Quantitative Ethnography

David Williamson Shaffer

Vilas Distinguished Achievement Professor of Learning Science
University of Wisconsin-Madison
Obel Foundation Professor of Learning Analytics
Aalborg University at Copenhagen
Data Philosopher
Wisconsin Center for Educational Research
Complex Collaborative Problem Solving
Learning is a process of Enculturation
How are you feeling?
How are you doing?
Do you want something to eat?
You're such a good pet!
Anything happen while I was gone?
I had a big party. Just kidding.

How are you feeling?
How are you doing?
Do you want something to eat?
You're such a good pet!
Anything happen while I was gone?
NEW ITEMS
Page 2 of 2

Jack O'Chair
No haunted Halloween house would be complete without this sinister seat!

Price: ¥220
(Only available until November 1, 2009)
Booger Gets an A
I hurt my brain!
Time until next job: 00:00:00

**Newz Delivery**
There are Newspapers to deliver! Time to get to work!

**Fence Painting**

**Ms. Birdy’s Assistant**

**Shoe Store Clerk**

**Piano Player**

**MY RESUME**

**THINGS TO DO**
Learning is a process of Enculturation
“A **Discourse** is a socially accepted association among ways of using language, of thinking, feeling, believing, valuing, and of acting that can be used to identify oneself as a member of a socially meaningful group... or to signal (that one is playing) a socially meaningful role.”

- Jim Gee
Learning is a process of Enculturation
Learning is a process of Enculturation
Learning is a process of Enculturation

—David Williamson Shaffer
Learning is a process of Enculturation

—Charles Goodwin

—David Williamson Shaffer
Learning is a process of Enculturation

—Charles Goodwin
Learning is a process of Enculturation

―Charles Goodwin
Learning is a process of Enculturation

—Charles Goodwin
Learning is a process of Enculturation

—Charles Goodwin
Learning is a process of Enculturation

—Charles Goodwin
Learning is a process of Enculturation

—Charles Goodwin
What are some **CODES** in the things you study?

—Charles Goodwin
Learning is a process of Enculturation

—Charles Goodwin
Learning is a process of Enculturation

—Charles Goodwin

Munsell Color Chart

—David Williamson Shaffer
Learning is a process of Enculturation

―Charles Goodwin

―David Williamson Shaffer
Learning is a process of Enculturation

Epistemic Frame
Learning is a process of Enculturation

Epistemic Frame
Learning is a process of Enculturation
Learning is a process of Enculturation
DISCOURSE

