Human-AI Interaction, Lecture 14

AI and Creativity



Jason M. Allen, *Théâtre D'opéra Spatial*, 2022

2022 Colorado State Fair: **first place**

An A.I.-Generated Picture Won an Art Prize. Artists Aren't Happy.

"I won, and I didn't break any rules," the artwork's creator says.

Reached by phone on Wednesday, Mr. Allen defended his work. He said that he had made clear that his work — which was submitted under the name "Jason M. Allen via Midjourney" — was created using A.I., and that he hadn't deceived anyone about its origins.

The New York Times, September 2, 2022, by Kevin Roose

“We’re watching the death of artistry unfold right before our eyes,” one Twitter user wrote.

Allen's reply:

“This isn’t going to stop,” Mr. Allen said. “Art is dead, dude. It’s over. A.I. won. Humans lost.”

The New York Times, September 2, 2022

Allen's description of his process



Midjourney Image



The Work

In response, Mr. Allen provided an explanation of his process, stating that he "input numerous revisions and text prompts at least 624 times to arrive at the initial version of the image."

U.S. Copyright Office Review Board, letter of September 5, 2023, pages 2 and 6

September 5, 2023: the Review Board

The Board finds that the Work contains more than a *de minimis* amount of content generated by artificial intelligence ("AI"), and this content must therefore be disclaimed in an application for registration. Because Mr. Allen is unwilling to disclaim the AI-generated material, the Work cannot be registered as submitted.

Allen did not want to exclude the parts Midjourney made.

Review Board letter, September 5, 2023, pages 1 and 5

Does generative AI make people **more creative**?

Writing task: with and without AI

Brief: a three-sentence idea for a story about an adventure on the open seas

1. Odd tables: no AI
2. Even tables: a chatbot's ideas, your own words
3. Post it in the shared document

In pairs, 6 minutes

A creative idea is “novel, surprising, and **valuable**”

P-creative: new to the person

H-creative: new to all of history

Boden, Artificial Intelligence 1998, p. 347



Margaret Boden, 2015. Photo: Bengt Oberger, CC BY-SA 4.0, Wikimedia Commons

Boden's three kinds of creativity

Combinational: “novel (improbable) combinations of familiar ideas”

Boden, Artificial Intelligence 1998, pp. 348-349

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Exploratory: “the exploration of structured conceptual spaces”

Boden, Artificial Intelligence 1998, pp. 348-349

Boden's three kinds of creativity

Combinational: “novel (improbable) combinations of familiar ideas”

Exploratory: “the exploration of structured conceptual spaces”

Transformational: changing a rule of the space itself

Boden, Artificial Intelligence 1998, pp. 348-349

Who decides what is creative?

A new idea counts when it is “**selected by the appropriate field**”

Csikszentmihalyi (1996), as quoted in Shneiderman, CACM 2007, p. 25

The two category judges did not know that Midjourney was an A.I. program, she said, but both subsequently told her that they would have awarded Mr. Allen the top prize even if they had.

At the fair, the field was two judges.

The New York Times, September 2, 2022

Designing as a **conversation**

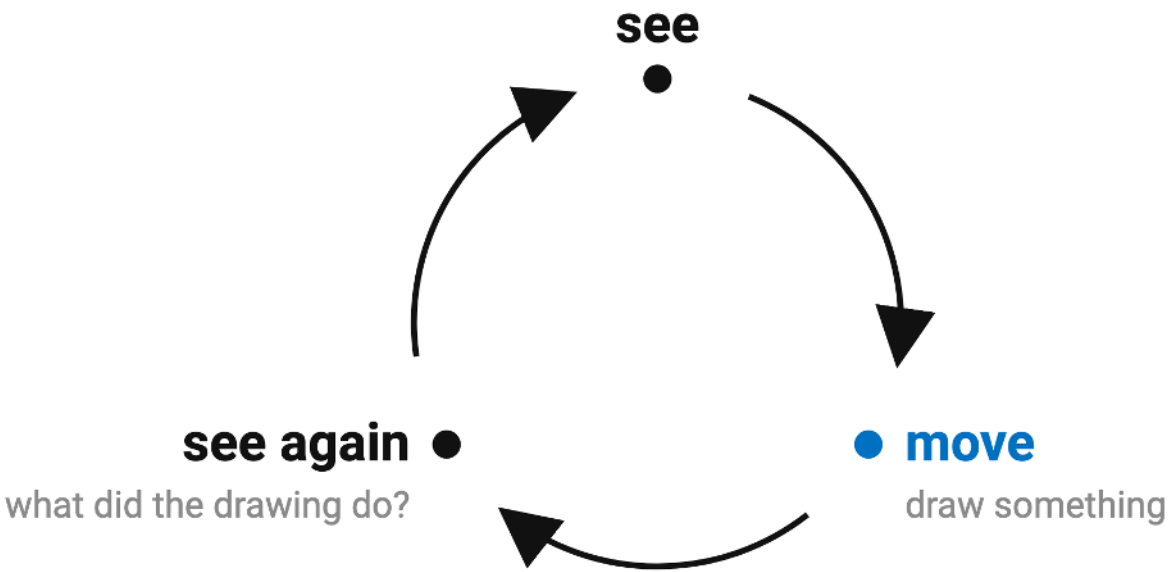
Kinds of seeing and their functions in designing

