2.009 Product engineering processes

Are you creative? (check as appropriate)

Yes ✔ No

People who believe they are creative, are; people who don’t, aren't.
“if you think you can do a thing or think you can't do a thing, either way you're right.”

Henry Ford
founder of Ford Motor Company, father of modern mass production
1863-1947
2.009 product engineering processes
last week

motivation
+ creativity
+ informed craft
+ process

project theme and context
idea generation strategies

typical PD milestones/structure
2.009 product engineering processes today

mini-quiz from Friday
brainstorming milestone
project idea fair (tonight)
teams
teamwork challenge

informed craft
process
building an innovation team

Friday mini-quiz


(motivation + creativity + informed craft + process)

![Bar chart showing the number of students in different categories: Motivation, Creativity, Informed Craft, Process. Creativity has the highest number of students, followed by Process, then Informed Craft, and Motivation has the least.

number of students

Motivation  Creativity  Informed Craft  Process
building an innovation team

Friday mini-quiz

retention?  (motivation + creativity + informed craft + process)
mini quiz!
One minute

write your name on the top of your index card

list 4 individual creativity strategies
strategy #1
look for the next right answer

defor all judgments
tell the left side of your brain to be quiet

strategy #4
challenge assumptions
question assumed boundaries or norms
number of ideas in 5 minutes
improvement after instruction (Lincoln lab)

listed ideas

viewpoints + ideas
a quick question

I have been asked to plant 4 trees equidistant from each other

what about a hill?
Brainstorming deliverable for lab this week

at least 20 project ideas in notebook, based on observation
you might be pleasantly surprised if you have many more
top 5 sketched on separate sheets

everything that follows depends on this!
opportunity/need inspiration, feasible, preliminary market research
Effort and results

Total hours spent by team vs. final outcome

![Graph showing the relationship between total number of hours on a project and final review results. The graph has a question mark indicating uncertainty or a mystery aspect.](image)
Effort and results

Hours spent on ideation vs. final outcome

importance of rigor in breadth
Workflow

each stage builds on prior effort

Homework

For real
Project idea fair
7 PM (sharp) to 8 PM tonight

See ideas fair session link on homepage
Project idea fair
7 PM (sharp) to 8 PM tonight

conference with parallel sessions

use team mailing list to coordinate
use slack site/dropbox: Tutorial 4:00 today

Schedule for the red team

<table>
<thead>
<tr>
<th>7:05-7:30 PM</th>
<th>7:35-8:00 PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kathy Guerra</td>
<td>Backcountry Search and Rescue</td>
</tr>
<tr>
<td>Melissa Gianello</td>
<td>room 1-134</td>
</tr>
<tr>
<td>Wei Xun He</td>
<td>Central Mass Search and Rescue</td>
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<tr>
<td></td>
<td>Dance Happens Here</td>
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<tr>
<td></td>
<td>room 1-132</td>
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<tr>
<td></td>
<td>Dance Complex</td>
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<tr>
<td>David Favela</td>
<td>Harmonix Music VR</td>
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<tr>
<td>Megan Thai</td>
<td>room 1-150</td>
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<tr>
<td>Zoe Lu</td>
<td>Harmonix Music Systems</td>
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<td></td>
<td>Conservation of Art and Artifacts</td>
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<td></td>
<td>room 1-135</td>
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<td></td>
<td>Boston Museum of Fine Arts</td>
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<td>Justin Herald</td>
<td>Target Shooting</td>
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<td>Tammy Wu</td>
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<tr>
<td>Tina Wang</td>
<td>MIT Pistol Club</td>
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<tr>
<td></td>
<td>Biking as Daily Transportation</td>
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<td></td>
<td>room 1-242</td>
</tr>
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<td></td>
<td>Landry's</td>
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</tbody>
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a team is...?
more than a group

a group that is interdependent for overall performance

team!
why?

the need for teamwork grows with the challenge

none of us is as good as all of us

a good team!
clear performance goals

meaningful purpose

communication

mailing lists
team slack site
notebooks
peer reviews
team reviews
milestone feedback
communication instructors
yoda

dream team
well-defined work approach

meaningful purpose

clear performance goals

complementary skills

communication

mutual accountability

dream team
dream team

- clear performance goals
- complementary skills
- communication
- mutual accountability
- meaningful purpose
- well-defined work approach

shared values
most important team success factor

- Shared values
- Mutual trust (mutual accountability)
- Inspiring vision (meaningful purpose)
- Complementary skills
- Rewards

Ten3 global internet polls
Teamwork

characteristics correlated with effectiveness

Positive:
- taking the initiative
- results orientation
- attention to detail
- clear guiding philosophy
  (e.g., meeting rules, team code of conduct)

Negative:
- informality
- high level of praise for performance

Teamwork

design success factors

Positive:
effective communication
management support (system integrators, yoda, lab instructors)
involvement of all relevant parties (e.g., user feedback throughout)

Negative:
team members unable to see different viewpoints (strong mental set)
organizational politics

Meetings
more on Wednesday

meeting ≠ chillaxin in a room around a big table
Teamwork challenge

team role-playing and problem solving

task

build the tallest free standing balloon structure

materials

144 balloons (in team color), 3 rolls packing tape,
3 tape dispensers, 3 pair scissors, pens and paper

where

outside, Killian court

deadline

1:50 PM during today’s class
Teamwork challenge
roles and rules

assemble your 2.009 team around the materials box
make sure you are with the right team
select at team manager
pick roles from envelope—keep confidential
all but team manager play assigned roles
do not tie balloons together
only use the materials provided
do not use chairs, ladders or climb objects to assemble structure
Teamwork challenge
reflection

at 1:50 PM
judging
awards ceremony
pop your balloons
discuss your roles and how they impacted team performance
discuss ways that the team manager was effective
cleanup

start now!