CODE ⇔ CODE

CODE

DISCOURSE

culture
Virtual Internships
Virtual Internships
Virtual Internships

https://www.youtube.com/watch?v=zyfJAtL93OU
Virtual Internships

[7/23 11:04AM] Fernando - @Team 3: How do you attach your batch to your notebook?
[7/23 11:04AM] James - @Team 3: its the middle option at the bottom
[7/23 11:05AM] Fernando - @Team 3: But when I click it, it opens up a new notebook entry.
[7/23 11:05AM] James - @Team 3: yea and it should be attached
[7/23 11:05AM] James - @Team 3: under the little it should say it
[7/23 11:05AM] Jeth - @Team 3: You can attach it by using the paper clip on the top right of the notebook.
[7/23 11:06AM] Fernando - @Team 3: Alright I got it. Thanks
[7/23 11:06AM] Jeth - @Team 3: i got jame's justification. I still need the others.
[7/23 11:07AM] James - @Team 3: due in about 7 minutes
[7/23 11:07AM] Jeth - @Team 3: I'll paste my justifications when you guys are ready.
[7/23 11:07AM] James - @Team 3: im ready for it
[7/23 11:07AM] Fernando - @Jeth: I'll put my justification on shared
Yes, one of my designs had a payload of 718, agility 281, recharge 7.88, safety 183, and price 14045. These attributes all meet company standards.
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<thead>
<tr>
<th>UserName</th>
<th>Condition</th>
<th>CONFIDENCE.Change</th>
<th>Timestamp</th>
<th>Activity</th>
<th>GroupName</th>
<th>GameDay</th>
<th>text</th>
</tr>
</thead>
<tbody>
<tr>
<td>robert z</td>
<td>FirstGame</td>
<td>1</td>
<td>10/17/2013 9:27</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>Hello Justin and Team, I'm Robert. I worked with the Pneumatic team before.</td>
</tr>
<tr>
<td>akash v</td>
<td>FirstGame</td>
<td>2</td>
<td>10/17/2013 9:29</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>Hi, I am Akash and I worked with the electric actuator before this group.</td>
</tr>
<tr>
<td>amirah u</td>
<td>FirstGame</td>
<td>2</td>
<td>10/17/2013 9:31</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>Hello, I am Amirah. I previously worked with Series Elastic actuator.</td>
</tr>
<tr>
<td>peter s</td>
<td>FirstGame</td>
<td>1</td>
<td>10/17/2013 9:31</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>Hi, I am Peter. I previously worked with the series elastic team</td>
</tr>
<tr>
<td>jimmy i</td>
<td>FirstGame</td>
<td>2</td>
<td>10/17/2013 9:33</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>Hello, I am Jimmy and I worked with the Hydraulic actuator on my previous team</td>
</tr>
<tr>
<td>amirah u</td>
<td>FirstGame</td>
<td>2</td>
<td>10/17/2013 9:38</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>yes i am. and i already posted in the chat that i previously worked with series elastic team.</td>
</tr>
<tr>
<td>robert z</td>
<td>FirstGame</td>
<td>1</td>
<td>10/17/2013 9:39</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>I worked with the Pneumatic Actuator. For a quick review, its strengths lie in that it is energy</td>
</tr>
<tr>
<td>akash v</td>
<td>FirstGame</td>
<td>2</td>
<td>10/17/2013 9:40</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>Ok I had the electric actuator and we kept what we found was as ROM went up the agility a</td>
</tr>
<tr>
<td>jimmy i</td>
<td>FirstGame</td>
<td>2</td>
<td>10/17/2013 9:41</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>So Hydraulic actuators use fluid to generate work with a piston. It can generate the highest</td>
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<tr>
<td>peter s</td>
<td>FirstGame</td>
<td>1</td>
<td>10/17/2013 9:43</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>I researched the series electric actuator. The series elastic actuator had a larger payload, bl</td>
</tr>
<tr>
<td>akash v</td>
<td>FirstGame</td>
<td>2</td>
<td>10/17/2013 9:45</td>
<td>12</td>
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<td>31</td>
<td>I am wondering, did anybody have a prototype that was able to meet the internal consulta</td>
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<tr>
<td>peter s</td>
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<td>10/17/2013 9:47</td>
<td>12</td>
<td>1</td>
<td>31</td>
<td>No, my previous group was not able to meet any of the requests from the internal consulta</td>
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<tr>
<td>devin c</td>
<td>FirstGame</td>
<td>0</td>
<td>10/22/2013 9:23</td>
<td>13</td>
<td>1</td>
<td>36</td>
<td>Morning everyone.</td>
</tr>
<tr>
<td>devin c</td>
<td>FirstGame</td>
<td>0</td>
<td>10/22/2013 9:27</td>
<td>13</td>
<td>1</td>
<td>36</td>
<td>Anything we should be doing in the meantime?</td>
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<tr>
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<td>FirstGame</td>
<td>0</td>
<td>10/22/2013 9:29</td>
<td>13</td>
<td>1</td>
<td>36</td>
<td>Yep, completed yesterday.</td>
</tr>
<tr>
<td>devin c</td>
<td>FirstGame</td>
<td>0</td>
<td>10/22/2013 9:31</td>
<td>13</td>
<td>1</td>
<td>36</td>
<td>@Justin Kim: Forgive me, but I'm fairly uninformed of the instructions on said presentation</td>
</tr>
<tr>
<td>jimmy i</td>
<td>FirstGame</td>
<td>2</td>
<td>10/22/2013 9:35</td>
<td>13</td>
<td>1</td>
<td>36</td>
<td>Oh, I see that now</td>
</tr>
<tr>
<td>jimmy i</td>
<td>FirstGame</td>
<td>2</td>
<td>10/22/2013 9:36</td>
<td>13</td>
<td>1</td>
<td>36</td>
<td>Yup, I just saw the email from Vedant</td>
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<td>@Justin Kim: Woops, meant so send that to you and not myself.</td>
</tr>
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<td>peter s</td>
<td>FirstGame</td>
<td>1</td>
<td>10/22/2013 9:46</td>
<td>13</td>
<td>1</td>
<td>36</td>
<td>I submitted my first notebook and now I'm working on the second one about the REDD ana</td>
</tr>
</tbody>
</table>
field notes

discourse

discourse

culture

CODE ⇔ CODE

CODE

DISCOURSE
Machinic Grip

field notes

discourse

--Andrew Pickering

CODE → CODE → CODE

DISCOURSE

culture
Culturally-relevant and meaningful aspects of a discourse code.
Culturally-relevant and meaningful aspects of a 