Donald A. Schon, Glenn Wiggins Show more

We consider designing as a conversation with materials conducted in the medium of drawing and crucially dependent on seeing, of which we distinguish several kinds: literal visual apprehension of (in this instance marks on a page; appreciative judgments of quality (such as ‘too small in scale’); apprehension of spatial gestalts (such as ‘two L's back to back’).

Schön & Wiggins, Design Studies 1992, abstract

Designing as a **conversation**



A tool can create a situation that “talks back to the users.”

Resnick et al., Design Principles for Tools to Support Creative Thinking, NSF workshop report 2005, principle 1



Ben Shneiderman, 2011. Photo: Robert Kosara, CC0, Wikimedia Commons

"…they are still only tools; **the act of creation is carried out by the users**."

Shneiderman, CACM 2007, p. 24

Shneiderman's design principles

Support **exploratory search**

Enable **collaboration**

Provide rich **history-keeping**

Design with **low thresholds, high ceilings, and wide walls**

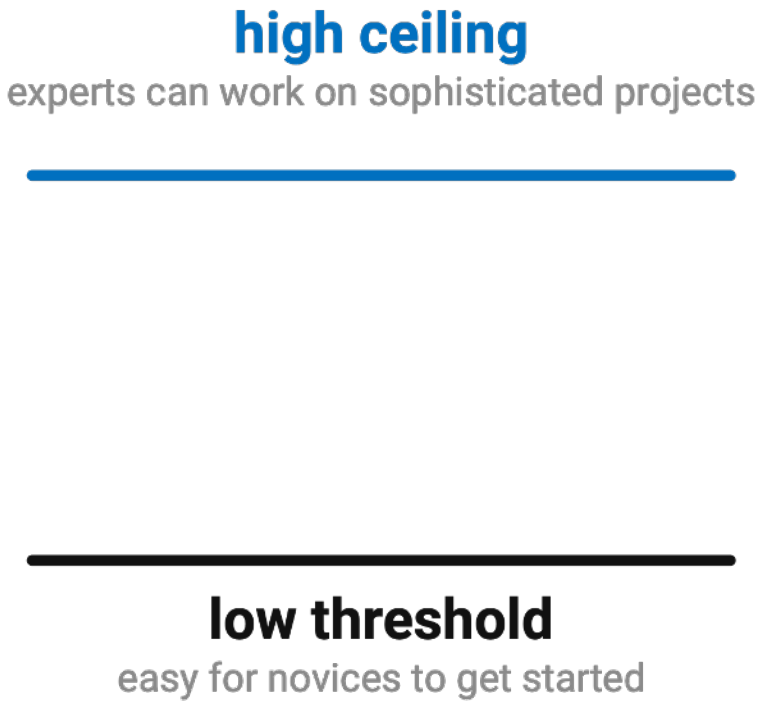
Shneiderman, CACM 2007, pp. 22 and 26-27

