

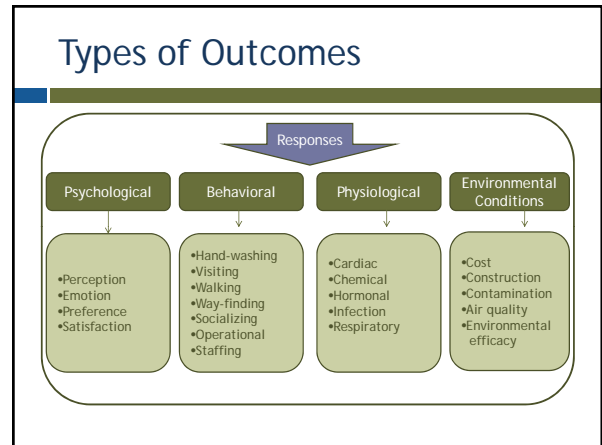
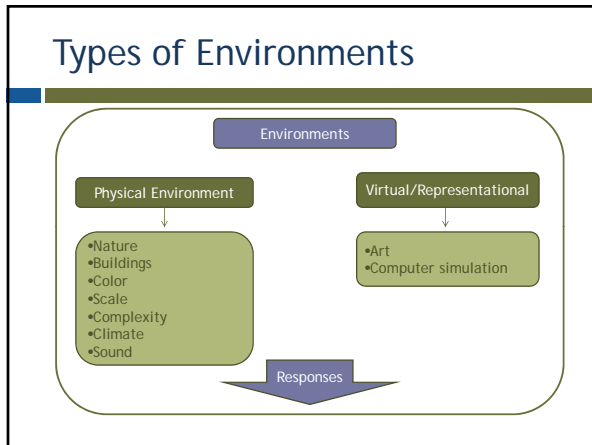
EVIDENCE BASED DESIGN: OPTIMIZING DESIGN DECISIONS



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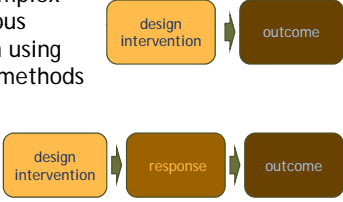
What is Design Research?

Design research is the exploration of the relationship between physical and virtual/representational environments and psychological, behavioral, physiological, and mechanical responses.



Direct & Indirect Environmental Impacts

□ Complexity of the environment means that research is also complex and requires rigorous investigation often using multiple research methods



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    graph LR
      DI1[design intervention] --> O1[outcome]
      DI2[design intervention] --> R[response]
      R --> O2[outcome]
  
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What is Evidence-based Design?

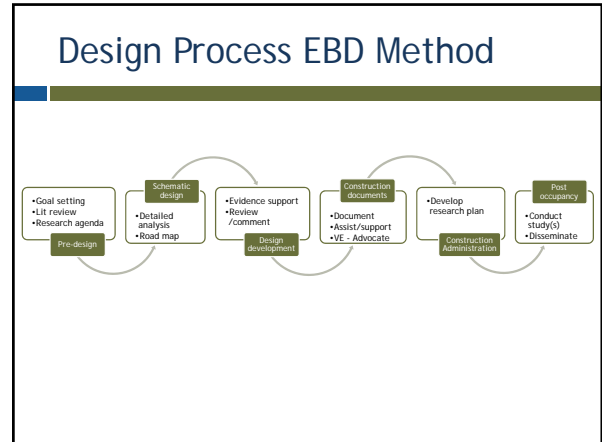
A process for the conscientious, explicit, and judicious use of current best evidence from research and practice in making critical decisions, together with an informed client, about the design of each individual and unique project.

Evidence-based Practitioner

Evidence-based design suggests the integration of design research into actual projects.

Practitioner Levels (Hamilton & Watkins, 2008):

0. **Claim to use an evidence-based process, or claims positive results, yet have no understanding of the process that requires diligent searches, critical interpretations, hypothesized outcomes, and carefully measured results.**
1. Keep up with the literature & apply the evidence
2. Predict & measure the outcomes (rigorous research design)
3. Share findings
4. Peer-reviewed publications



LEARNING ENVIRONMENTS

- Preschool
- K-12 Grade
- University

Research Shows Design Impacts...

Strategy

- **Preschool - Classroom design**
 - Learning - literacy & creativity productivity
 - Socialization - interaction & cooperation
 - Prevention of behavior problems
- **K-12 Grade - Day lighting [Vitamin D]**
 - Health
 - Attendance
 - Achievement
 - Financial benefits - cost of absence & energy

Research Shows Design Impacts...