DISCOURSE 

CODE 

code code
Culturally-relevant and meaningful aspects of a Discourse Code

Things that count as evidence or warrants for CODES code
What are codes in things you study?

Culturally-relevant and meaningful aspects of a discourse

Things that count as evidence or warrants for codes
Culturally-relevant and meaningful aspects of a DISCOURSE

Things that count as evidence or warrants for CODES
<table>
<thead>
<tr>
<th>Technical Requirements</th>
<th>Discussion of one or more criteria for device functionality: agility, payload, cost, recharge interval, and/or safety.</th>
<th>The reason only one met the required payload is probably because PAM is not the best choice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>Referring to or justifying decisions based on numerical values, results tables, graphs, research papers, or relative quantities.</td>
<td>if we can lift a payload of 564 N and we add 100 N more of metal, then our payload becomes 464 N</td>
</tr>
</tbody>
</table>
code ↔ code

field notes

discourse

Code ↔ Code

Discourse

culture
code ↔ code

field notes

discourse

Code ↔ Code

DISCOURSE

culture
Thin Description
Theoretical Saturation

field notes

discourse

Code

Discourse

culture
Theoretical Saturation

field notes

discourse

Code ↔ Code

Munsell Color Chart

Post hole

Soil

Code ↔ Code

Discourse

culture
Justin Kim: Please take a moment to introduce yourselves and indicate what actuator you have experience with.

Elizabeth E.: Hi everybody!

Gabrielle F.: Hi I'm Gabby

Elizabeth E.: I'm Elizabeth, and I spent the first part of this internship working with PAM

Gabrielle F.: I'm from Pneumatic

Lena H.: I am Lena and I worked with electric
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Elizabeth E.: Hi everybody!

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Daniel M. Elizabeth that was very similar to my group. We were able to reach all internal consultant requests, but the machine costed a lot.

Gabrielle F. We used Pneumatic and it seemed to meet everyone's required and most preferred!

Gabrielle F. Our cost always met preferred costs.

Lena H. Yes and electric, depending on the other aspects, also met all required and most preferred.

Michael T. What were the results of the best prototype for pneumatic and electric?
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The best prototype for hydraulic was payload 1044, agility 203, recharge interval 8.7, cost $14540, and safety 214.

It consisted of safety 190, cost 12875, recharge interval 8.32, payload 552, and agility 263.

Payload 608 agility 257 RI 8.52 cost $12740 and safety 206.

It seems like most performed well with one or two attributes scoring low.

I mean if we need to improve safety we can use the PFC power source, even though it has a pretty poor rating in all other aspects.

I think we need to determine which attributes are the most important to us so that we can meet those internal requirements and then just company for the ones we find less important.
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DATA

TECHNICAL REQUIREMENTS

DESIGN TRADEOFFS
DESIGN TRADEOFFS

TECHNICAL REQUIREMENTS

DATA

DESIGN TRADEOFFS
DESIGN TRADEOFFS

DATA

TECHNICAL REQUIREMENTS

DESIGN TRADEOFFS
Can you draw a diagram about how your codes are related?
DESIGN TRADEOFFS

TECHNICAL REQUIREMENTS

DATA

DESIGN TRADEOFFS
DATA

TECHNICAL
REQUIREMENTS

DESIGN
TRADEOFFS
Theoretical Saturation

DATA

TECHNICAL REQUIREMENTS

DESIGN TRADEOFFS
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### Moving Window

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<th><strong>I slightly prioritized agility</strong> in order to meet Shawn Edwards' recommendations.</th>
</tr>
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<tbody>
<tr>
<td>I chose light materials because I believe they would like something comfortable to wear</td>
</tr>
<tr>
<td>Yeah I agree</td>
</tr>
<tr>
<td>I was reviewing <strong>Paulo Henriquez's requests</strong> and he was most focused on safety.</td>
</tr>
<tr>
<td><strong>But recharge interval</strong> may be irritating if too low</td>
</tr>
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<td>Rescue workers are concerned about safety</td>
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Moving Window

