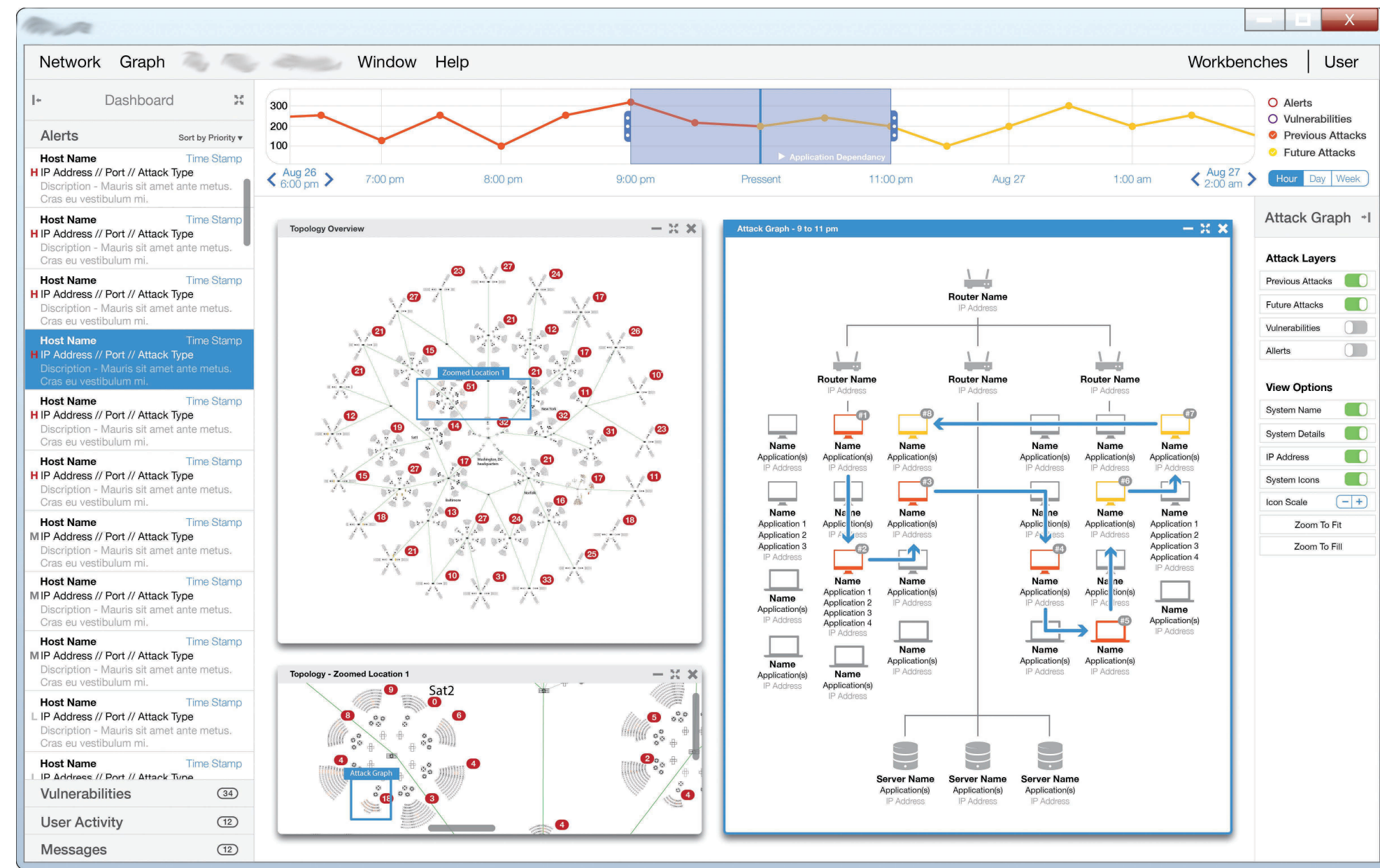


Design Activity Framework for Visualization Design

Sean McKenna, Dominika Mazur, James Agutter, Miriah Meyer
University of Utah

visualization design

What We Did



cybersecurity redesign project

Who We Are

visualization experts



psychologist



designer

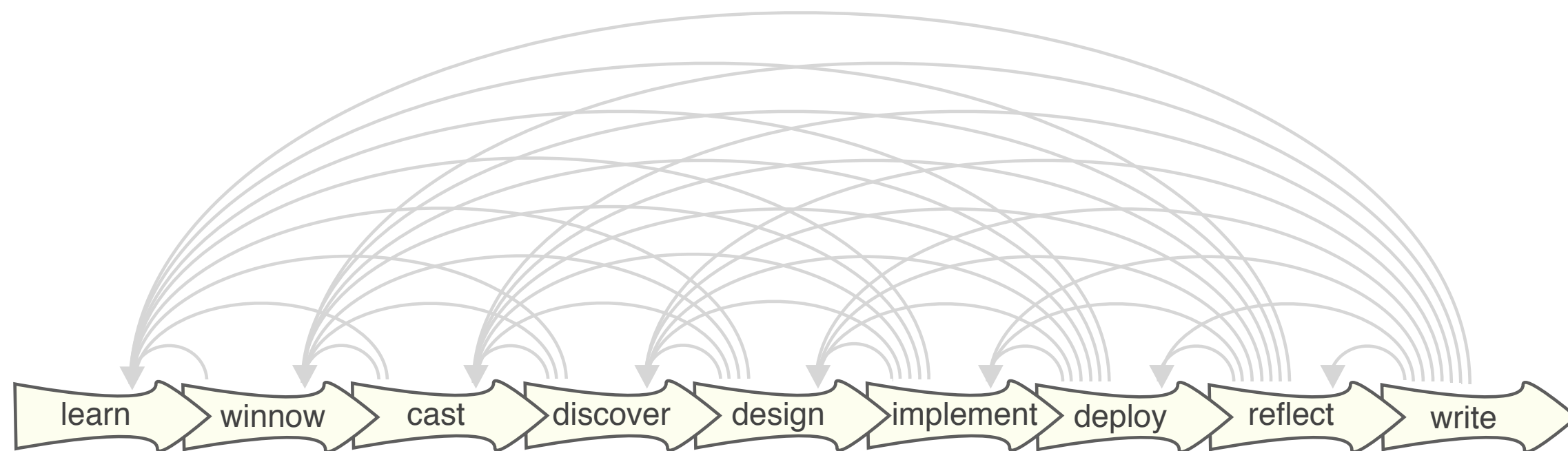


visualization & creative re-design

Challenges

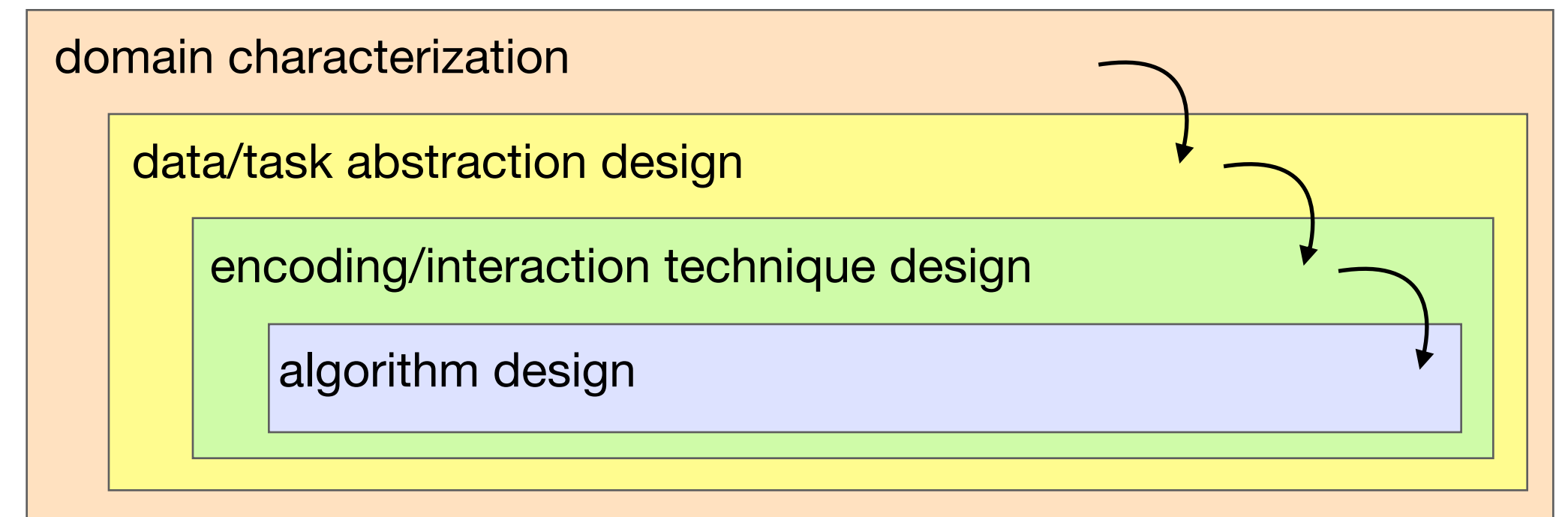
- connect **actions we take** and **decisions we make**

