their mind.

“An interview with office D representative showed that because of easy walking distance to coffee shops outside the office, cafeteria is less often utilized inside”
FEEDBACK FROM PARTICIPANTS

Do the survey results provide valuable insight on your office design?
3 responses

- As expected: 33.3%
- Somewhat: 66.7%

Do you think the results will be useful to you in further redesigning work or workplace?
3 responses

- Yes: 100%

What do you think the survey could have addressed regarding relationship between your workplace design and wellness of employees?
3 responses

- Not sure: I think surveys a useful tool to take the temperature of a space and its inhabitants but it struggles to show inhabitants what a space could be.
- I think the survey had a good balance of in-house data and reference concepts. Some indication that addition of plants, collaborative space would improve staff satisfaction which could be implemented in the near term.
- could be cool to look at nearby amenities outside the office (food, coffee, fitness, entertainment - how often people leave their desk to eat lunch and get outside essentially.

Any other comments or feedback?
3 responses

- None except to say that Darpam was exceedingly polite and professional as he guided us through his process.
- Well organized survey protocol and presentation. Graphically clear and interesting.
- Thank you Darpam, this was very data driven and comprehensive, and visually compelling. great work and follow up

Feedbacks were received from Office B, D, and G
OFFICE A

SITE VISIT OBSERVATIONS
 Episcopal Center, 27,000 SF
 Historic office building

Engaged 538%

FINDINGS

Acoustic & Space Preferences

STAFF SEATING FURNITURE
C-shaped desks with low to medium height partitions, and cubicles in open-plan work spaces with private offices for upper management

STAFF SEATING FURNITURE
Most of the floor has cubicles arranged in a linear fashion, except a conference room and an informal seating. This restricts visual transparency between spaces on the floor

CHOICE OF SPACES
The floor has enough conference spaces for group meetings but lacks informal or common areas for breaks or socializing

CHOICE OF SPACES
There are minimal common/ informal meeting spaces, that too along circulation pathway. Pantry area is under-utilized due to lack of enough seating.

KEY FINDINGS

62% WORK IN A CUBICLE SPACE

Feel Satisfied
Feel Productive
Feel Innovative
Feel Engaged
Feel Comfortable

44%
34%
38%
15%
24%

34%
38%
28%
24%
30%

42%
34%
28%
30%
24%

22% 28% 22% 22% 20%

30%
42%
42%
42%
28%

42%
28%
30%
24%
24% 38%

10% DISAGREE TO HAVING VARIETY IN SEATING OPTIONS

10% FEEL VISUALLY OPTIMISTIC IN THE OFFICE

41% ARE GETTING DISTRACTED BY NOISE

42% AGREE & DISAGREE TO HAVING PRIVATE SPACES FOR FOCUSED WORK

7 out of 10 HAVE NO CONTROL OVER THE TEMPERATURE IN THE SPACE

100% FEEL RESTRICTED TO DESK FOR ACCESS TO TECHNOLOGY

44% AGREE TO FEELING CONGESTED IN THE SPACE

60% SAY THERE IS LACK OF ENOUGH VISUAL TRANSPARENCY

54% SAY TEMPERATURE & HUMIDITY LEVELS ARE NOT SATISFACTORY

54% SAY AIR DOES NOT FEEL FRESH IN THE OFFICE

4 out of 10 LACK ENOUGH PRIVACY AT THEIR DESK

4 out of 10 DISAGREE TO HAVING ACCESS TO NATURAL LIGHT

MEETING SPACES

80% PREFER MEETING ROOMS GOOD FOR 3-8 PEOPLE

65% SAY THAT EQUIPMENT/ TECHNOLOGY IS MOST SIGNIFICANT FOR A USEFUL MEETING SPACE

MULTIPLE SCATTERED MEETING SPACES SERVE WELL

• Out of 36% of respondents who say they need to meet with others outside of their desk more than 3 times a day, 67% say that they spend less than 2 hours working at a space other than their desk on a typical work day

• Over 90% of them say they would prefer to work in a common lounge or an enclosed-private room for collaborative team meetings