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Consultant Justification
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**Design-based Justification**

**Consultant Justification**
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Technical Requirements

Design Tradeoffs

Data

Collaboration
Epistemic Frame
**Epistemic Network Analysis (ENA)**
EPISTEMIC NETWORK ANALYSIS (ENA)

https://m.youtube.com/watch?v=RI8b3x85MVE
Technical Requirements

Design Tradeoffs

Collaboration

Data
Technical Requirements

Design Tradeoffs

Collaboration

Data
Data Design Tradeoffs Collaboration
Dimensional Reduction of co-occurrence matrices
Optimization of node positions

Design Tradeoffs

Technical Requirements

Collaboration

Data
Data

Design Tradeoffs

Technical Requirements

Collaboration
Technical Requirements

Design Tradeoffs

Collaboration

Data
Data from N=50 students

1st year college students

25 novices
25 more advanced
Data

Design Tradeoffs

Technical Requirements

Collaboration

Novices

More Advanced

Data

Collaboration

Design Tradeoffs

Technical Requirements
N = 50, $p < 0.001$, $r^2 = 39\%$
Theoretical Saturation

field notes

discourse

culture

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code ↔ code

code ↔ code

Code ↔ Code

DISCOURSE
Novices

Collaboration

Design Tradeoffs

Data

Technical Requirements

More Advanced
Data

Design Tradeoffs

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Data Design Tradeoffs

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Collaboration
| A | B    | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    | M    | N    | O    | P    | Q    | R    | S    | T    | U    | V    | W    | X    | Y    | Z    |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| User Name | Condition | Level of Pre | Pos. Change | Start Date | Activity | Group | Plant | Game | Fall | Gain Text | M. Date | S. Date | E. Design | S. Design | Professional | Client | V. Client | E. Consulta V. |
| akash v   | 6      | 2     | High Pre | Pos. Chang | 14/11/2013 | Electric | First | Yes | Hi, I am Akash | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi, my name is Akash |
| alexander | First Game | 5     | 7     | Low Pre | Pos. Chang | 18/11/2013 | Electric | First | I'm Alex | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi, my name is Alexander |
| sametia   | First Game | 6     | 7     | Low Pre | Pos. Chang | 17/11/2013 | Electric | First | I'm Kim | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi, my name is Sametia |
| arden f   | First Game | 5     | 7     | Low Pre | Pos. Chang | 15/11/2013 | Electric | First | Greetings everyone! My name is Arden, and I am | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi, my name is Arden, and I am |
| brandon b | First Game | 6     | 6     | Low Pre | Pos. Chang | 18/11/2013 | Electric | First | OK | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi, my name is Brandon |
| brandon m | First Game | 6     | 6     | Low Pre | Pos. Chang | 18/11/2013 | Electric | First | OK | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi, my name is Brandon |
| cameron k | First Game | 6     | 7     | High Pre | Pos. Chang | 9/11/2013  | Series Elan | First | Hi everyone! I'm Cameron, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Cameron, nice to meet you |
| cameron m | First Game | 6     | 7     | Low Pre | Pos. Chang | 10/11/2013 | Series Elan | First | Hi everyone! I'm Cameron, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Cameron, nice to meet you |
| connor f | First Game | 6     | 6     | Low Pre | Pos. Chang | 11/11/2013 | Series Elan | First | Hi everyone! I'm Connor, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Connor, nice to meet you |
| devin c   | First Game | 6     | 7     | Low Pre | Pos. Chang | 12/11/2013 | Series Elan | First | Hi everyone! I'm Devin, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Devin, nice to meet you |
| devin c   | First Game | 7     | 7     | Low Pre | Pos. Chang | 13/11/2013 | Series Elan | First | Hi everyone! I'm Devin, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Devin, nice to meet you |
| devin c   | First Game | 7     | 7     | Low Pre | Pos. Chang | 14/11/2013 | Series Elan | First | Hi everyone! I'm Devin, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Devin, nice to meet you |