process models



Sedlmair et al, "Design study methodology" 2012

decision models

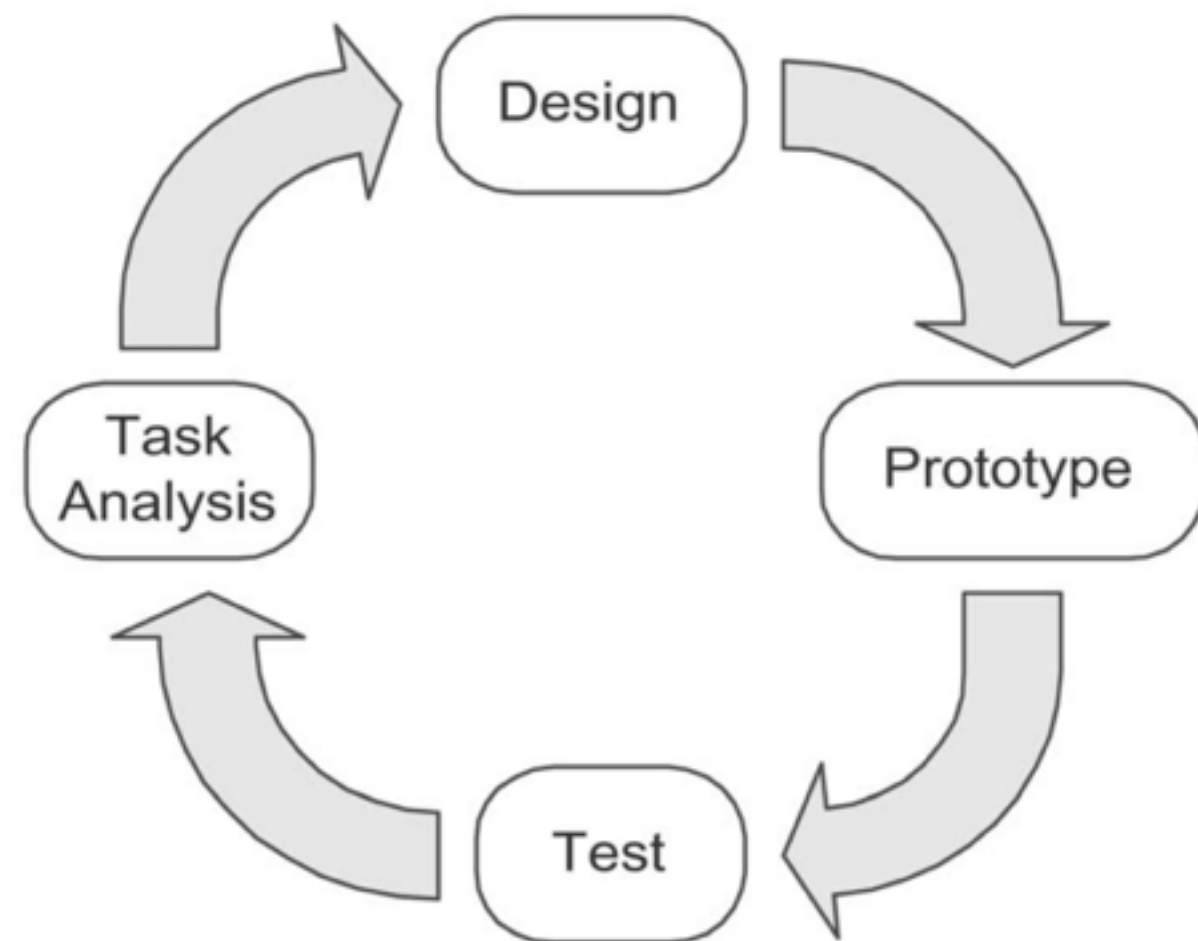


Munzner, "A Nested Model for Visualization Design and Validation" 2010

Challenges

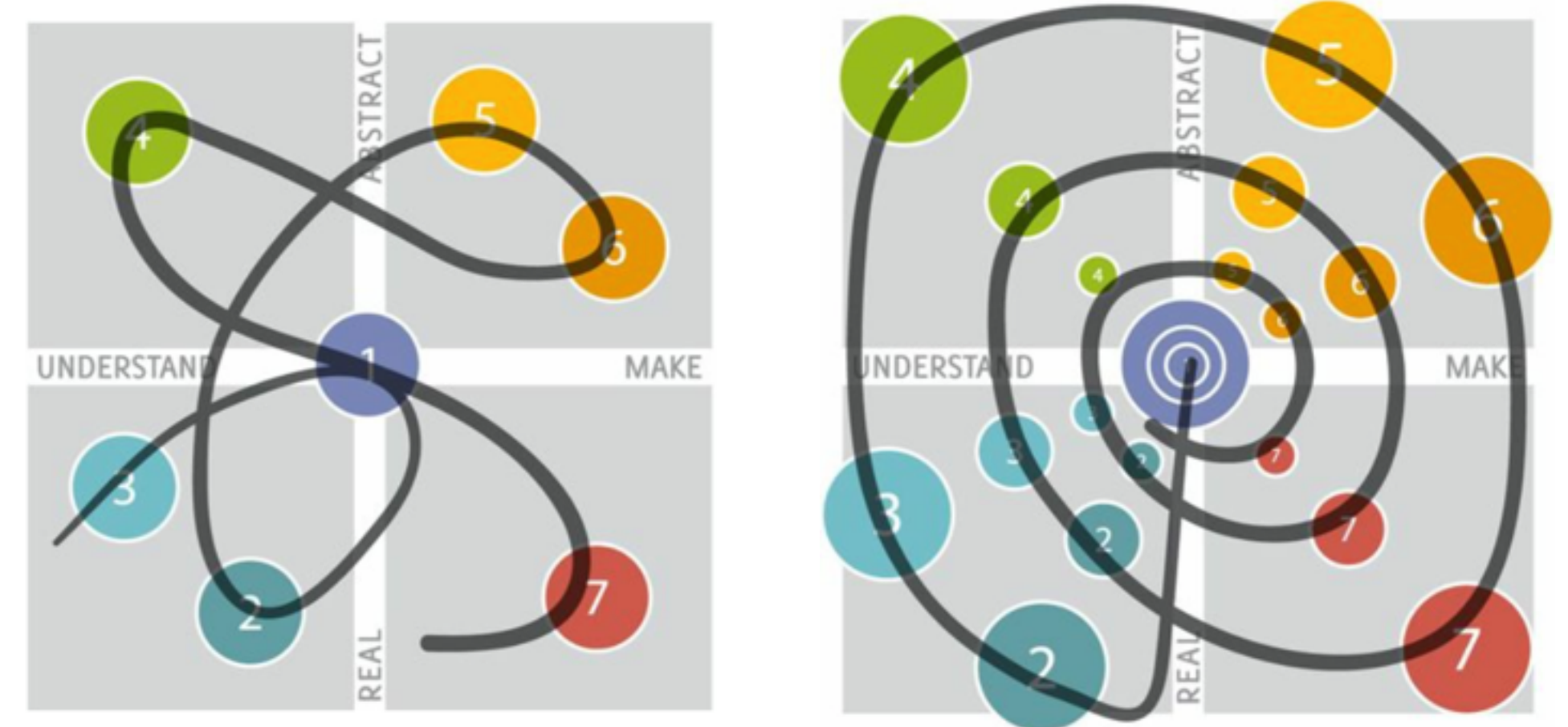
- support a **more flexible** design process

engineering process




Tory & Möller, "Human factors in visualization research" 2004

creative process



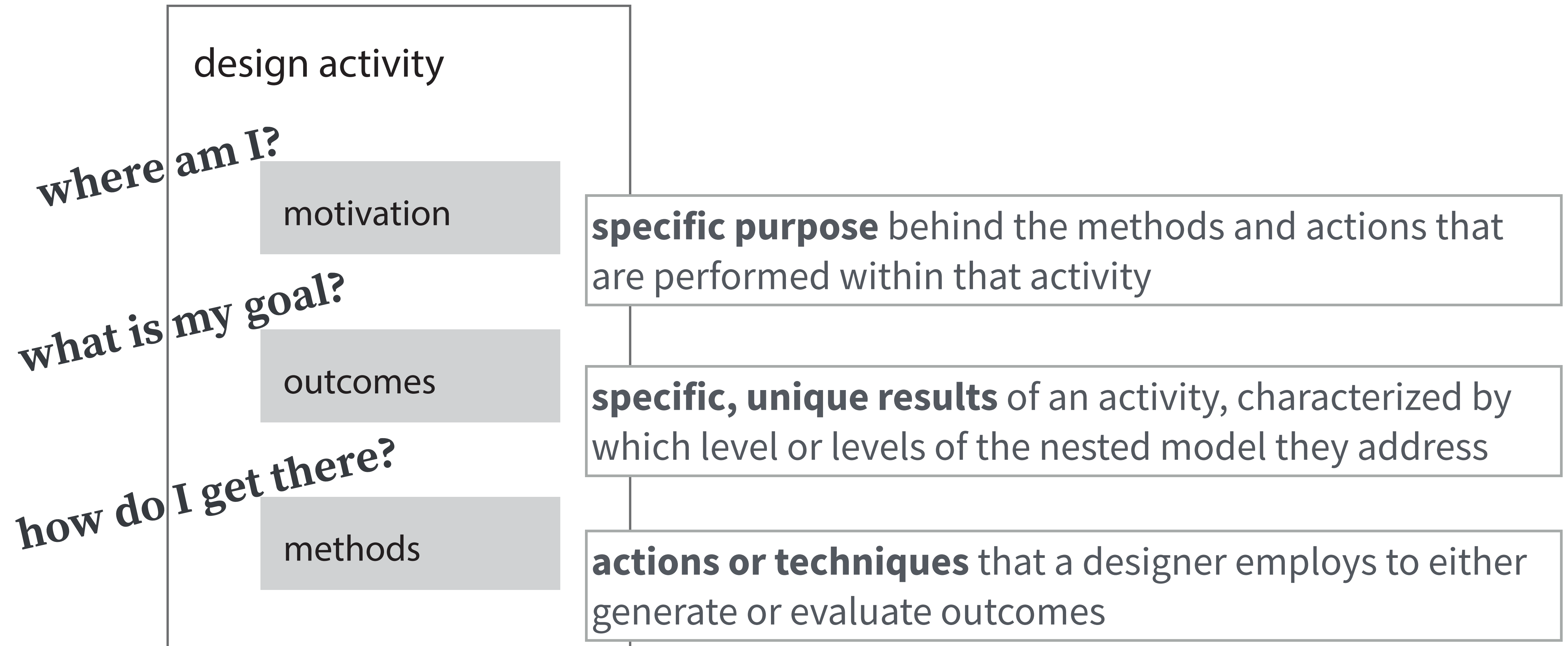
Kumar, 101 Design Methods, 2012

- **where am I?**
- **what is my goal?**
- **how do I get there?**



actionability
+
flexibility

Design Activity Framework



Design Activity Framework

four activities

understand

ideate

make

deploy

design activity

motivation

outcomes

methods

- **where am I?**
- what is my goal?
- how do I get there?

Design Activity Framework

Understand

motivation: finding the needs of the user

ideate

generate good ideas to support needs

make

concretize ideas, make them tangible

deploy

bring a prototype into effective action

- where am I?
- **what is my goal?**
- how do I get there?