In terms of the influence on overall perception of the environment, respondents within the age group of 45 to 64 feel more positive about their environment than the younger generation who prefer more flexible and mobile environment to be innovative and engaged

70% of them say they would prefer to work in a common lounge or an enclosed-private room for collaborative team meetings

36%
10%
24%
28%
16%

80%
65%

Multiple meeting rooms within close proximity are more likely to be occupied than large rooms away from the desk

For instance, yellow spaces indicated here depict conference/meeting rooms and close proximity circle around them. They acquire same area in both types of layout but serve a large pool of users who would use these spaces for focused or collaborative work, or even for private phone calls or relaxation.

DESKS WITH SPACE-DIVIDERS WORK BETTER THAN CUBICLES

While majority (62%) of respondents work in a cubicle, it is observed that respondents who work at desks having space-dividers (28%) feel more positive about their working environment in all variables

Masters of Architecture Thesis
Lawrence Technological University

Workplace Environments Survey: Individual Office Survey Analysis

April 2018

Chair: Daniel L. Faoro M.Arch, RA
Coordinator: Anirban Adhya Ph.D.
OFFICE B
Size: 115-120 employees
Area: 20,000 SF
Timeline: Feb 23 – Mar 11, 2018
Setting: Modern office center
Total responses: 40

**DAYLIGHT & VIEWS**
Recent office renovations revived the open-plan layout, providing daylight and access to views outside away from personal desks of employees. The current open layout was well-liked.

**STAFF SEATING FURNITURE**
C-shaped desks with low height partitions provide a sense of privacy while also providing opportunity for peer interaction while seated. The floor area seems over occupied in terms of a balance between circulation space and furniture.

**CHOICE OF SPACES**
The reorganization added simple meeting spaces with formal and informal and that provide opportunity for more effective collaboration and interaction within the office.

**OFFICE SURROUNDINGS INFLUENCE MIND AND WELLNESS**
Out of 73% of respondents who say they go outside the office for natural vegetation or to relax at least 2 hours a week, many indicate that the office environment feels visually appealing and relaxing compared to their previous workplaces.

**INFERENCES**
- The office design offers the potential for more socialization and collaboration.
- The overall perception of the office environment is visually appealing and relaxing.

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OFFICE C
Size: 35-40 employees
Area: 12,000 SF
Timeline: Feb 24 – Mar 11, 2018
Setting: Recycled Industrial
Total responses: 19

**DAYLIGHT & VIEWS**
Flow of stack and clerestory windows allow ample natural light into the space, eliminating the need for artificial lighting during the day.

**STAFF SEATING FURNITURE**
C-shaped and L-shaped desks with no partitions provide ease peer interaction but no privacy. There are ample of storage spaces as well as safety in seating options such as no, informal chairs or areas.

**CHOICE OF SPACES**
The office has a central informal gathering space with variety in seating options and access to a monitor for group discussions. A cafeteria is closely proximate to main flow of work serves informal collaboration.

**INFERENCES**
- The overall perception of the office environment is visually appealing and relaxing.
- The office design offers the potential for more socialization and collaboration.

---

OFFICE D
Size: 70-80 employees
Area: 19,200 SF
Timeline: Feb 24 – Mar 11, 2018
Setting: Renewed Residential
Total responses: 32

**DAYLIGHT & VIEWS**
Being in a reused residential space, only desks located next to a window have access to daylight. Sources further interior solely depend on artificial lighting throughout.

**STAFF SEATING FURNITURE**
C-shaped and L-shaped desks with no partitions provide ease peer interaction but no privacy. There are ample of storage spaces as well as safety in seating options such as no, informal chairs or areas.

**CHOICE OF SPACES**
The office design offers multiple common spaces scattered throughout the floor for collaborative meetings formal and informal such as small kitchen, pantry spaces for food storage and handling.

**INFERENCES**
- The overall perception of the office environment is visually appealing and relaxing.
- The office design offers the potential for more socialization and collaboration.