| devin c   | First Game | 7     | 7     | Low Pre | Pos. Chang | 15/11/2013 | Series Elan | First | Hi everyone! I'm Devin, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Devin, nice to meet you |
| jimmy y   | First Game | 5     | 8     | Low Pre | Pos. Chang | 16/11/2013 | Series Elan | First | Hi everyone! I'm Jimmy, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Jimmy, nice to meet you |
| jordan l  | First Game | 6     | 8     | High Pre | Pos. Chang | 17/11/2013 | Series Elan | First | Hi everyone! I'm Jordan, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Jordan, nice to meet you |
| jordan l  | First Game | 6     | 8     | High Pre | Pos. Chang | 17/11/2013 | Series Elan | First | Hi everyone! I'm Jordan, nice to meet you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Jordan, nice to meet you |
| joseph g  | First Game | 6     | 8     | Low Pre | Pos. Chang | 18/11/2013 | Series Elan | First | Hi everyone! I'm Joe. Nice to meet all of you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Joe. Nice to meet all of you |
| joseph g  | First Game | 6     | 8     | Low Pre | Pos. Chang | 18/11/2013 | Series Elan | First | Hi everyone! I'm Joe. Nice to meet all of you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Joe. Nice to meet all of you |
| joseph g  | First Game | 6     | 8     | Low Pre | Pos. Chang | 18/11/2013 | Series Elan | First | Hi everyone! I'm Joe. Nice to meet all of you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Joe. Nice to meet all of you |
| margaret f | First Game | 4     | 7     | Low Pre | Pos. Chang | 19/11/2013 | Series Elan | First | Hi everyone! I'm Margaret. You can call me Maggie | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Margaret. You can call me Maggie |
| pete p   | First Game | 4     | 4     | Low Pre | Pos. Chang | 19/11/2013 | Series Elan | First | Hi everyone! I'm Pete. Nice to work with you | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Pete. Nice to work with you |
| robert z | First Game | 7     | 8     | High Pre | Pos. Chang | 20/11/2013 | Pneumonic First | First | Hi everyone! I'm Robert. Can't wait to see what we | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Robert. Can't wait to see what we |
| robert z | First Game | 7     | 8     | High Pre | Pos. Chang | 20/11/2013 | Pneumonic First | First | Hi everyone! I'm Robert. Can't wait to see what we | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Robert. Can't wait to see what we |
| robert z | First Game | 7     | 8     | High Pre | Pos. Chang | 20/11/2013 | Pneumonic First | First | Hi everyone! I'm Robert. Can't wait to see what we | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Robert. Can't wait to see what we |
| robert z | First Game | 7     | 8     | High Pre | Pos. Chang | 20/11/2013 | Pneumonic First | First | Hi everyone! I'm Robert. Can't wait to see what we | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Robert. Can't wait to see what we |
| steve l  | First Game | 7     | 8     | High Pre | Pos. Chang | 21/11/2013 | Electric | First | Hi everyone! I'm Steve. | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Steve. |
| taffy x  | First Game | 6     | 7     | High Pre | Pos. Chang | 22/11/2013 | Electric | First | Hi everyone! I'm Tiffany. | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Tiffany. |
| tiago l  | First Game | 6     | 7     | High Pre | Pos. Chang | 22/11/2013 | Electric | First | I'm Tiago. | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Tiago. |
| tiago l  | First Game | 6     | 7     | High Pre | Pos. Chang | 22/11/2013 | Electric | First | I'm Tiago. | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Tiago. |
| tiago l  | First Game | 6     | 7     | High Pre | Pos. Chang | 22/11/2013 | Electric | First | I'm Tiago. | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Tiago. |
| tiago l  | First Game | 6     | 7     | High Pre | Pos. Chang | 22/11/2013 | Electric | First | I'm Tiago. | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Tiago. |
| tiago l  | First Game | 6     | 7     | High Pre | Pos. Chang | 22/11/2013 | Electric | First | I'm Tiago. | 0 | 0 | 0 | 0 | 0 | @ Justin Kim: Hi everyone! I'm Tiago. |
Data Design Tradeoffs

Technical Requirements

Collaboration

Novices

More Advanced

Design Tradeoffs

Data

Collaboration
Data
Design Tradeoffs
Technical Requirements
Collaboration

Novices

More Advanced

Data

Collaboration
Data
Design Tradeoffs
Technical Requirements
Collaboration
Novices
More Advanced