Design Activity Framework

Understand

motivation: finding the needs of the user

outcome: sets of design requirements

ideate

generate good ideas to support needs
sets of ideas

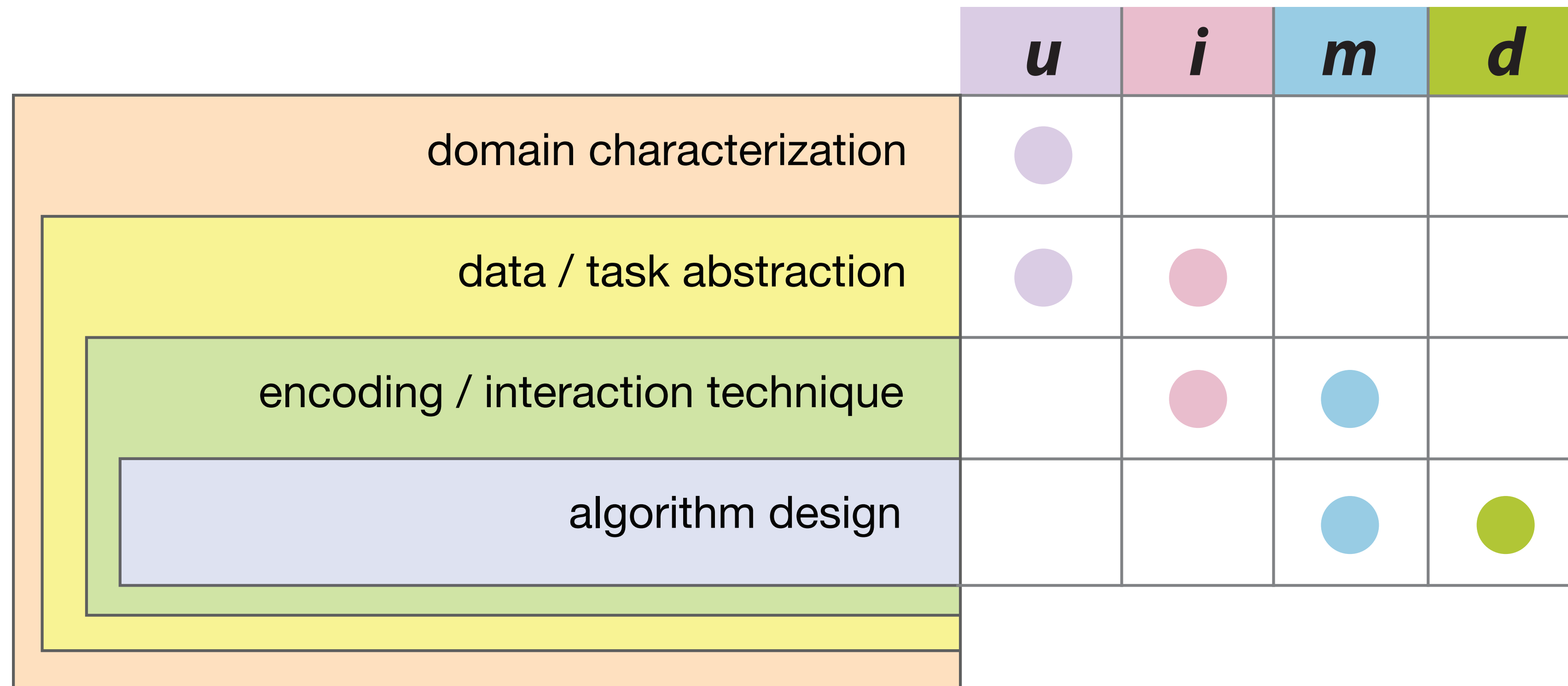
make

concretize ideas, make them tangible
sets of prototypes

deploy

bring a prototype into effective action
visualization system

Design Activity Framework



understand

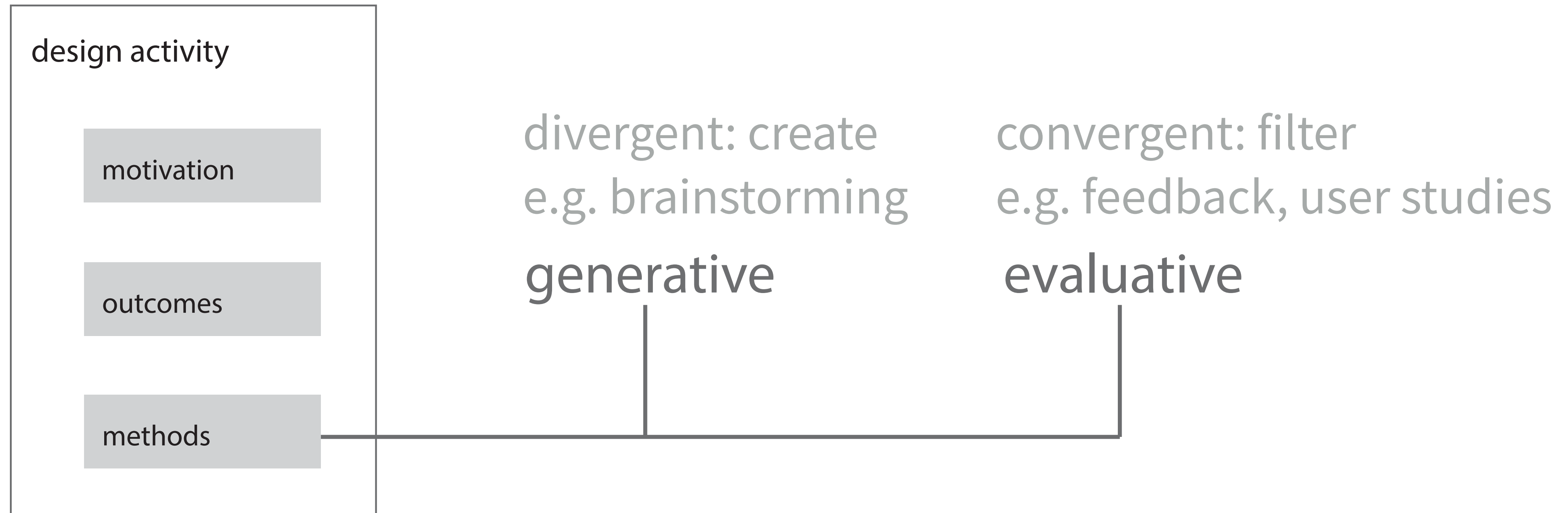
ideate

make

deploy

- where am I?
- what is my goal?
- **how do I get there?**

Design Activity Framework



understand

ideate

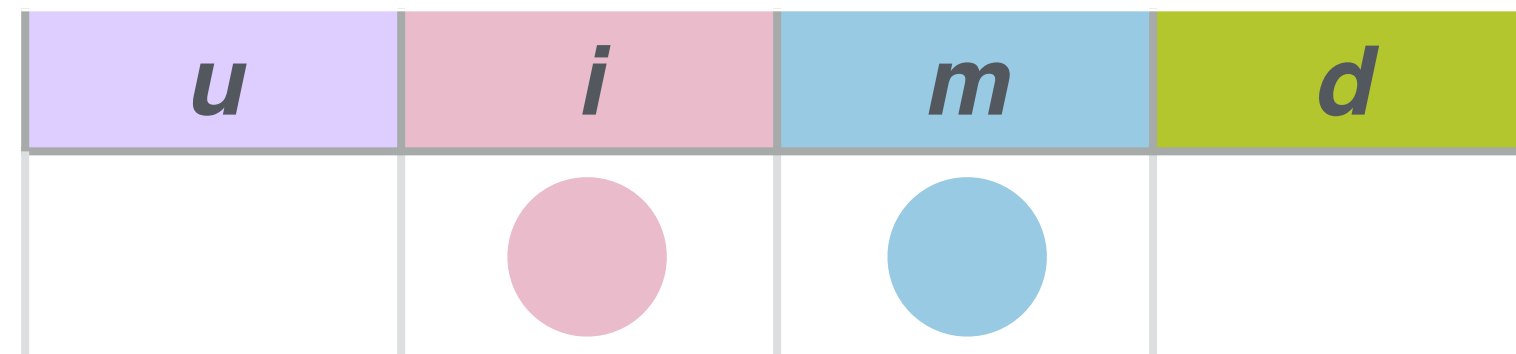
make

deploy

#	method	g	u	e	i	e	m	e	d	e	v
1	A/B testing										
2	activity map										
3	AEIOU framework										
4	affinity diagramming										
5	algorithmic performance										
6	analogical reasoning										
7	appearance modeling										
8	artifact analysis										
9	automated logging										
10	behavioral prototype										
11	brainstorming										
12	bullseye diagramming										
13	buy a feature										
14	card sorting										
15	case study										
16	casting										
17	competitive map										
18	competitive task analysis										
19	competitive walkthrough										
20	collage										
21	competitive testing										
22	concept map										
23	concept sketching										
24	concept mapping										
25	consistency inspection										
26	contextual research										
27	contextual inquiry										
28	controlled experiment										
29	creative writing										
30	creative thinking										
31	debugging										
32	debugging										
33	documentation										
34	expectation evaluation										
35	example response										
36	experience										
37	experience prototyping										
38	field notes (diary journal)										
39	five W's										
40	focus group										
41	forecast scenario										
42	flow of customer thinking										
43	fractal table										
44	functional evaluation										
45	idea evaluation										
46	iteration game										
47	image quality analysis										
48	importance/difficulty matrix										
49	intention										
50	intentional research										
51	interviewing										
52	key performance indicators										
53	knowledge review										
54	low-fidelity review										
55	managing user experience										
56	mindmapping										
57	morphological analysis										
58	observation										
59	online focus										
60	online engagement										
61	paper prototyping										
62	parallel prototyping										
63	persona										
64	photo studies										
65	photo testing										
66	POCUI framework										