---

**INFORMAL MEETING SPACES SUPPORT COLLABORATION AND ENCOURAGE DISCUSSIONS**
Out of 50% of respondents who say they attend many collaborative meetings on a typical day at work, 40-40% say that they spend 2-4 or 2-3 hours working at a space other than their desk. Moreover, 20% of them say they would prefer to work in a collaborative office area or open-plan layout.

**INFERENCES**
- The office design offers the potential for more socialization and collaboration.
- The overall perception of the office environment is visually appealing and relaxing.
**SITE VISIT**

**Acoustic & Choice & Statistics**

Observations/Inferences for Ample access to daylight and visual connection within the open-plan office provides opportunity for employees to go for privacy needs during site visit showed a need for more private enclosed spaces for employees to go for privacy needs.

**Statistics**

- **Office**
  - **A** (3540 employees, 11000 SF)
    - **Key Findings**
      - Overall Perception: 85%
      - Feel Comfortable: 85%
      - Feel Innovative: 80%
      - Say Spaces Feel Fresh: 80%
      - Say Spaces Have No Control Over Temperature: 65%
      - Lack Endough Privacy at their Desk: 65%
      - Agree to Have Variety in Seating Options: 55%
      - Agree to Have Access to Natural Light: 55%
      - Say Spaces Do Not Feel Fresh: 35%
      - Say Spaces are Not Satisfactory: 35%

- **B** (8085 employees, 17000 SF)
  - **Key Findings**
    - Overall Perception: 80%
    - Feel Comfortable: 80%
    - Feel Innovative: 75%
    - Say Spaces Feel Fresh: 75%
    - Say Spaces Have No Control Over Temperature: 70%
    - Lack Endough Privacy at their Desk: 70%
    - Agree to Have Variety in Seating Options: 65%
    - Agree to Have Access to Natural Light: 65%
    - Say Spaces Do Not Feel Fresh: 45%
    - Say Spaces are Not Satisfactory: 45%

- **C** (7580 employees, 18000 SF)
  - **Key Findings**
    - Overall Perception: 75%
    - Feel Comfortable: 75%
    - Feel Innovative: 70%
    - Say Spaces Feel Fresh: 70%
    - Say Spaces Have No Control Over Temperature: 75%
    - Lack Endough Privacy at their Desk: 75%
    - Agree to Have Variety in Seating Options: 60%
    - Agree to Have Access to Natural Light: 60%
    - Say Spaces Do Not Feel Fresh: 35%
    - Say Spaces are Not Satisfactory: 35%

**Daylight & Views**

Deals are aligned along the periphery of the interior space allowing ample natural light to penetrate. Private offices and conference rooms surrounding the open-plan office have glass walls along that provide visual transparency and exchange of diffracted light at end of the room.

**Inferences**

- **Daylight Increases morale and ultimately well-being.**
- **Visual Transparency in the space increases engagement and overall satisfaction, which influences the feeling of innovativeness.**
- **65% of respondents say they go out of office to make private phone calls, more than 70% of open-ended responses attribute the reason to the lack of enclosed spaces/rooms for privacy within the office.**
- Out of 80-85% of respondents who agree to having ample daylight and visual transparency within the space, majority of them have high rating on overall satisfaction and engagement in the space.

**Office Environment Survey: Individual Office Survey Analysis**

- **A** (11000 SF)
  - **Overall**
    - **Office**
      - **A** (3540 employees, 11000 SF)
        - **Key Findings**
          - Overall Perception: 85%
          - Feel Comfortable: 85%
          - Feel Innovative: 80%
          - Say Spaces Feel Fresh: 80%
          - Say Spaces Have No Control Over Temperature: 65%
          - Lack Endough Privacy at their Desk: 65%
          - Agree to Have Variety in Seating Options: 55%
          - Agree to Have Access to Natural Light: 55%
          - Say Spaces Do Not Feel Fresh: 35%
          - Say Spaces are Not Satisfactory: 35%

