DESIGN THINKING IN ACTION: A DPR CASE STUDY TO DEVELOP A SUSTAINABLE DIGITAL SOLUTION FOR LABOR RESOURCE MANAGEMENT

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Agenda

• Introduction
  • Construction challenge in new era
  • Design Thinking under the context of innovation
  • DPR Construction as an advanced Lean organization to foster innovation

• Case Study
  • The Labor Management Problem
  • Design Thinking approach to develop a user-centered solution
    • Empathy
    • Insights
    • Design
    • Implementation

• Discussion & Conclusion
• Q&A
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Construction challenges in the new era

How can we produce more innovative solutions to disrupt the AEC industry in order to handle the new challenges in the market?
Design Thinking under the context of innovation

“As we emerge from the current crisis, more than ever we must engage in designing the systems of the future integrating technology also striving to provide experiences and guide transformation for people. So, we need to bring technology and people to design the future systems.”

Source: CIDCI Design Thinking Workshop

https://time.com/4378108/driverless-car-study/
https://www.businessinsider.com/best-toilet-paper
The Design Thinking Approach

Abstract Conceptualization

Insights: Process Mapping and Brainstorm Sessions

Empathy: Observations and Interviews

Reflective Observation (Why?)

Active Experimentation (How?)

Design: Ideation Sessions and Fast Iterations

Implementation: Company-wide piloting and feedback

Concrete Experience
DPR Construction as an advanced Lean organization to foster innovation

DPR Construction is founded by Doug Woods, Peter Nosler and Ron Davidowski with offices in Redwood City, CA, and Sacramento, CA.

Design a solution with the people

https://www.dpr.com/company/history
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Project Timeline

2019
Jan
2019
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Today

Kickoff Meeting
Jan 30

Interview User and Process Investigation
Feb 8

Admin Onboarding
May 10

Testing Finished. Release to business for Pilot
Aug 1

Business UAT Finished
Sep 20

Manager Training
Oct 2

Mar 8
User Feedback Check-In
Feb 28
First Internal Demo

May 3
Pilot Version Demo

May 31
Revised Pilot Version Released
The Labor Management Problem

• We have a problem with the resource management within the general labor group...
  • No data to show current allocation
  • Managers are making decisions with their memories
  • Etc.

“We want a tool that is very simple and fits exactly our daily work, not what the others think is going to be useful for us” – Brian O’Kelly, General Superintendent at DPR
Observations and Interviews

• Ask question to explore the problem space:
  • What does people want?
  • Get to know WHY?
  • Seek to establish both cognitive and emotional empathy.
  • How does people make sense to themselves?

*Empathy motivates the team to think from the perspective of the user*
Ethnographic Interviews

• An extended open-ended conversation exploring needs, emotions, and aspirations by eliciting stories.
• A different way to look at the situation.
• Understand other people’s life.
• Tongue is like could you please tell me how do you communicate your labor request to the managers?
• https://www.youtube.com/watch?v=3oCeTkJdjIA&feature=youtu.be
Observations and Interviews

- What does resource management mean for the general labor group?

BAY Staffing Meeting
- Put together tax
- Availability time
- IMO Status update
- Update project dynamics and
- Getting new projects

SAC Staffing Meeting
- Staffing list, sorted by roles and names
- What day are the people will be available, updates?
- What are the next assignment for people?
- What are the projects that are looking for people?
- Update on the request dates, what type of the work? Tags?
- What are the people’s current task? Which phase is the project? Which way the project is trending (ramping up or down)?
- For the incoming scope of the project, estimate for the FTE needed, discussion done during the meeting
- What type of project, who is currently on the project as PM/PMO?
- People’s name spelling??
- Is the assignment completed? Is the person already report to the project?
- Incoming RFPs?
- Where are the interns? Are they back?
- Who has been assigned? Is there an over cap?

Excel versioning problem, which file is the latest?

Staffing notes: for memos and action items, keep a log of it.