67	prototyping										
68	prototyping sketch										
69	questionnaire										
70	refinement										
71	research										
72	role playing										
73	role-played										
74	round table										
75	sample data										
76	scenario development										
77	simulation										
78	social mapping										
79	social mapping										
80	social design										
81	stakeholder feedback										
82	stakeholder map										
83	structural analysis										
84	storyboarding										
85	suspended judgment										
86	task analysis										
87	task-based prototyping										
88	think-aloud protocol										
89	thought experiment										
90	usability report										
91	usability testing										
92	user journey map										
93	video ethnography										
94	video scenarios										
95	visual analysis										
96	writing										
97	written notes										
98	whiteboarding										
99	wild thinking										
100	wireframes										

#	method	<i>u</i> <i>g e</i>	<i>i</i> <i>g e</i>	<i>m</i> <i>g e</i>	<i>d</i> <i>g e</i>	<i>v</i>	definition
1	A/B testing			•	•	•	“compare two versions of the same design against a predetermined goal” [18]
2	activity map	• •					“structuring activities of stakeholders around a list of activities gathered during research relationships” [14]
3	AEIOU framework	• •					“organizational framework reminding the user of information under a guiding taxonomy of ‘What Users’ [18]
4	affinity diagramming		•	•			“process used to externalize and meaningfully keeping design teams grounded in data”
5	algorithmic performance	• •		•	•	•	“quantitatively study the performance of examples include measurements of rendering
6	analogical reasoning	• •	•			•	“cognitive strategy in which previous knowledge requirements of a novel situation” [8]
7	appearance modeling		•	•	•		“refined model of a new idea that emphasizes
8	artifact analysis	• •				•	“systematic examination of the material attributes to an understanding of their physical
9	automated logging	• •		•	•	•	“captures the users’ patterns of activity, error message, menu-item selection, dialog or web-page access.... can also capture
10	behavioral prototype		•				“simulating situations of user activity and concepts.... through observation and conversation on the concepts” [14]

Methods: Paper Prototyping




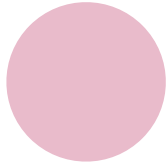
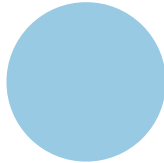

“create a **paper-based simulation of an interface** to test interaction with a user”

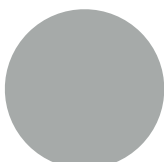
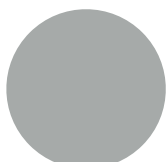
Maguire, “Methods to support human-centred design” 2001