  - **Physical Environment**
    - **Office**
      - **A** (3540 employees, 11000 SF)
        - **Key Findings**
          - Overall Perception: 85%
          - Feel Comfortable: 85%
          - Feel Innovative: 80%
          - Say Spaces Feel Fresh: 80%
          - Say Spaces Have No Control Over Temperature: 65%
          - Lack Endough Privacy at their Desk: 65%
          - Agree to Have Variety in Seating Options: 55%
          - Agree to Have Access to Natural Light: 55%
          - Say Spaces Do Not Feel Fresh: 35%
          - Say Spaces are Not Satisfactory: 35%

- **B** (18000 SF)
  - **Overall**
    - **Office**
      - **B** (8085 employees, 17000 SF)
        - **Key Findings**
          - Overall Perception: 80%
          - Feel Comfortable: 80%
          - Feel Innovative: 75%
          - Say Spaces Feel Fresh: 75%
          - Say Spaces Have No Control Over Temperature: 70%
          - Lack Endough Privacy at their Desk: 70%
          - Agree to Have Variety in Seating Options: 65%
          - Agree to Have Access to Natural Light: 65%
          - Say Spaces Do Not Feel Fresh: 45%
          - Say Spaces are Not Satisfactory: 45%

  - **Physical Environment**
    - **Office**
      - **B** (8085 employees, 17000 SF)
        - **Key Findings**
          - Overall Perception: 80%
          - Feel Comfortable: 80%
          - Feel Innovative: 75%
          - Say Spaces Feel Fresh: 75%
          - Say Spaces Have No Control Over Temperature: 70%
          - Lack Endough Privacy at their Desk: 70%
          - Agree to Have Variety in Seating Options: 65%
          - Agree to Have Access to Natural Light: 65%
          - Say Spaces Do Not Feel Fresh: 45%
          - Say Spaces are Not Satisfactory: 45%

- **C** (18000 SF)
  - **Overall**
    - **Office**
      - **C** (7580 employees, 18000 SF)
        - **Key Findings**
          - Overall Perception: 75%
          - Feel Comfortable: 75%
          - Feel Innovative: 70%
          - Say Spaces Feel Fresh: 70%
          - Say Spaces Have No Control Over Temperature: 75%
          - Lack Endough Privacy at their Desk: 75%
          - Agree to Have Variety in Seating Options: 60%
          - Agree to Have Access to Natural Light: 60%
          - Say Spaces Do Not Feel Fresh: 35%
          - Say Spaces are Not Satisfactory: 35%

  - **Physical Environment**
    - **Office**
      - **C** (7580 employees, 18000 SF)
        - **Key Findings**
          - Overall Perception: 75%
          - Feel Comfortable: 75%
          - Feel Innovative: 70%
          - Say Spaces Feel Fresh: 70%
          - Say Spaces Have No Control Over Temperature: 75%
          - Lack Endough Privacy at their Desk: 75%
          - Agree to Have Variety in Seating Options: 60%
          - Agree to Have Access to Natural Light: 60%
          - Say Spaces Do Not Feel Fresh: 35%
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HEALTH incorporates physical health outcomes that can be measured or evaluated such as: headache, eye strain, stress & depression, etc. that constitute physical and mental health of employees.

An occupant’s sense of WELLBEING is also comprised of their perception of numerous factors, including how PRODUCTIVE they think they are: perceived physical & psychological stability, perceived productivity, perceived office environment, perceived organizational culture, etc.

**SCOPE OF RESEARCH**

**METRICS FRAMEWORK**

- Financial metrics
- Physical Metrics
  - Physical spatial design of the building
  - Indoor environmental quality of the space
- Perceptual metrics
  - Self-reported attitudes on health, well-being, & productivity in the workplace

**SURVEY FRAMEWORK**

- Variable: Sound Privacy
  - Cause: Poor spatial planning where collaborative & focus zones are too close or not enough physical barrier
  - Effect: Difficulty in concentrating at work can lead to discomfort, and low productivity at work

- Variable: Sitting Posture
  - Cause: An effort to increase productivity, individual put in more & more work hours sitting at their workstations
  - Effect: Sitting in same posture all day and not moving increases the risk of health issues such as back-pain, obesity, eye-strain, etc.

