PIECEMEAL VERSUS INTEGRATED DESIGN: 
Framing Meets Design Thinking

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Overview of Argument

Design Thinking

Piecemeal vs Integration dimension

Framing

Framings of individual activities reinforce broader purposes of design

Non-deficit explanation of novice piecemeal design
Research on Expert/Novice Design

<table>
<thead>
<tr>
<th>Expert</th>
<th>Novice</th>
</tr>
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<tbody>
<tr>
<td>Systematic yet flexible</td>
<td>Inadequate planning</td>
</tr>
<tr>
<td>Explore multiple solutions</td>
<td>Get stuck in 1 solution path</td>
</tr>
<tr>
<td>Evaluate assumptions, progress</td>
<td>Don’t “come up for air”</td>
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<tr>
<td>Optimization</td>
<td>Difficulty with optimization</td>
</tr>
<tr>
<td>Iteration</td>
<td>One and done</td>
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</tbody>
</table>

**Integrate design elements**  
**Systems thinking**  
**Difficulty integrating**  
**Piecemeal design**

Adams & Atman, 1999  
Dym, Agogino, & Eris, 2005
Analytical lens

- **Framing** answers the question:
  
  “What is the nature of the activity?”

- **Framing the design activity**
  

Goffman, 1974; Tannen 1993
Scherr & Hammer, 2009
Overview of Argument

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Service Learning Tree-house Design

**Video 1:** Student question receives ambiguous messages from stakeholders

**Video 2:** Student Brainstorming Session. Structure and interaction of activity reify piecemeal framing

**Video 3:** Safety integration concerns sidelined by stakeholder.

**Video 4:** Advisor conversation sustains piecemeal framing

**Video 5:** Advisor alludes to Piecemeal/Integration but piecemeal is pursued
Video 1

• Stakeholder “walk through” of detailed aspects of design
• Frame: experts giving students an assignment
  • Students do not speak freely or equally. Students interrupt to ask questions.
Video 1: Mackenzie Question (21:30)
Mackenzie question (21:30)

I have a question for you guys. Um, so in terms of like – well, like what exactly would you like the most useful thing we can give to you to like to use? Like do you, do you want an actual like kind of undeveloped design that's kind of like rough? Do you want a list of ideas or things that we think would be great to incorporate? I mean what is gonna be most useful to you in terms of, of making this real?

[Long pause from students and organizers, some nervous laughter.]
Video 1

• Stakeholder responses to Mackenzie’s Question:

*Dominic:* I could say yes to all the above.

[Laughter, pause.]

*Todd:* – yeah. You know, obviously, there's, there's some sense of, you know, not doing the finished design as Mark was talking about, obviously, there's weight considerations structural stuff that needs to be gone through. *Um, by all means, rough designs or designs plural that incorporate some of the ideas I was hoping you guys could add, and in terms of the kids have had, some of the [ideas] the kids have, would be awesome.*
Video 1

• Stakeholder response and negotiation:

Michael: This is a big great space, so **design elements** whether particularly interesting or innovative that you might be able to dream up to we may not think of or the designers may not think of, um specifically with assisting these kids that, um, might not be common sense to us with creating lot of design over and over, but this is something unique that you can–wrap your minds around. But as far as getting into the, you know, the detail design or structural or spatial relationships…

Cate: And none of us have that expertise. We have one P/E… that’s it.

Todd: Yeah but obviously, you know, it’s **not a totally unrealistic conceptual sketch** either because you guys, you know the existing trees and the platforms [up there now, so], you know, some really…

Cate: Oh, we just recognize our limitations.
Brainstorming Activity
Brainstorming Activity

Activity framed as Show and Tell
- Facilitator initiates and enforces short summaries of individual ideas.
- Collaborative discourse: Short-lived shifts towards collaboration support integration.

Material context separates design elements
- Post-it note size
- Separate categories on different walls (nature, ramp, sensory)

Piecemeal Design
Brainstorming Activity

• Piecemeal framing further stabilized by concluding activities
  • Students vote on favorite post-it note ideas
  • Redraw these individual ideas on larger sheets

Analysis of subsequent episodes finds similar material and discursive affordances for piecemeal design
Discussion

Phenomenon: Undergraduate students engage in piecemeal design.