Low threshold



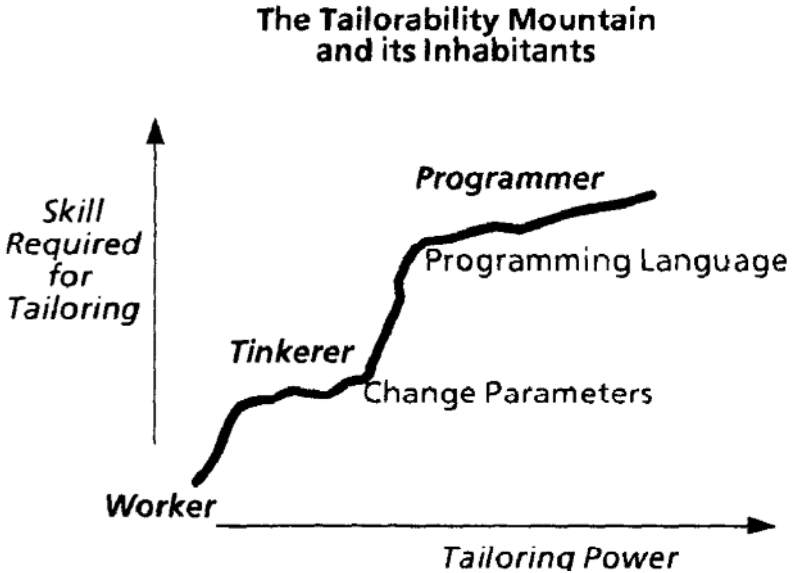
Resnick et al., Design Principles for Tools to Support Creative Thinking, NSF workshop report 2005, principle 2

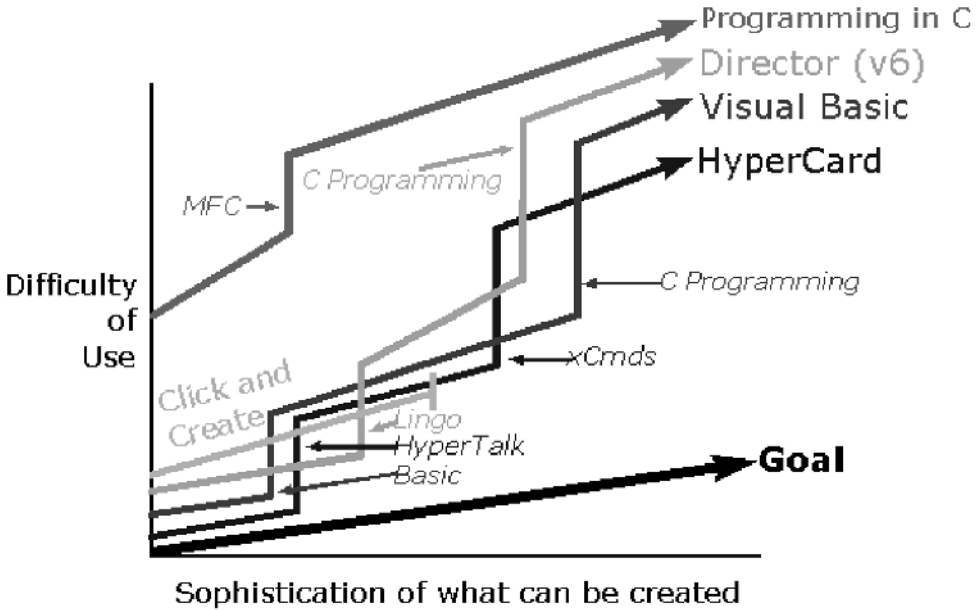
Low threshold, high ceiling



Resnick et al., Design Principles for Tools to Support Creative Thinking, NSF workshop report 2005, principle 2