**WGBC Guide: Health, Well-being, & Productivity in offices**
Within the context of PROGRAM, the study explores tangible and intangible elements that constitute the physical spatial design of a workplace and its indoor environment – which affects the comfortability of the users in that space.

Growth of alternate workspace layouts (Illustration by Benjamin Monroe)

FURNITURE is an important attribute that is studied in terms of ergonomics as well as flexibility of it within the workplace.

Barbarian group’s New York office

THESIS 2: Forum 4: Context
Darpan Arora
While factors such as employee relations, work regulations, organizational practice, etc. serve as a halo effect factors in determining employee satisfaction; providing CHOICE & CONTROL, that is within the architectural realm, significantly affects cognitive comfort in employees.

• The context of Choice revolves around engagement and disengagement.
• Incorporating a variety of settings, styles and postures to choose from is essential to wellbeing and employee engagement.

Choice to work in secluded pods for focusing
Choice to conduct video calling in a private room
Choice for group meeting space and furniture flexibility

Office culture affects behaviors that make movement and control acceptable during the workday.

Providing workers a control over their working environment significantly affects comfortability.

These two examples depict the freedom to control lighting levels – both artificial and natural.
Observed factors that influence architectural design of a workplace (based on literature review and case studies) and contribute to the health, well-being and productivity of an individual.
CASE STUDY

STEELCASE INNOVATION CENTER
GRAND RAPIDS, MICHIGAN

Forum 4: Context

An Innovation Center Typology
As a result, a new typology focusing on individual and collaborative work was developed which clearly communicated the expected behaviors.
Office: Harley-Ellis Devereaux (HED)

Location: Southfield, MI

Size: About 120 employees

Area: About 20,000 Sq.Ft.
SURVEY INSIGHTS

Initial Analysis

METADATA:
1. No of respondents: 20 (17 complete, 3 partial)
2. Response sources: 15 FCA employees; 3 random employees; 1 from HED; 2 from Tiseo Architects
3. Average time: 8-13 min to complete

Based on 17 complete responses:

Some open-ended answers:
change ONE thing about your office furniture/ layout
“ability to have a standing desk”
“add height adjustable worksurfaces”
“move next to a window”
“More of a variety of desks in all offices (standing, sitting, and pods)…. option to sit, stand”

change anything about your visual, acoustic, or thermal comfort
“Make a provision for natural light”
“More windows which are openable”
“More sunlight and fresh views”
“Make partitions taller”

why do you prefer to leave your workplace
“working indoors makes me feel confined and uncreative”
“private”
“Fresh air”
“I like to keep my life private”
“TO go for walks and stretch my legs”
PRIMARY PURPOSE OF THE STUDY

To advocate for the need for wellness within the workplace by identifying spatial design factors that influence one’s physical and cognitive satisfaction and involvement. Wellness is a sum of one’s positive physical, mental, and social state.

Target Audience: Employees working in an office

Sample audience: Architecture/Design firm employees in Southeast Michigan

The study aims at contributing to the growing body of research in the field of workplace wellness by correlating spatial design attributes with physical and cognitive environmental satisfaction within employees.

The anticipated outcomes will highlight the gap between spatial design of the surveyed firms and employee preferences. The study will also identify common design factors that work and that don’t work within those offices.

WHAT IS WORKPLACE WELLNESS?

