Activity Theory, Speech Acts, and the Politics of the Artifact: Learning and Becoming in Design Scenarios

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Learning and Becoming as a Designer

Communicate Design Ideas

• “Talk” like a designer
• Produce “designs”
Research Questions

1. How do language practices mediate the interactions between design mentors and design learners?

2. How do design artifacts mediate these interactions between mentors and learners?
Theoretical Frameworks

- **Activity Theory** – systematic framework for comparing the structure of review sessions (Engeström, 1987)

- **Speech Acts** – framework for analyzing and identifying language practices used within design scenarios (Gee, 2005; Austin, 1975)

- **Politics of the Artifact** – lens to explore the role of artifacts within design scenarios (Winner, 1999)
Conceptual Framework

RQ 1: Activity Theory

RQ 2: Politics of the Artifact

Speech Acts
Conceptual Framework

RQ 1: Speech Acts
RQ 2: Politics of the Artifact

Activity Theory (AT)
Selected Participants

- **Mechanical Engineering**
  - Final Design Review (FDR)
    - Cap Team (CT)
    - Prop Team (PT)
    - Robot Fish Team (RFT)
- **Industrial Design**
  - Client Review (CR)
    - Adam
    - Lynn
Diagram of Components: PPP FDR Presentation

**Subject:**
The Student Team, Project Manager (Instructor), Project Engineer

**Object:**
Student Team’s Design

**Instruments:**
Design Prototype, Video, Speech, Hand Gestures, Prior Knowledge

**Rules:**
Instructor will ask questions to be answered by the Student Team in an improvised presentation with minimal interruptions by the instructor.

**Community:**
The Student Team, Project Engineer, Students in Lab, Project Manager (Instructor)

**Outcome:**
Explain Design and Function of Product, receive final grade, and determine participation in competition

**Division of Labor:**
Students take turns addressing each question posed by the instructor (Project Manager)

Identifying Key Scenario Components (AT)
Engeström (1987)
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# Artifact Interactions

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Understanding</td>
<td></td>
</tr>
<tr>
<td>Illustrate/Explain</td>
<td>Instructors, clients, or student uses the artifact to understand or communicate basic, visual characteristics of a design concept.</td>
</tr>
<tr>
<td>Explore/Discover</td>
<td>Instructors, clients, or student uses the artifact to understand or communicate the function or demonstrate the use of a design concept.</td>
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<tr>
<td>Evaluation</td>
<td></td>
</tr>
<tr>
<td>Noting Positives</td>
<td>Instructors, clients or students identify positive aspects or components of the design.</td>
</tr>
<tr>
<td>Noting Negatives</td>
<td>Instructors, clients or students identify negative aspects or components of the design.</td>
</tr>
<tr>
<td>Suggesting Modifications</td>
<td>Instructors, clients or students provide suggestions and/or areas for improvement.</td>
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</tbody>
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Observed Themes throughout Each Scenario

<table>
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Adam: Robust Artifacts, Robust Discourse

Evaluation: Noting Positives

The other thing, I think...the versatility I think is what’s strongly towards a couple of your ideas and I see this being a very versatile, functional piece and in fact you can use it as a table. [Jason flips the model over so that the seat turns into a table]

-- Jason, ID Client
What I would like to see is almost take the cushion... be removable from this as well

[points to a specific piece of the model], kind of what you did with the third concept so now you can remove the cushion, flip it over [flips the model over as he speaks], sit on the cushion, use this potentially as a writing surface [taps the bottom of the bench, now facing up], and then you could also – [flips the model vertically] flip it vertically to now it’s a stand-at-height table possibly.

-- Jason, ID Client
Observed Themes throughout Each Scenario

- **Adam**: Robust Artifacts; Robust Discourse
- **Robot Fish Team**: Robust Artifacts; Robust Discourse
- **Prop Team**: Solid Artifacts; Rich Discourse
- **Lynn**: Weak Artifacts; Limited Discourse
- **Cap Team**: Incomplete Artifacts; Aborted Discourse
Doug: And the IR is a differential-based code – [Nelson puts his hand up to the right sensor on the prototype.]

Joshua: [Putting his hand up to the left sensor.] Both eyes have to see something.

Doug: Yeah. Both eyes have to see something as a error-checking method. [Nelson puts his hand in front of the prototype in an effort to activate both sensors and then lowers his hand.] And beyond that it takes the differential between the two distances and [Nelson raises his hand to again activate the sensors] whichever side sees an object closer, it turns away from it so it can turn in both directions.
RFT: Robust Artifacts, Robust Discourse

Evaluation: Noting Positives

Nelson: There it is on its side. It rights itself well.

[As the participants watch the video, the turning movement of the prototype is captured, allowing Nelson and Andrew to view its maneuvering capabilities.]

Andrew: Wow.

Nelson: It’s turning the other way.
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Nelson: Ah, narrate. Tell me what’s happening.

Saul: Ah, so right now the lift motors are working, and um, the back wedge is actually moving towards the device [points to the wedge on the video] – lifting the plane up. Um, it should come into contact soon. And we have a closer view when it comes off the ground.

[Camera frame is zoomed out to view more participants.]

Nelson: [Watching the video.] And what airplane was this one?

Saul: This was a Piper, six-cylinder.

Nelson: Piper six-cylinder?

Saul: Yes.
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Darren: The um, the first – [Lynn changes the slide to Concept 1.] Yeah, that one there. Um, are you thinking that, and I guess I’m just having a hard time seeing, is that sphere…is it hollow or are those pie sections that –

Lynn: They are solid.

Darren: Okay. So it actually has the colored sides going in?
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CT: Weak Artifacts, Limited Discourse

Evaluate: Noting Negatives

Our project. Ah, in terms of assembly, it is not fully assembled. We do not have the force sensors included because while testing last night they were giving us completely, um, unreliable data. We couldn't get them to give us a number that, that was similar at all. It kept jumping around a lot. So we, um, just left them off because they weren't functioning correctly. And we also don't have sufficient power sources to power everything at one time. So it's also not fully assembled in that way.

-- Mason, ME Student
Robust Artifacts Enhance Discourse
Acknowledgements

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References