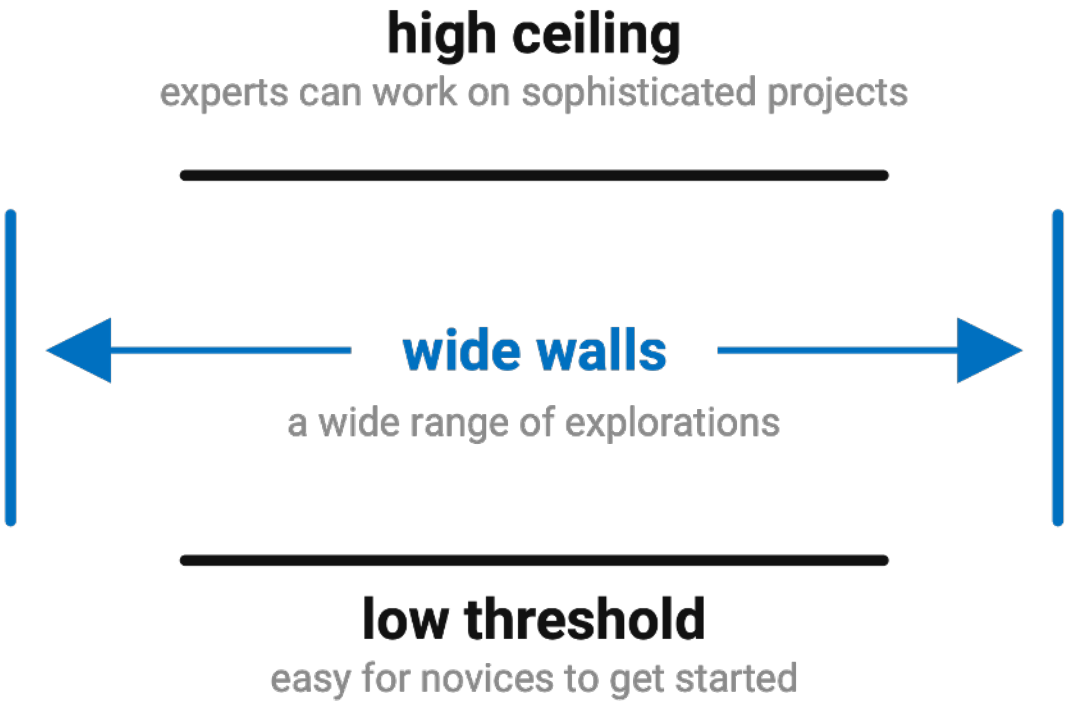
Low threshold, high ceiling





MacLean et al., CHI 1990, Fig. 1 (left); Myers, Hudson & Pausch, TOCHI 2000, Fig. 1 (right)

Low threshold, high ceiling, **wide walls**



Resnick et al., Design Principles for Tools to Support Creative Thinking, NSF workshop report 2005, principle 2

Low threshold, high ceiling, **wide walls**

“If the creations are all similar to one another, we feel that **something has gone wrong**.”

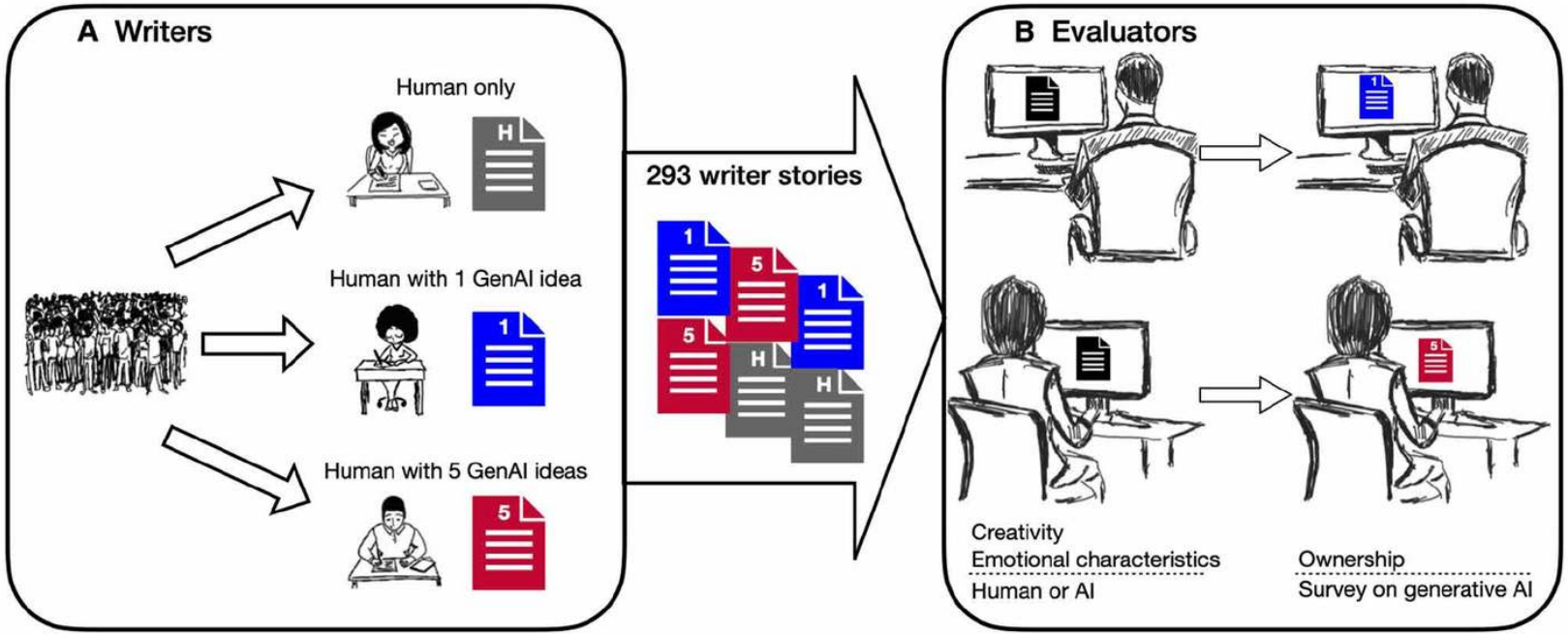
Resnick et al., Design Principles for Tools to Support Creative Thinking, NSF workshop report 2005, principle 2