Lloyd & J. Dykes, “Human-centered approaches in geovisualization design” 2011

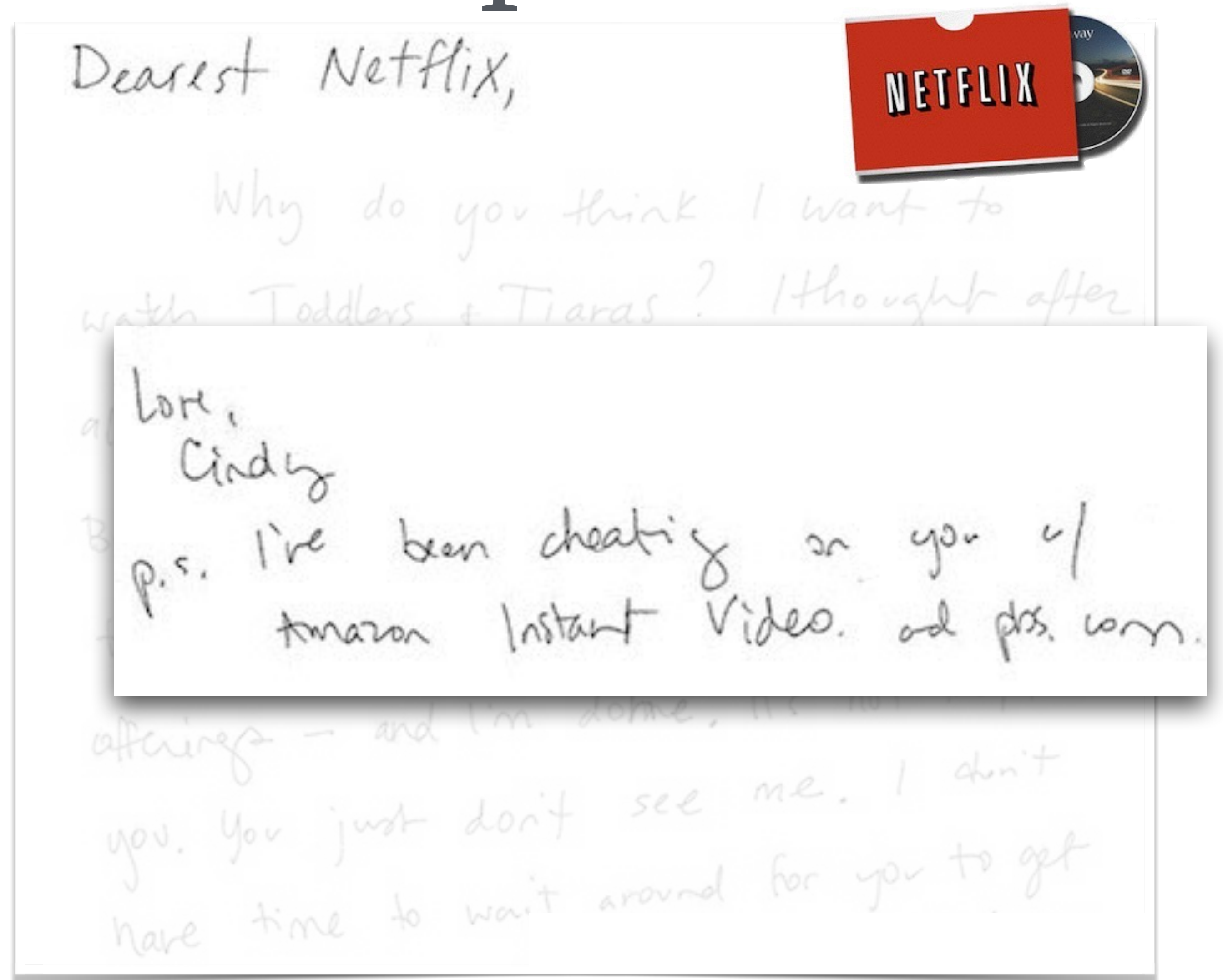
Methods: Love/Breakup Letters

<i>u</i>	<i>i</i>	<i>m</i>	<i>d</i>
			

<i>g</i>	<i>e</i>
	


“personal letter written to a product... [to reveal] profound insights about what people value and expect”

Martin & Hanington, Universal Methods of Design: 100 Ways to Research, 2012



<http://editorial.designtaxi.com/news-designerbreakup280114/1.jpg>

- **where am I?**
- **what is my goal?**
- **how do I get there?**

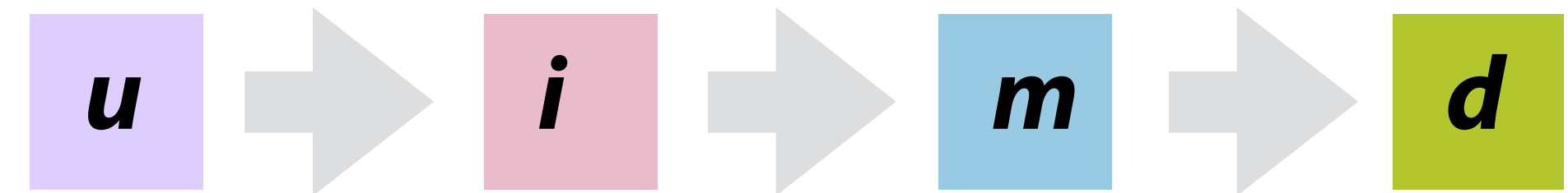


actionability
+
flexibility

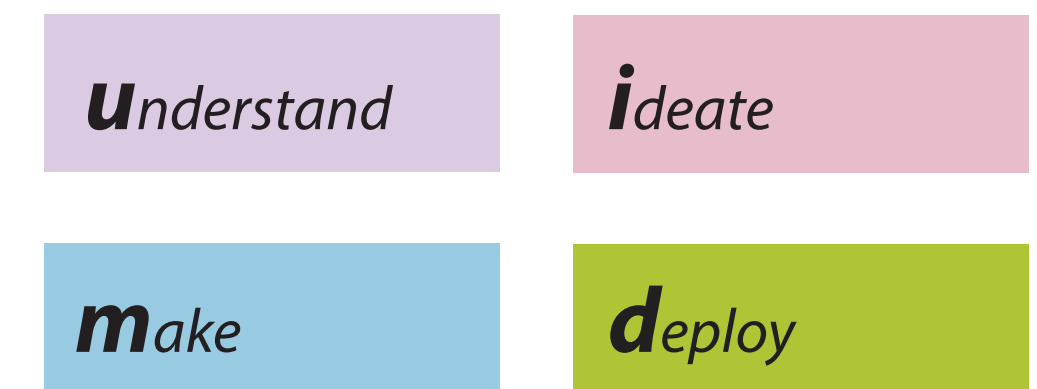
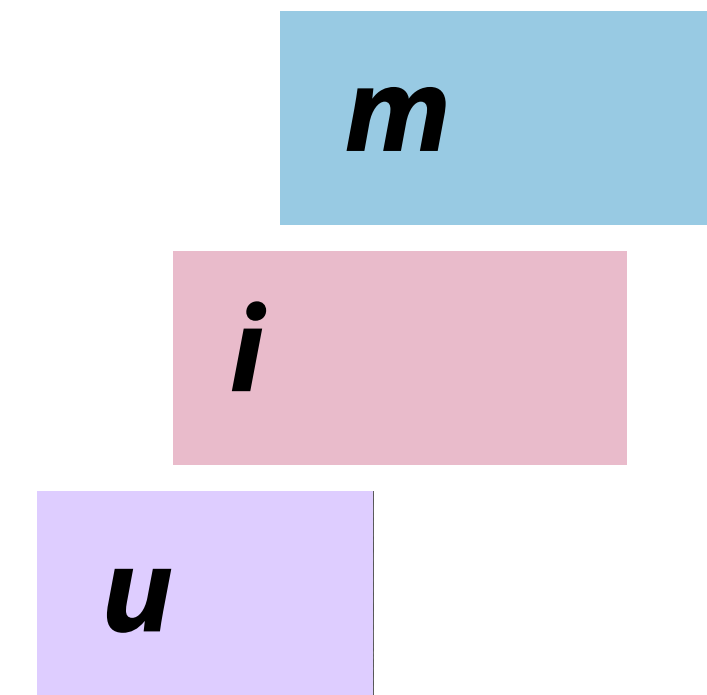
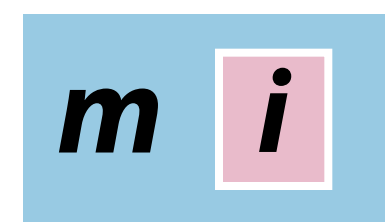
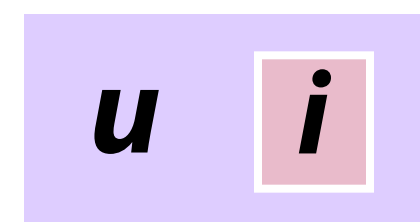
Capturing Design Flow

