Not Everything is a Nail

Renée Cheng, FAIA
Dean, College of Built Environments
University of Washington
areas for architectural education requiring collaboration and intercultural skill
“To return to the difficulty which has been stated with respect both to definitions and to numbers, what is the cause of their unity? In the case of all things which have several parts and in which the totality is not, as it were, a mere heap, but the whole is something besides the parts, there is a cause.”

- Aristotle, Metaphysics
Performance of homogeneous teams follows a typical bell curve

Performance measured on creativity, ability to generate more and better alternatives, more and better criteria for evaluating alternatives

Homogeneous defined as team members share same national identity

TEAM PERFORMANCE AND DIVERSITY
Research has shown that well-managed homogeneous teams outperform poorly-managed diverse teams while well-managed diverse teams outstrip all others.¹

Diverse teams follow a very different pattern

**Conflict:** the energy that could have been channeled into effective work was drained into negative stereotyping...the “team” destroyed value rather than creating it.

or

**Mediocrity:** by not allowing the differences to surface in any way, the teams suffered because they couldn’t leverage them for innovation or performance advantages.

**Value Creation:** Differences are explicitly recognized and accepted, even nurtured, and their implications are incorporated into every facet of the group’s processes.

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The researchers also discovered which variables were not significantly connected with team effectiveness at Google:

- Colocation of teammates (sitting together in the same office)
- Consensus-driven decision making
- Extroversion of team members
- Individual performance of team members
- Workload size
- Seniority
- Team size
- Tenure
shared belief held by members of a team that the team is safe for interpersonal risk taking

...an integrative perspective in which both team structures, such as context support and team leader coaching, and shared beliefs shape team outcomes.

-Amy Edmondson, 1999
TEAMS MATTER: LESSONS FROM ARRA

GSA REGION 5 AND THE AMERICAN RECOVERY AND REINVESTMENT ACT

RENEE CHENG, AIA, PROFESSOR, SCHOOL OF ARCHITECTURE UNIVERSITY OF MINNESOTA
PUBLISHED MAY 2016, SPONSORED BY GSA REGION 5 AND 4240 ARCHITECTURE
<table>
<thead>
<tr>
<th>Context</th>
<th>Key Ingredients</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td>Project Size</td>
<td>Commercial</td>
<td>Team Outcomes</td>
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<tr>
<td>Capacity and risk</td>
<td>Leadership</td>
<td>Project Efficiency</td>
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<td>Impact</td>
<td>Service Level Agreement</td>
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<td>Key Performance Indicators</td>
<td>Organizational Change</td>
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<td>Experience Level (PhD or Center)</td>
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<td>Experience Level (Master or Center)</td>
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<td>Impact of Change on Business</td>
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<td>Impact of Change on Project</td>
<td>Organizational Structure</td>
<td>Change Management</td>
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</tbody>
</table>
# Causal Factors

- Trust & Respect
- Accountability

## Project Success

- Aligned Goals

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<table>
<thead>
<tr>
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<th>Team Outcomes</th>
<th>Building Outcomes</th>
</tr>
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<tbody>
<tr>
<td>Project Size</td>
<td>Complexity &amp; Risk</td>
<td>Leadership</td>
<td>Knowledge &amp; Process Vectors</td>
<td>Team Stability</td>
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<tr>
<td>Team Size</td>
<td>Trust &amp; Respect</td>
<td>Team Effectiveness</td>
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<td>Team Composition</td>
<td>Aligned Goals</td>
<td>Project Outcomes</td>
<td>Project Outcomes</td>
<td>Project Outcomes</td>
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<tr>
<td>Team Dynamics</td>
<td>Accountability</td>
<td>Impact of Scope Change</td>
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</tr>
</tbody>
</table>

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### NON-FACTORS

| SHARED SAVINGS | USE OF BIM | CO-LOCATION |

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**Table Content:**

- **Context:**
  - Project Size
  - Complexity and Risk
  - Innovation
  - Level of細微的 Engagement/Ownership
  - Efficiency
  - Performance

- **Big Ideas:**
  - Training
  - Leadership
  - Integrated Design

- **Operational & Performance Metrics:**
  - Environmental
  - Social
  - Economic

