dancing with ambiguity
never go hunting alone

bürgenstock-konferenz der schwizer fachhochschulen
13-14 janvier 2012

Larry Leifer
Professor, Director, Center for Design Research at Stanford
Director, Hasso Plattner Design Thinking Research Program at Stanford
http://cdr.stanford.edu
my dance
our dance

1,035,968 BCE
today we go **hunting** for the next big idea with an equation for success
i = mc\^X

innovation = minds in Communication
radical, relevant, & rigorous
working creatively together
and a road map that looks like this
this slide is blank because there is no map we have to find our own way
precision innovation

the 1st rule

never go hunting alone

reviving an ancient art
hunting is always about people
communicating tangibly
prototype storming
accelerating learning
defying gravity
creating ambiguity
building “T” people
and
“T” people teams
in the moment, should I be an “I” shaped or “T” shaped person

(Suzuki’2011)
In-depth knowledge

“[I]” shaped by knowledge in depth
In-depth knowledge shaped by breadth in behavior.
why is it so hard
to be an adaptive “T” person
people have different ways of thinking, working, and learning

Lande 2009
way points along the passage from concept to functional proof-of-concept prototype
team-B’s 8 month passage through the thinking and doing space
team-A’s 8 month passage through the thinking and doing space

A earned a WOW

B earned a thank you
introducing a curriculum and laboratory for extreme design innovation

... so who is in the lab
global pan-disciplinary design teams
global teaching teams
professional coaches

Munich Team

Stanford Team

Teaching Team
culture coaches

Project Coach

Culture Coach

Teaching Team

Munich Team

Project Coach

Culture Coach

Teaching Team

Stanford Team
real industry projects
Some of Our Neighbors
(9) 310-stanford partnerships 2010-2011
(20) total 310-global teams network wide

Stanford ME (9)
Stanford-UNAMexico (1/3)
Stanford-Cali (2 of 3)
Stanford-UNAMexico-Munich (2)
Stanford-HPI (2 of 3)
Stanford-Paris (1 of 4)
Stanford-Helsinki (2 of 5)
Stanford-St.Gallen (1 of 7)

PIEp, KTH Stockholm
PIEp, TU Lülea
make space

How to Set the Stage for Creative Collaboration
Scott Doorley & Scott Witthoft
With a Foreword by David Kelley
The Power of Design thinking

A tiny firm called IDEO redefined good design by creating experiences, not just products. Now it's changing the way companies innovate.

By Bruce Nussbaum
re-designing
products
services
education
business
communication
...
and the future of the human experience
extreme me310 case study

need-find, conceive, build-test

re-invent the convertible experience

for BMW with TUM in 2005
project challenge

improve the open air experience
critical
function-experience
prototyping
modeling what we know @ TUM
finding the noise source @ Stanford
airflow revisited
airflow revisited again
& again
... one more try
full scale prototyping
failure
precision innovation

the 2nd rule

never stop hunting

persevere
dark horse prototyping
airflow
re-invented
found it, the big idea
precision innovation

the 3\textsuperscript{rd} rule

deliver

transport your ideas
to the market place
getting real on the open road
from concept to reality
fluid dynamics re-visited

re-circulation creates bad-air in the cabin

re-circulating bad-air is eliminated by the good-air jet stream
validating airspeed measurement
but watch her hair

Base Case Airspeed

OpenRoad Airspeed

<table>
<thead>
<tr>
<th>Wind Condition</th>
<th>Base Case</th>
<th>OpenRoad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad Wind</td>
<td>7 m/s</td>
<td>2.3 m/s</td>
</tr>
<tr>
<td>Good Wind</td>
<td>1.9 m/s</td>
<td>1.4 m/s</td>
</tr>
</tbody>
</table>
a better convertible, problem eliminated
me310 case study

need-find, conceive, build-test

re-invent the nursing home experience

for Swedish Welfare Agency with Lüleå SE 2006
need finding

California

Sweden
map wellbeing with prototypes

Social

Mental

Wellbeing

Multi-Sensory Stimulation

Mobility Assistance

Exercise Motivation

Bath & Shower

Patient Monitoring & Assistance

Physical
Nösphere
in cross-section
Nösphere User Testing

Nosphere Testing

Hyatt Classic Residence

June 1, 2006
me310 case study

need-find, conceive, build-test

re-invent the eye make-up experience

for Belcorp with Cali Columbia 2011
2014
~$80 Billion

* Stones 2010
I don’t experiment because there is no easy way to take it off.
"I don’t use eyeliner because it’s hard to do correctly"
but, what if...
before & after
design thinking research

understanding innovation complexity

a few things we have learned from instrumenting design team activity
the attention time constant
Baya PhD’1997

7 second rule
design information fragment duration
across six activity categories
(2 each = receptive, expressive, search)
creative language = learning

noun-phrases in formal documents predict awards in peer-reviewed design competitions

Mabogunje, PhD’1996

wow
thank you
questioning drives performance

Eris PhD’2002

better questions / hour

combined rate of DRQ+GDQ (questions/hour)

DRQ = deep reasoning question
GDQ = generative design question

abstract / concrete (Brereton’92)
reasoning / conceiving (Eris’02)

wow

thank you
design thinking is

Eris PhD’2002

Divergent Thinking

Convergent Thinking

C1, C2, C3, C4, C5...