- Simple explanation: knowledge and skills

  *Expert Integration* versus *Novice Piecemeal* design practices
Discussion

Phenomenon: Undergraduate students engage in piecemeal design.

- Simple explanation: knowledge and skills
  
  *Expert Integration* versus *Novice Piecemeal* design practices
  
- On the contrary:

  **Fri** |  **Sat** |  **Sun** |  **Mon** |  **Tues**
  
  **Video 6:** Students give piecemeal presentation to stakeholders. → Stakeholder request for integrated space/cost estimate.

  **Video 7:** Final Review. Students produce 3 iterations of integrated floor plans to incorporate best ideas.
Conclusions

… about this data set

… about methods and theoretical lenses

… for instructors/facilitators of design experiences
Conclusions

... about this data set

  Ambiguous stakeholder messages
  + Discourse/material structures → Piecemeal Design

...about methods and theoretical lenses

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Use of framing, tools from interaction analysis
→ Non-skills-deficit explanations for novice design practices

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... for instructors/facilitators of design experiences
Awareness of student framing
Joint roles in framing design appropriately
ANY QUESTIONS?

Thank you for your attention and feedback. Email me any further questions: secules@umd.edu.

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Methodology

- Group video and transcript analysis
  - Compared significant moments and interpretations
  - Moment-by-moment versus broad framings of design
  - Identified a central tension: piecemeal versus integrated design
  - Followed the development of this tension:

<table>
<thead>
<tr>
<th>Name</th>
<th>When</th>
<th>Participants</th>
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<tbody>
<tr>
<td>Partner Debrief #1</td>
<td>Week 2 - Tuesday; on camp site</td>
<td>Camp Organizers, Instructors, Students</td>
</tr>
<tr>
<td>Brainstorm Review</td>
<td>Week 2 - Wednesday; on camp site</td>
<td>Students, student supervisor</td>
</tr>
<tr>
<td>Partner Debrief #2</td>
<td>Week 2 - Wednesday; on site</td>
<td>Students, stakeholder</td>
</tr>
<tr>
<td>Advisor Debrief #1</td>
<td>Week 2 - Thursday; on camp site</td>
<td>Instructor and student advisor</td>
</tr>
<tr>
<td>Advisor Debrief #2</td>
<td>Week 2 - Thursday; on camp site</td>
<td>Instructor, student advisor, students</td>
</tr>
<tr>
<td>Partner Review</td>
<td>Week 2 - Friday; on camp site</td>
<td>Camp Directors, Students, Instructor, student advisor</td>
</tr>
<tr>
<td>Final Review</td>
<td>Week 3 - Tuesday (on campus)</td>
<td>Instructor, student advisor, students, guest reviewers</td>
</tr>
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Additional videos

• Partner debrief 2
  • Students meet Todd to address safety concerns, versus fun and proximity-to-nature specifications. Suggests students moving towards integration on some level.
  • Todd says safety is Michael’s domain, and handled by legislative requirements. Students receive message and do not focus much on integrating safety specification to design for remainder of project.

• Advisor debrief 1
  • Cate (instructor) and Ellie (student leader) discuss presentation of individual design elements to campers. No shift from piecemeal design product towards integration, or sense that it is needed.

• Advisor debrief 2
  • Cate: “Um, Mackenzie, you asked a really great question, and um, like Michael everybody, um, they what would be useful for them. And so they really said a rough design, right, and then design elements. So how are you gonna capture those design elements?”
Additional videos

• Partner review
  • Design presentation is focused around piecemeal design elements.
    • Individual post-it note ideas redrawn on white paper feature prominently.
  • Stakeholder question reveals some breakdown in communicated design product. Some form of integrated design desired.

  Male 1: Great. Um, will your model be – will it – you know, I want to give this to Abby Inc. and one of the things they need to know is how long and how wide, the interaction of trees. Will it include all those specs in it?

  [Students and instructor had not interpreted this as their role.]

  Male 1: Yeah, just a rough estimate would actually help for building materials.

• Final review
  • Student presentation largely piecemeal design.
  • Response to Partner review request: 3 students have attempted integrated design floor plans and all students voted on their favorite.