- **Outcomes:**
  - User Outcomes
  - Building Outcomes

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Cheng et al., *Teams Matter*, 2019. [http://hdl.handle.net/11299/201406](http://hdl.handle.net/11299/201406)
MOTIVATION AND MEANS:
How and Why IPD and Lean Lead to Success

Research Report
November, 2016

University of Minnesota in collaboration with University of Washington, University of British Columbia, Scan Consulting
Sponsored by Integrated Project Delivery Alliance (IPDA) & Lean Construction Institute (LCI)
Our conclusion is that IPD sets the terms and provides the motivation for collaboration; Lean provides the means for teams to optimize their performance and achieve project goals.
<table>
<thead>
<tr>
<th>Project</th>
<th>Target Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akron*</td>
<td>2 months savings on 24 month schedule</td>
</tr>
<tr>
<td>Autodesk</td>
<td>6 months late on 6 month schedule</td>
</tr>
<tr>
<td>Mosaic</td>
<td>4 months savings on 16 month schedule</td>
</tr>
<tr>
<td>Quail Run</td>
<td>1 month late on 8 month schedule</td>
</tr>
<tr>
<td>Rocky Mountain**</td>
<td>0 months savings on 12.5 month schedule</td>
</tr>
<tr>
<td>St. Anthony*</td>
<td>2 months savings on 18 month schedule</td>
</tr>
<tr>
<td>Sutter Los Gatos</td>
<td>0 months savings on 12 month schedule</td>
</tr>
<tr>
<td>Sutter Sunnyvale</td>
<td>2.5 months savings on 30.5 month schedule</td>
</tr>
<tr>
<td>T. Rowe Price*</td>
<td>0 months savings on 8 month schedule</td>
</tr>
<tr>
<td>Wekiva Springs</td>
<td>0 months savings on 6 month schedule</td>
</tr>
</tbody>
</table>

* Significant project savings were used to increase project scope
** Target comparison to final cost not available

- Final project cost
- One month construction schedule
- One month schedule savings
- Over schedule by one month
Industry adoption of Lean tools and processes is uneven and weighted towards construction over design.

Teams with more Lean were:

- more likely to have slightly more positive team and building outcomes.
- rate their projects as less complex.

This may be perception, since Lean tools and processes can make tasks clear and straightforward.
New Hypothesis:
Lean tools and processes **BUILD** and **RELY UPON**

- Trust
- Communication
- Accountability
- Psychological Safety
Lean and IPD teams discuss intention and differences in agendas, priorities and practices – assume not every firm or individual is the same, but goals are shared.
Use tools to intentionally build equitable culture on your team:

- Team performance metrics such as plan percent complete
- Communication protocols such as A3
- Decision protocols such as CBA
- Attitude of continuous improvement and project first priorities
- Benefits from challenging concepts such as last responsible moment
Conceptual Model

forces acting upon project & team

contract “gravitational assist”

point of equilibrium

Design Bid Build,
CM@Risk, Design Build

Integrated Project Delivery (IPD)

Howard Ashcraft, 2019
Self-Centering System

- No Cap on Variable Costs
- Profit Unlinked from Variable Costs
- Actual Profit Based on Project Outcome
- No Change Orders for Team Managed Risks
Conceptual Model (adapted)

Design Bid Build

CM@Risk, Design Build, (maybe) IPD-ish (if nothing goes wrong)

Integrated Project Delivery (IPD)

Renée Cheng adapted from Howard Ashcraft, 2019
Proportional way to consider the value proposition in the built environment
Value to society, region, neighborhood
   Equity, health, engagement
Value to building owner
   Cost of personnel development, recruitment, retention
   Savings to healthcare expenditures
   Building builds positive brand

Renée Cheng, 2020
investment of time for design and planning
Tree cover may improve academic performance. This study of 624 Illinois public high schools showed that tree cover density within a 1-mile radius of schools was positively associated with better ACT scores and...