- Novices
- More Advanced

- Data
- Collaboration
- Design Tradeoffs
- Technical Requirements
<table>
<thead>
<tr>
<th>Conversation: Condition = SecondGame, GroupName = 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ the recharge interval ranged from $5.08-6.90$</td>
</tr>
<tr>
<td>○ Most of my prototypes were only able to satisfy 1-3 consultants, did anyone have more?</td>
</tr>
<tr>
<td>○ We should think about what we want to prioritize. What do you think are the most important factors?</td>
</tr>
<tr>
<td>○ I think that safety is a very important factor to focus on</td>
</tr>
<tr>
<td>○ I would say Safety &amp; Payload</td>
</tr>
<tr>
<td>○ Sounds good to me!</td>
</tr>
<tr>
<td>○ does anyone have any results that satisfy all three of those?</td>
</tr>
<tr>
<td>○ My device has a pretty good safety, payload, agility, and recharge interval; the cost is a little high though</td>
</tr>
<tr>
<td>○ same here. I have one that has good scores for the categories, but is set at $15440$ dollars</td>
</tr>
<tr>
<td>○ What’s everyone’s range for safety cause I feel mine is very high $101-229$</td>
</tr>
<tr>
<td>○ 188-230</td>
</tr>
<tr>
<td>○ for electric it is $190-220$</td>
</tr>
<tr>
<td>○ same here for hydraulic, $190-235$</td>
</tr>
<tr>
<td>○ Okay so should we choose either mine/Shane’s prototypes, which are good in all categories except cost, or try to find another prototype that does not have such a high cost?</td>
</tr>
<tr>
<td>○ We should choose our 3 best prototypes and then try to improve 2 of them by changing something</td>
</tr>
<tr>
<td>○ because the agility, recharge interval and safety are good.</td>
</tr>
<tr>
<td>○ They gave us reference points to base our opinions on</td>
</tr>
<tr>
<td>○ Which prototype are you guys thinking?</td>
</tr>
<tr>
<td>○ ya I was thinking either that one or Team 4 prototype, but the safety is the only issue with that one is safety</td>
</tr>
<tr>
<td>○ I liked the group 2 #2 but the safety is too high so the batch 2 design 3 would be overall best</td>
</tr>
</tbody>
</table>
Utterance Column

Conversation: Condition = SecondGame, GroupName = 4

- the recharge interval ranged from 5:00-6:30
- Most of my prototypes were only able to satisfy 1-3 consultants, did anyone have more?

Sounds good to me!

does anyone have any results that satisfy all three of those?

- My device has a pretty good safety, payload, agility, and recharge interval; the cost is a little high though same here. I have one that has good scores for the categories, but is set at 15440 dollars

- What's everyone's range for safety cause I feel mine is very high 191-229

- Okay so should we choose either mine/Shane's prototypes, which are good in all categories except cost, or try to find another prototype that does not have such a high cost?

- We should choose our 3 best prototypes and then try to improve 2 of them by changing something

- because the agility, recharge interval and safety are good.

- They gave us references to base our opinions on

- Which prototype are you guys thinking?

- ya I was thinking either that one or Team 4 prototype, but the safety is the only issue with that one is safety

- I liked the group 2 #2 but the safety is too high so the batch 2 design 3 would be overall best
Theoretical Saturation
Theoretical Saturation

field notes  **Grounded Analysis** DISCOURSE

discourse  culture
Thick Description

Theoretical Saturation
Intervention

Justine is:
- balancing issues stakeholders care about

You might suggest that Justin thinks about:
- how land use changes affect indicators in the model, and how that can help balance issues stakeholders care about

Chat

Justine: 6/29/16 02:45 PM
知how to balance this out.

Bel: 6/29/16 02:45 PM
as we change things the indicator graphs would change things, like more commercial zones increased sales and more industrial zones increased the Carbon monoxide and job

Bel: 6/29/16 02:45 PM
good

Justine: 6/29/16 02:45 PM
That sounds right

Justine: 6/29/16 02:45 PM
I feel I need to know more about zoning and its implications.

Ryan: 6/29/16 02:45 PM
I think it was very hard to change anything without having repercussions in a different category. It was definitely challenging to try and satisfy all of the different demands of the stakeholders.