HOLISTIC WELL-BEING

WORKPLACE CULTURE

Positive Collaboration/Communication

PERKS & BENEFITS

Lunch programs

Paid time off/Sick leave

Gym benefits

Physical Comfort

MENTAL STATE

Self Motivation

Stress Handling

PHYSICAL STATE

Healthy Habits

SOCIAL STATE

Work-Life Balance

Peer Interactions

Peer

Social Wellness also depends on workplace culture

Examples

State of social wellness also depends on workplace culture

FORUM 5: PURPOSE

In an study by Continental Office, it is found
Creativity in an office can depend on

COLLABORATION

TEAM VISIBILITY

IMMEDIATE SETTING

A 2016 study by Foundation for Young Australians, estimates that

jobs in the future will demand

260% MORE CREATIVITY & INNOVATION SKILLS

According to a 2014 survey by Gallup

the new average for most full-time workers has risen to

46-47 HOURS PER WEEK

According to a 2015 report by Gallup

less than one-third of U.S. employees feel engaged in their workplaces (tracked since 2000)

PERCENT OF ENGAGED EMPLOYEES (Gallup data)

32% 13%

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HOW DOES DESIGN IMPACT WELLNESS?

Workplace design affects one’s ability to do a task by providing comfortable ambient conditions as well as motivation by promoting psychological engagement.

KED (Kelby Ergo Design) explains

THE CORRELATION BETWEEN WELL-BEING and WORKPLACE DESIGN

According to Jennifer Veitch there are four areas in which there is some evidence that workplace conditions can benefit employees (especially with certain mental health problems):

- **Social Relations**
- **Attention Focus**
- **Crowding**
- **Stress Reduction**
- **Photo-biology**

**Personal Space**

- **Daylight**
- **Circadian Rhythm**
- **Social Engagement**
- **Visual Transparency**
- **Open Plan**

**FORUM 5: PURPOSE**

- **Seasonal Mood Disorder** due to insufficient access to daylight
PRACTICAL IMPLICATIONS OF THE STUDY
(An example of a surveyed firm)

SUMMARY

This firm studied occupies part of a historic building in Detroit. The first floor has private and open offices including multiple conference rooms and runs management-based activities. The second floor has more departmental-type setup (cubicle spaces) and runs design-based activities.

SURVEY STATISTICS

Timeline: March 2 – March 17, 2018
Total responses: 55 (66% of the firm size)
Completion rate: 91% (50 complete responses)

Types of spaces
Open-plan, Private enclosed, conference rooms (big and small), break rooms (small), material library + utilities

Firm Size
80-85 employees

Square Feet
About 27,000 Sq. Ft. divided between first and second floor of the building

Recent renovations
First floor – 2001
Second floor – Mid 90s
SPATIAL DESIGN OBSERVATIONS AND INFERENCES FROM THE SURVEY RESULTS

**Category: Spatial Layout**

**DESKS WITH SPACE-DIVIDERS WORK BETTER THAN CUBICLES**

While majority (62%) of respondents work in a cubicle, it is observed that respondents who work at desks having space-dividers (26%) feel more positive about their working environment in all variables.

Highest influence of the space type on overall perception of the working environment is found on the feeling of engagement/involvement while slight difference is found in productivity, innovation or comfortability.

**MULTIPLE SCATTERED MEETING SPACES SERVE WELL**

- Out of 36% of respondents who say they need to meet with others outside of their desk more than 3 times a day, 67% say that they spend less than 2 hours working at a space other than their desk on a typical work day.
- Over 90% of them say they would prefer to work in a common lounge or an enclosed-private room for collaborative team meetings.
- Open-ended responses too show a need for more enclosed-private meeting spaces good for 3-8 people.

Multiple meeting rooms within close proximity are more likely to be occupied than large rooms away from the desk.

For instance, yellow spaces indicated here depict conference/meeting rooms and close proximity circle around them. They acquire same area in both types of layout but serve a large pool of users who would use these spaces for focused or collaborative work; or even for private phone calls or relaxation.

**Category: Choice and Control**

**(FLEXIBLE TECHNOLOGY) = (INCREASED SATISFACTION) VARIES BY AGE**

70% of respondents feel restricted to their desk for work having access to technology only at their assigned work space AND more than half of them say they often communicate with others in corridors or circulation spaces.

In terms of the influence on overall perception of the environment, respondents within the age group of 45 to 64 feel more positive about their environment than the younger generation who prefer more flexible and mobile environment to be innovative and engaged.

**OVERALL PERCEPTION OF THE WORKING ENVIRONMENT – FORUM 5: PURPOSE**