Effects of birthing room design on maternal and neonate outcomes: A systematic review


A scoping review of the impact on children of the built environment design characteristics of healing spaces

2020

HERD: Health Environments Research & Design Journal Journal Article

Pages in press

Author(s): Gaminiesfahani, H., Lozanovska, M., Tucker, R.

https://www.landscapeperformance.org

https://www.healthdesign.org/research-services/pebble-project
Green office environments linked with higher cognitive function scores

For immediate release: October 26, 2015

Boston, MA – People who work in well-ventilated offices with below-average levels of indoor pollutants and carbon dioxide (CO₂) have significantly higher cognitive functioning scores—in crucial areas such as responding to a crisis or developing strategy—than those who work in offices with typical levels, according to a new study from the Harvard T.H. Chan School of Public Health’s Center for Health and the Global Environment, SUNY Upstate Medical University, and Syracuse University.

The researchers looked at people’s experiences in “green” vs. “non-green” buildings in a double-blind study, in which both the participants and the analysts were blinded to test conditions to avoid biased results.

Green Roofs Over Time: A Spatially Explicit Method for Studying Green Roof Vegetative Dynamics and Performance

Article (PDF Available) · August 2014 with 391 Reads

Max R. Piana
University of Massachusetts Amherst/U.S. Forest S...

Stephanie Carlisle
University of Pennsylvania
KNOWLEDGE LOOP

BROKEN KNOWLEDGE LOOP
- In-house research positions firm as market expert, limited sharing of proprietary knowledge
- Research meets University standards for tenure and promotion, dissemination through academic venues
- PRACTICE
- ACADEMY

COMPLETED KNOWLEDGE LOOP
- Identify issues relevant to profession
- New techniques or recommendations based on research
- PRACTICE
- ACADEMY

drawn by Kai Samela based on conversations between Tom Fisher and Renée Cheng
Model of Applied Research Consortium under development at UW CBE
multi-disciplinary expansion of architecture research program originally developed by Renee Cheng at University of Minnesota
Guides for Equitable Practice

Guides for understanding and building equity in the architecture profession

FIRST EDITION
PART I - RELEASED NOVEMBER, 2018
PART II - RELEASED JUNE, 2019

The University of Washington for the American Institute of Architects Equity and the Future of Architecture Committee
Equity, Diversity, and Inclusion

Introduction
The guides make the moral, business, ethical, and societal cases for equitable practice in architecture.

Intercultural Competence
As architecture becomes more diverse, bias and intercultural competence—the ability to function effectively across cultures—have

Compensation
Architects' compensatory issues arise from incomparable opportunities, evaluation of work, and pay structures.

Recruitment and Retention
Attracting and retaining young talent is vital for every firm and the profession as a whole.

Negotiation
This guide outlines skills architects can develop to act inclusively and equitably during negotiations.

Mentorship and Sponsorship
Mentorship and sponsorship can provide critical to individual's careers, and they can help make workplaces

Advancing Careers
This guide details the importance of approaching career advancement as a shared responsibility between employee and employer.

Engaging Community
Because the majority of architects' work affects communities, respectfully engaging with them and adopting solutions received

Measuring Progress
True support of equity, diversity, and inclusion requires that we measure the outcomes of our work.

http://aia.org/equityguides
Renée Cheng

Dean

Renée Cheng joined the College of Built Environments as dean on January 1, 2019. Dean Cheng comes from the University of Minnesota where she was a professor, associate dean of research, head of the school of architecture, and directed an innovative graduate program linking research with practice and licensure. Prior to UMN, she taught at the University of Michigan and the University of Arizona. She is a graduate of Harvard’s Graduate School of Design and Harvard College.

An licensed architect, her professional experience includes work for Pelli, Cobb, Fried and Partners and Richard Meyer and Partners before founding Cheng Olson Design. Dean Cheng has been honored twice as one of the top 25 most admired design educators in the United States by DesignIntelligence. She has received numerous honors and awards including the 2017 Lean Construction Institute Faculty Award and was named to the American Institute of Architecture’s College of Fellows in 2017.

Cheng is a leader in the American Institute of Architects (AIA) and advocates for equity in the field of architecture and in the practices related to the built environment. Recently, Cheng led the research effort for the AIA guides for equitable practice in the workplace. Cheng has pioneered research surrounding the intersection of design and emerging technologies, including work on industry adoption of integrated Project Delivery, Building Information Modeling and Lean.