Design Concepts

Design Requirements

GDQ

DRQ

Design Decisions & Specifications
2 teams of 6 students each
with all of the same problem solving preference
Schar PhD’2011

“Diverger” Team
HBDI-D
KAI-I

“Converger” Team
HBDI-A
KAI-A
making design decisions together in the design observatory
KINETIC Concept Views

MERRELL Designs
Shoe Design
Task
"Divergers"
“Convergers”
“Shoe Design” Task

Subject Group

<table>
<thead>
<tr>
<th></th>
<th>Divergers</th>
<th>Convergers</th>
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</thead>
<tbody>
<tr>
<td>Facts</td>
<td>9/12 (75%)</td>
<td>9/12 (75%)</td>
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<tr>
<td>Questions</td>
<td>7/12 (58%)</td>
<td>2/12 (17%)</td>
</tr>
<tr>
<td>Total</td>
<td>16/24 (67%)</td>
<td>11/24 (46%)</td>
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</table>

Information Item Rating

<table>
<thead>
<tr>
<th></th>
<th>Divergers</th>
<th>Convergers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facts</td>
<td>3.42</td>
<td>3.26</td>
</tr>
<tr>
<td>Questions</td>
<td>3.32</td>
<td>2.96</td>
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<tr>
<td>Difference</td>
<td>+.10</td>
<td>+.31</td>
</tr>
</tbody>
</table>

“How important was the information? (5 – Important, 1-Not Important)
NEUTROGENA Styling Essence

A: Toronto
B: Trebbin
C: Tianjin
“Product Selection”

Task

“Divergers”

20 minutes
“Convergers”

Product Selection Task

C2

U1

Select

A

C1

U3

C5

C6

C3

U6

C4

U4

U2

U5

20 minutes
“Divergers”

Subject Group
- Divergers
- Convergers

Items Discussed:
- Common: 6/6 (100%) 5/6 (83%)
- Unique: 5/6 (83%) 5/6 (83%)
- Total: 11/12 (92%) 10/12 (83%)

Decision Making:
- Elapsed: 16:50 6:53
- Process: Review then Decide Rate then Review
design thinking research

tangible business process modeling

Grosskopf, Weske, Edelman, Leifer 2010
Hasso Plattner Institute, Potsdam
Stanford University, California
a 5 day planned case study

Universitätsklinikum Jena

with scenario consultant Dr. Markus Güntert
day-1
hunting in the clinic building a scenario
day-1+

extending the hunt using tangible plastic process blocks
day-1++
a physician joins and the model, grows beyond the space available paper representations are added
day 1 – outcome
a prototype process model in paper and block media
day-2 introduce the CAD modeling tool
day – 3
clinical process modeling exercise wraps up ahead of schedule with consensus captured in CAD tool
design thinking research

managing emotion dynamics

to improve design team performance

Jung PhD’2011
Can we adapt a set of methods that were developed to predict satisfaction and divorce in marriages to solve the problem of understanding the relationships between affective interaction characteristics and performance in design teams?

(Gottman and Levenson, 1992, 2000; Gottman, 1994)
LAB STUDY

5 minute affect dynamics ~5 to 8 hours Team Performance

FIELD STUDY

15 minute affect dynamics ~3 months ~3 months Team Performance
re-designing the equation for success

\[ i = (m+e)c^x \]

innovation = minds and emotions in communication
radical, relevant, & even more rigorous
working creatively together
thank you for your attention
there is more to the story,
3rd edition pending ...

“Everybody loves an innovation, an idea that sells.” But how do we arrive at such ideas that sell? And is it possible to learn how to become an innovator? Over the years Design Thinking – a program originally developed in the engineering department of Stanford University and offered by the two D-schools at the Hasso Plattner Institutes in Stanford and in Potsdam – has proved to be really successful in educating innovators. It blends an end-user focus with multidisciplinary collaboration and iterative improvement to produce innovative products, systems, and services. Design Thinking creates a vibrant interactive environment that promotes learning through rapid conceptual prototyping. In 2008, the HPI-Stanford Design Thinking Research Program was initiated, a venture that encourages multidisciplinary teams to investigate various phenomena of innovation in its technical, business, and human aspects. The researchers are guided by two general questions:

• What are people really thinking and doing when they are engaged in creative design innovation? How can new frameworks, tools, systems, and methods augment, capture, and reuse successful practices?

• What is the impact on technology, business, and human performance when design thinking is practiced? How do the tools, systems, and methods really work to get the innovation you want when you want it? How do they fail?

In this book, the researchers take a system’s view that begins with a demand for deep, evidence-based understanding of design thinking phenomena. They continue with an exploration of tools which can help improve the adaptive expertise needed for design thinking. The final part of the book concerns design thinking in information technology and its relevance for business process modeling and agile software development, i.e. real world creation and deployment of products, services, and enterprise systems.