Strategy

- **University**
 - Color study
 - Color study - white, red, blue; math or reading test
 - Questionnaire assessed:
 - Task demand and perceptions of the task
 - Satisfaction and motivation
 - Privacy, room temperature, and lighting
 - Individuals performing tasks in **blue** environment had:
 - Higher levels of performance
 - Lower levels of fatigue
 - Higher levels with satisfaction of their environment
- Campus wayfinding
- Spread of disease in college dormitory

RETAIL ENVIRONMENTS

- Improving
 - Shopper experience
 - Staff loyalty
 - Crime and theft prevention

Retail Environmental Design Research

Strategy

- Sales
 - Environmental color & consumer response
 - Studies focusing on color
 - More positive retail outcomes in **blue** rather than **red** environments
 - More purchases
 - Fewer purchase postponements
 - Stronger inclination to shop and browse
- Productivity
 - Macy's Department Store
 - Sam's Club
 - Grocery shopping behavior

Crime Prevention Through Environmental Design (CPTED)

Strategy

- Theft
 - Convenience stores
 - Increased sales and reduced losses from theft up to 50%
 - Increased sales and reduced losses from burglaries up to 65%
- General Crime
 - Burglaries
 - Drug sales
 - Parking lot incidents



WORKPLACE ENVIRONMENTS

<ul style="list-style-type: none"> Productivity Satisfaction Encouraging physical activity Impact of environmental conditions 	<ul style="list-style-type: none"> Ergonomics & workstation design Color Day lighting Flexibility
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What about Office Clutter?


Strategy

- Hypothesis: personalization leads to greater employee satisfaction
- Research design - Statistical analysis
 - 338 office workers from 20 companies
 - Independent variables - organizational policy, employee gender, individual personality traits
 - Dependent variables - workplace personalization, satisfaction with the physical environment, job satisfaction and well-being

What about Office Clutter?

Strategy

- Findings
 - Satisfaction with the physical work environment was the link between job satisfaction and office personalization
 - Number of items displayed
 - Extent to which employee is able to determine workplace arrangement
 - Personalization leads to a positive organizational and social climate, higher employee morale, and increased retention.
 - Gender
 - Women personalize more than men
 - Women express identity, individuality, emotions
 - Men personalize to show status



SUSTAINABILITY

Most peer-review published articles are focused on urban design or making the case for sustainable design

More research/publications should focus on:

- Building outcomes
- Human outcomes

Effect of IEQ on Occupants Perception of Performance (Master Thesis)

Strategy

- Research design
 - Comparative study of two similar university buildings - one LEED certified, one not certified
 - Multimethod - Statistical analysis
 - Environmental conditions - noise, lighting, thermal comfort, CO2
 - Web-based survey (145 participants)
- Findings
 - LEED certification did not influence perception of student performance
 - Environmental conditions were within recommended standards, but occupants often complained about various parameters
 - Day lighting was reported to contribute to better IEQ and had a positive affect on occupants' perception of productivity and performance

Patient falls
 Hospital acquired infections
 Medical errors
 Noise levels / quality of sleep



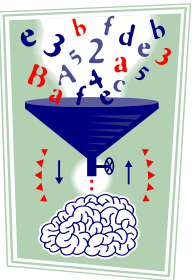
HEALTHCARE DESIGN RESEARCH

In reviewing the literature, researchers (Ulrich and Zimring, 2004; Shepley & Quan, 2003; Rubin, Owens & Golden, 1998) found that there was a correlation between patient outcomes and the physical environment.

Rubin et al - reviewed 78,761 articles... 84 met criteria
 Shepley & Quan - reviewed additional 2,000... additional 35 met criteria
 Ulrich & Zimring - broader inclusion of disciplines... additional 400 met criteria

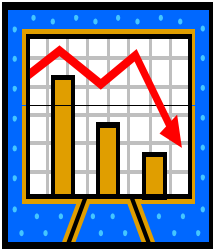
What information is available?

- Scientific studies
- Literature reviews
- Guidelines and descriptions
- Raw data




Existing Data

- Maintenance statistics
- Staff pattern data
- Staff injury data
- Information desk records
- Patient medical records
- Patient satisfaction survey
- Hospital Acquired Infection data
- Patient injury data



Where can I find information?

- Libraries
- Universities/Colleges
- Organizations
- Conferences
- Existing databases
- Listservs
- Internet



Resources - Books

- DAK Kopec, Health, Sustainability, and the Built Environment
- Cohen & Weisman, Holding on to Home
- Hamilton & Watkins, Evidence-based Design for Multiple Building Types
- Harris, Joseph, et al., A Practitioner's Guide to Evidence-based Design
- Malkin, A Visual Reference for Evidence-based Design

Resources - Journals & Newsletters

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- Architectural Research Centers Consortium (ARCC)
- Environment & Behavior
- Journal of Architectural & Planning Research (JAPR)
- Health Environments Research and Design (HERD)
- Medical, nursing and science journals



Design-Related

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- AIA Academy of Architecture for Health
- Architectural Research Centers Consortium
- Center for Health Design
- Environmental Design Research Association



Conferences

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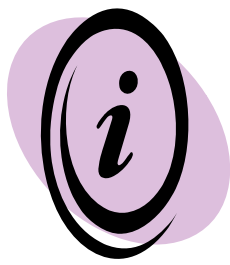
- ACSA
- AIA
- ARCC
- ASHE
- CleanMed
- EDRA
- HealthDesign 09
- Symposium on Healthcare Design
- Specialty Conferences



Search Engines - Types

28

- Avery Index
- Current Contents
- ERIC
- First Search
- Healthstar
- Medline
- PubMed
- Google Scholar
- Informadesign
- PsycInfo
- Sociofile



QUESTIONS?

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