Ryan: 6/29/16 02:45 PM
Several

Justine: 6/29/16 02:45 PM
I tried to change carbon monoxide but clearly it didn’t work.

Nic: 6/29/16 02:45 PM
I feel like I was just randomly changing industrial plots to open space/wetlands for more nesting sites and less carbon emissions but I feel like if I really knew how to successfully zone, the outcome would be better.

Nic: 6/29/16 02:45 PM
Also several indicators

Justine: 6/29/16 02:45 PM
It seems almost impossible to please every stakeholder because you have to sacrifice jobs and sales to reduce carbon emissions and increase nesting sites, so we will have to compromise.
**Intervention**

Justine is:
- balancing issues stakeholders care about

You might suggest that Justin thinks about:
- how land use changes affect indicators in the model, and how that can help balance issues stakeholders care about

**Chat**

**Bel:**
9/29/16 02:45 PM
as we change things the indicator graphs would change things, like more commercial zones increased sales and more industrial zones increased the Carbon monoxide and job

**Justine:**
9/29/16 02:49 PM
That sounds right

**Justine:**
9/29/16 02:44 PM
I feel I need to know more about zoning and its implications.

**Ryan:**
9/29/16 02:45 PM
I think it was very hard to change anything without having repercussions in a different category. It was definitely challenging to try and satisfy all of the different demands of the stakeholders.

**Justine:**
9/29/16 02:43 PM
I tried to change carbon monoxide but clearly it didn’t work.

**Nic:**
9/29/16 02:45 PM
I feel like I was just randomly changing industrial plots to open space/wetlands for more nesting sites and less carbon emissions but I feel like if I really knew how to successfully zone, the outcome would be better.

**Justine:**
9/29/16 02:43 PM
It seems almost impossible to please every stakeholder because you have to sacrifice jobs and sales to reduce carbon emissions and increase nesting sites, so we will have to compromise.
Intervention

Justine is:
- balancing issues stakeholders care about

You might suggest that Justin thinks about:
- how land use changes affect indicators in the model, and how that can help balance issues stakeholders care about

Chat

Justine: I feel I need to know more about zoning and its implications.
Ryan: I think it was very hard to change anything without having repercussions in a different category. It was definitely challenging to try and satisfy all of the different demands of the stakeholders.

Justine: I tried to change carbon monoxide but clearly it didn’t work.
Nic: I feel like I was just randomly changing industrial plots to open space/wetlands for more nesting sites and less carbon emissions but I feel like if I really knew how to successfully zone the outcome would be better.

Justine: It seems almost impossible to please every stakeholder because you have to sacrifice jobs and sales to reduce carbon emissions and increase nesting sites, so we will have to compromise.
Intervention

Justine is:
- balancing issues stakeholders care about

You might suggest that Justin thinks about:
- how land use changes affect indicators in the model, and how that can help balance issues stakeholders care about

Chat

Bel:
- as we change things the indicator graphs would change things, like more commercial zones increased sales and more industrial zones increased the Carbon monoxide and job

Justine:
- good

That sounds right

Justine:
- I feel I need to know more about zoning and its implications.

Ryan:
- I think it was very hard to change anything without having repercussions in a different category. It was definitely challenging to try and satisfy all of the different demands of the stakeholders.

Several:
- I tried to change carbon monoxide but clearly it didn’t work.

Nic:
- I feel like I was just randomly changing industrial plots to open space/wetlands for more nesting sites and less carbon emissions but I feel like if I really knew how to successfully zone, the outcome would be better.

Nic:
- Also several indicators

Justine:
- It seems almost impossible to please every stakeholder because you have to sacrifice jobs and sales to reduce carbon emissions and increase nesting sites, so we will have to compromise.
Theoretical Saturation

Thick Description
“The essential task of [ethnography] is not to codify abstract regularities but to make thick description possible, not to generalize across cases but to generalize within them.”

- Clifford Geertz

See Shaffer and Serlin (2004), *What good are statistics that don’t generalize?*
"A compelling philosophical and intellectual journey for anyone looking for a way to understand learning, culture and behaviour in the age of Big Data."

MORTEN MISFELDT
Professor of Education, Learning and Philosophy
Aalborg University

[Available on Amazon](https://quantitativeethnography.org)