- **flexible**; support messiness
- two basic **movement principles**

1. **forward** movement is **ordered**

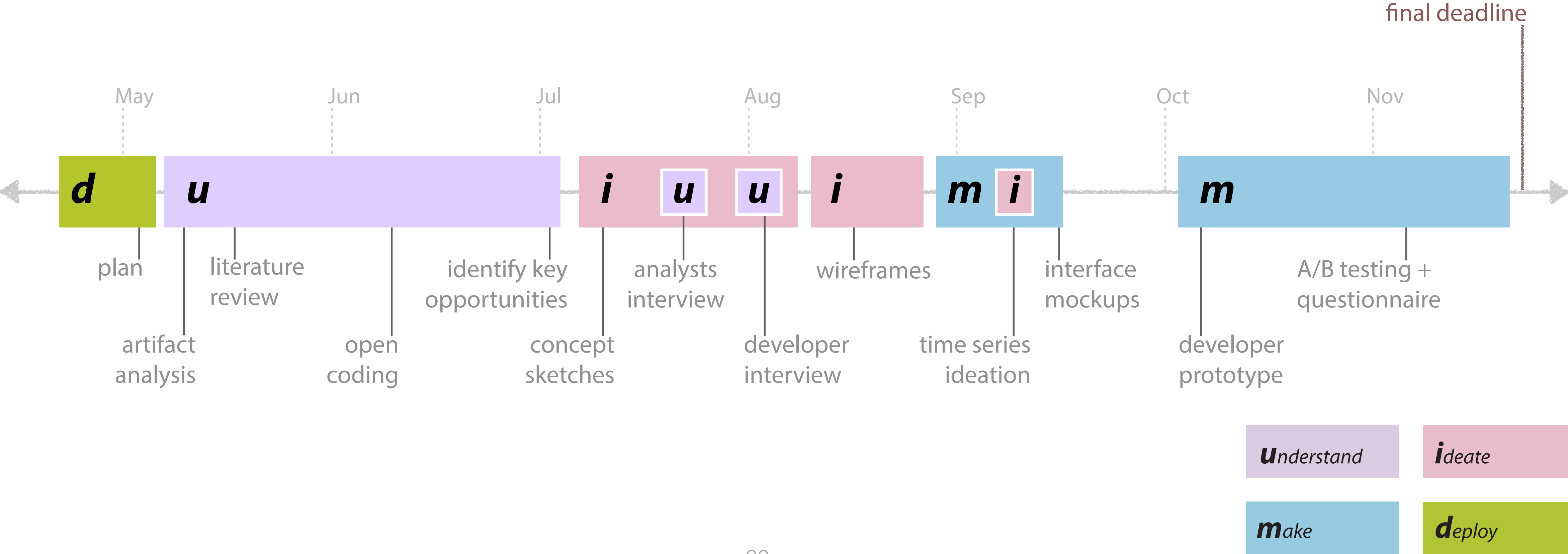
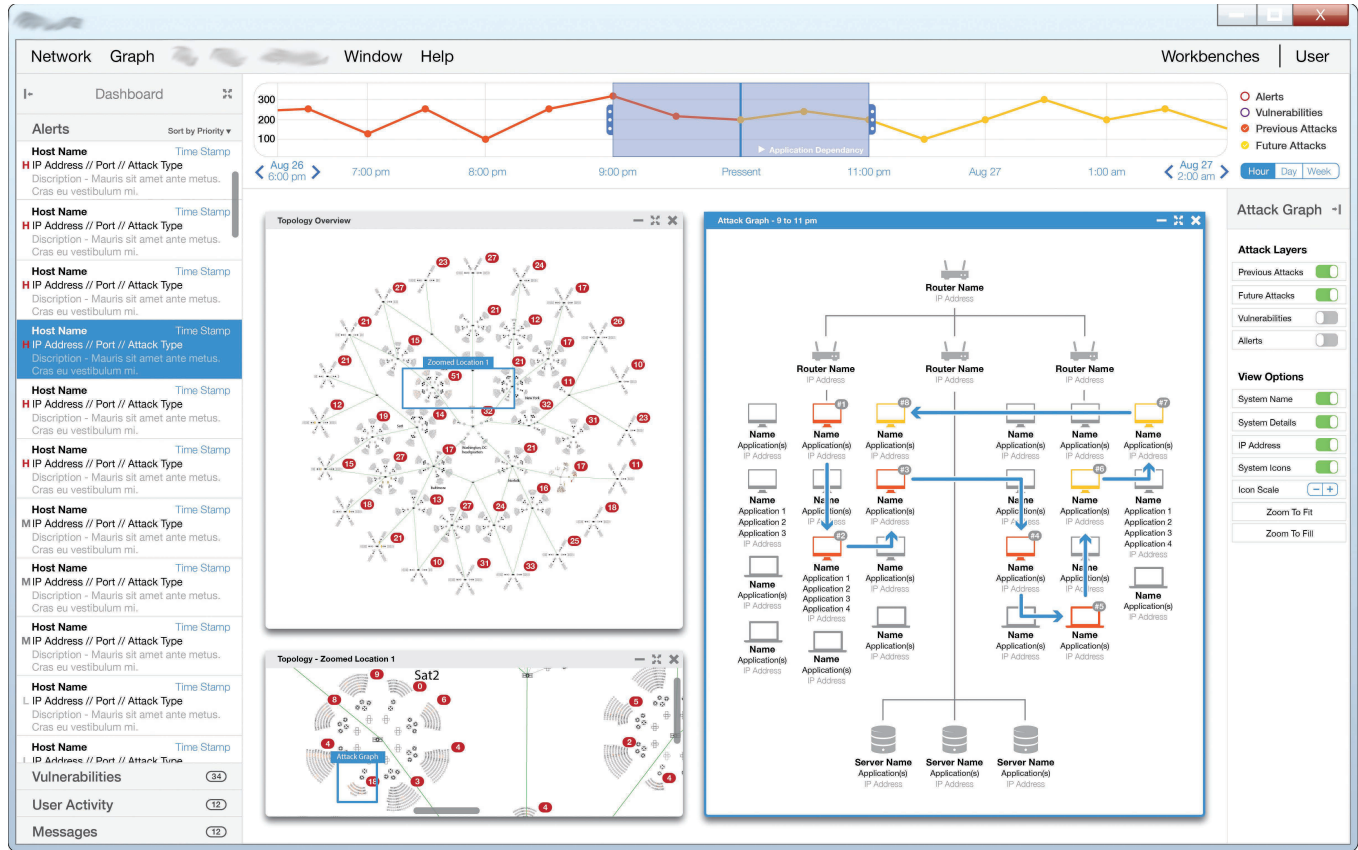