Next of the people in the meeting is just consulting

Differentiate request using TBD PMR1, PMR2

Records of meeting decisions/promises?

Project info? Project task info?

Potential double assignment identified

Requests currently captured by the emails
Insights: Process Mapping and Brainstorm Sessions

Abstract Conceptualization

Reflective Observation (Why?)

Active Experimentation (How?)

Concrete Experience

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Empathy: Observations and Interviews
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Customer-focused Design Develops New Customer Stories

Figure out the story
- Analysis

Tell a new story
- Synthesis

Abstract

Concrete

Source: CIDCI Design Thinking Workshop
## Approaches

<table>
<thead>
<tr>
<th>To visualize any type of information on any project:</th>
<th>To visualize information associated with an organization or business:</th>
<th>To visualize information associated with understanding customers and users:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mindmap</td>
<td>Business model canvas</td>
<td>Empathy map</td>
</tr>
<tr>
<td>Timelines</td>
<td><strong>Process flowcharts</strong></td>
<td>Customer journey map</td>
</tr>
<tr>
<td>2x2s</td>
<td>Swimlane diagrams</td>
<td>2x2s mapping behavioral extremes</td>
</tr>
<tr>
<td>Affinity diagrams</td>
<td>Eco-system maps</td>
<td></td>
</tr>
</tbody>
</table>
Map the story with process mapping

- No readily data
- No instant feedback
- Info fly in the air
- No guaranteed allocation

Record Request → Labor Manager

Labor Request → Project Teams
Generate Insights

How might we generate consistent and reliable data in the process of labor dispatching and forecast without disrupting the current process?
Diverge and Converge
Solution Space
Design: Ideation Sessions and Fast Iterations

Abstract Conceptualization

Insights: Process Mapping and Brainstorm Sessions

Design: Ideation Sessions and Fast Iterations

Reflective Observation (Why?)

Empathy: Observations and Interviews

Active Experimentation (How?)

Concrete Experience
Ideation Sessions
New System Schema

Low-Code Application Platform

Resource Management Database (Common Data Service)

Request Received

Manager Application
(iPad)

Labor Request

Labor Assigned

Job Site Application
(iPhone)

Arrangement

Text / Email Notification

Allocation Decision

General Labor Manager

Superintendents/Foreman

Labors
Low-Code Application Platform

- Create application software through graphical user interfaces and configuration instead of traditional coding.
- Enables “Citizen Developer” to create applications with model-driven logic.
- Low initial cost of setup, training, deployment and maintenance.
- Enables fast iteration to test design ideas for MVP.

https://www.dronahq.com/time-for-low-code-revolution/
Prototypes and iterations

132 iterations within 1 month
Implementation: Company-wide piloting and feedback
Pilots

- Volunteered early testers.
- Identify champions within the group to support.
- Word-of-mouth wisdom.
- Collect feedback.

Always work with our people to refine the product.
Implementation: Company-wide Piloting and Collecting Feedback

“Super simple, I don’t need training, I can find out by myself, it’s great!” – Superintendent

“We like it so far; it changes our way to work.” – Labor Manager
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Discussions

• Ethnographic interviews and shadowing users helped to build empathy and strengthened the perception of the user story.
• Visualization (e.g. whiteboard sessions) is important in the process to convert the cognitive sensation into insights and detailed problem statements
• Prototype with the Low-Code Application Platform shortened the turn around time to address design alternatives with high quality, which motivated early testers to participate in the design process.
• “Word-of-mouth” wisdom from committed individuals helped with the innovation diffusion.
• Pull vs Push
Conclusion

• Design a solution “with the user” instead of “for the user”.

• The Design Thinking approach fully solicited the problem space to understand the user needs and explored the design spaces to find the best solution for the users.

• Low-Code Application Platform has great potential to foster innovative digital solutions due to reduced cost and training efforts.

• In-house development provided full flexibility to develop a sustainable solution with intensive user engagement, need more time to test the sustainability and governance perspectives.
Q&A
Thanks!