2. activities can be **nested** or conducted in **parallel**



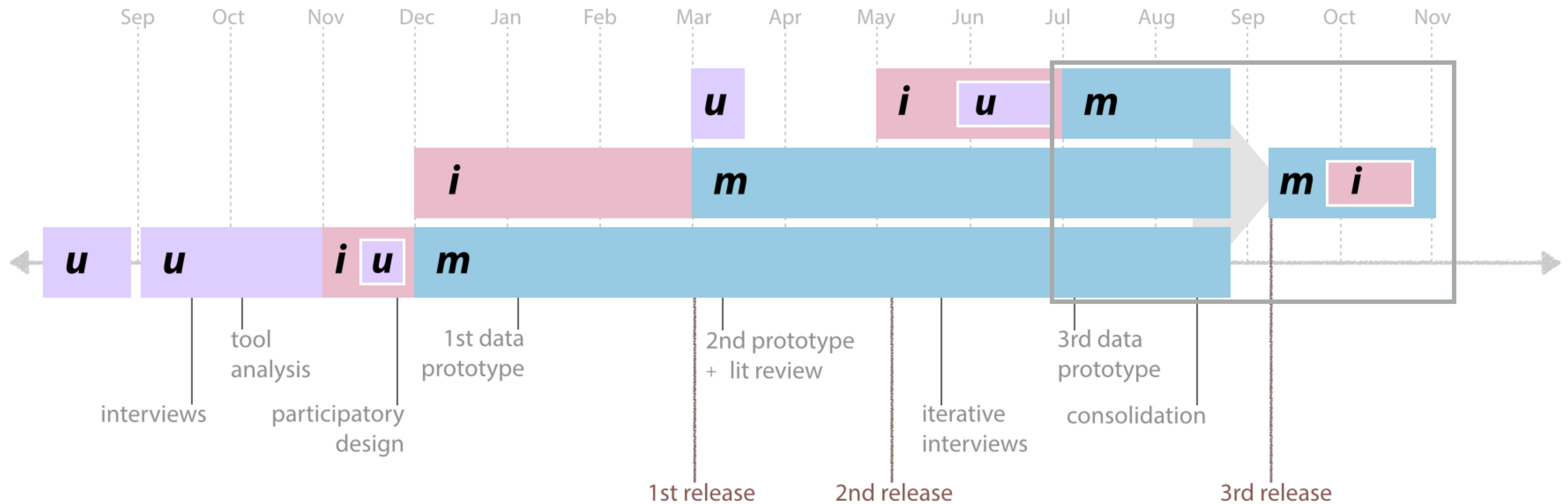
Process Timelines

- redesign project



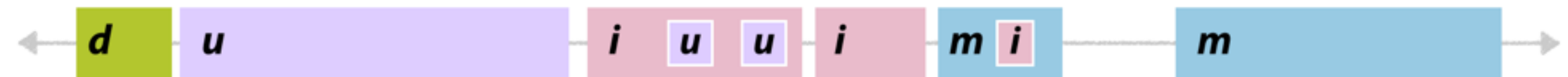
Process Timelines

- colleague's design study



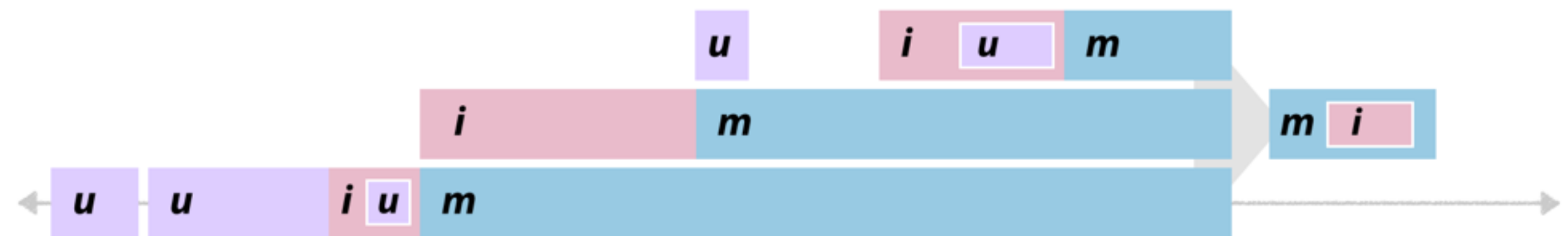
Process Timelines

- **communicates** a messy, creative process



- **supports flexibility**

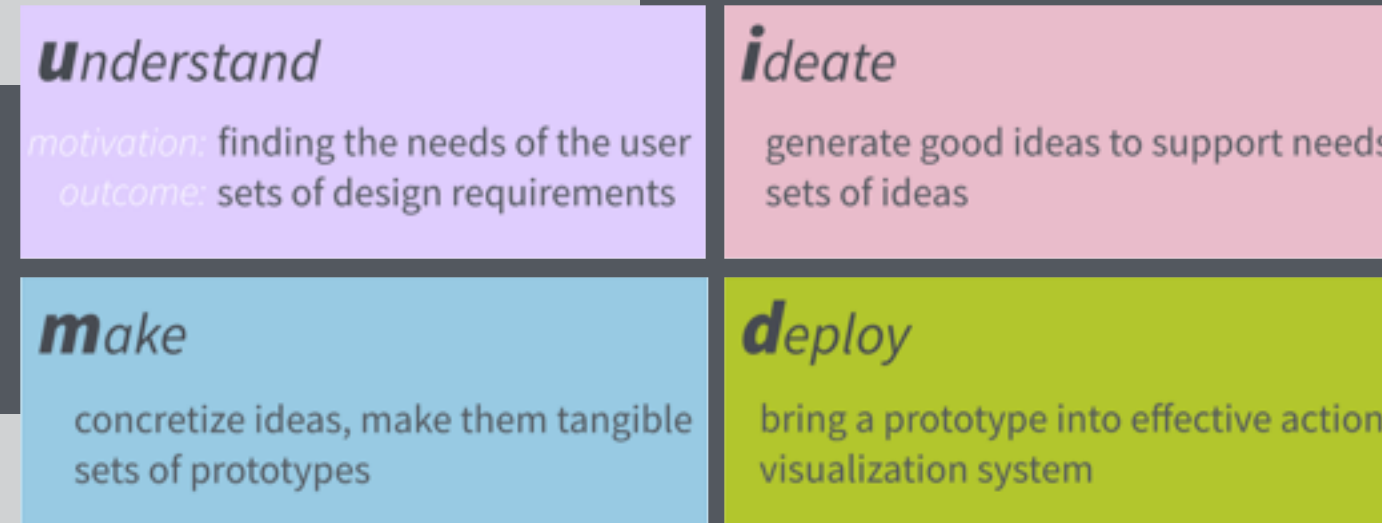
- nested



- parallel



- motivation



- outcomes

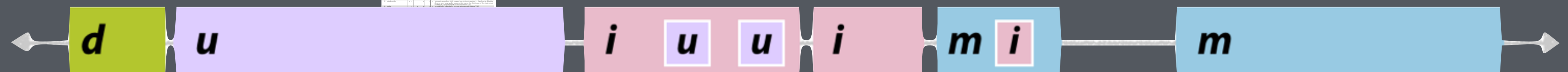
A vertical table with many rows and columns, likely representing a detailed design specification or a list of requirements.

- methods

actionability

+

flexibility



Take-Aways

- **design activity framework** can influence how you:
 - design
 - connect
 - explore
 - communicate
- **embrace the messiness!**

***u**nderstand*

***i**deate*

***m**ake*

***d**eploy*

Questions?

***u*nderstand**

motivation: finding the needs of the user
outcome: sets of design requirements

***i*deate**

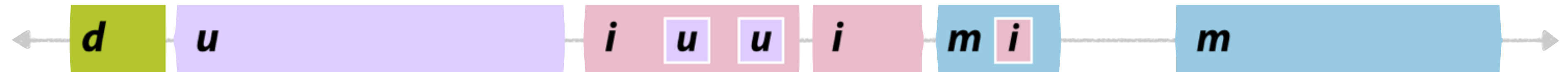
generate good ideas to support needs
sets of ideas

***m*ake**

concretize ideas, make them tangible
sets of prototypes

***d*eploy**

bring a prototype into effective action
visualization system



 <http://mckennapsean.com/projects/design-activity-framework/>

 sean@cs.utah.edu

Many thanks to: Michael Sedlmair, Mike Kirby, Alex Bigelow, Ethan Kerzner, Nina McCurdy, Sam Quinan, Kris Zygmunt, and Matthew Parkin

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