Writing task: counting the ideas

1. Read every idea
2. Group ideas with the same hero, twist or ending
3. Count the groups in each half

Which half had **more different** ideas?

Doshi & Hauser's study



No AI, one GPT-4 idea, or up to five ideas. Then 600 readers rated the stories.

Doshi & Hauser, Science Advances 2024, Fig. 1 (CC BY 4.0)

Answers to the study's prompt

“Write a three-sentence summary of a story about an adventure on the open seas.”

Captain Elara steered her weathered brigantine through the treacherous mists of the Uncharted Straits, …

Captain Elara sets sail on the uncharted Meridian Ocean, driven by a map that whispers secrets only visible at high tide.

After a sudden storm shattered his vessel, young navigator Elias found himself drifting alone on a vast, starless ocean.

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All 8 full answers have a storm, and in 5 the prize turns out **not to be gold**.

The same test with an image model


seed 1


seed 2


seed 3


seed 4


seed 5

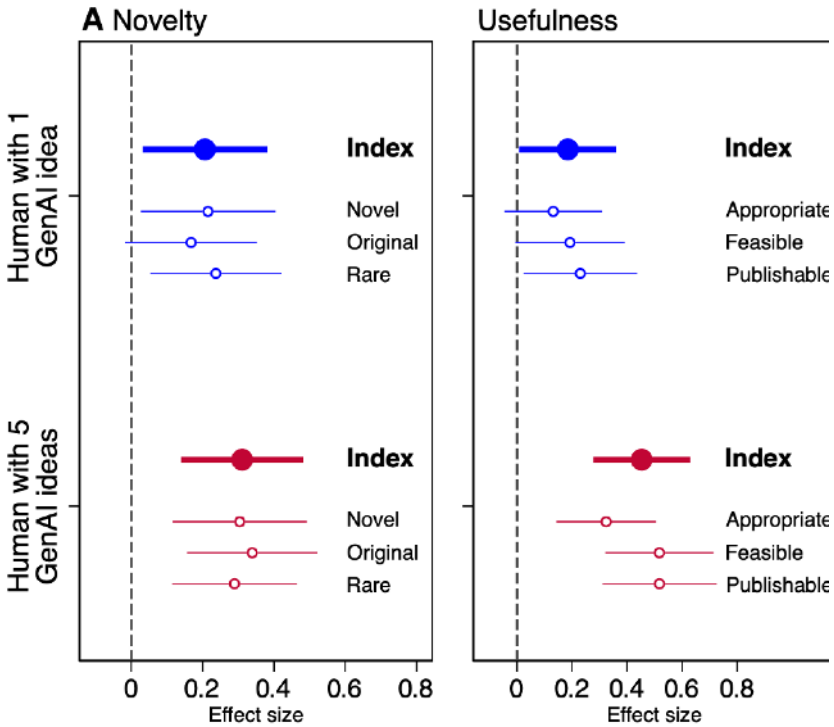

seed 6


seed 7


seed 8

FLUX.1 [schnell]

Novelty and usefulness ratings

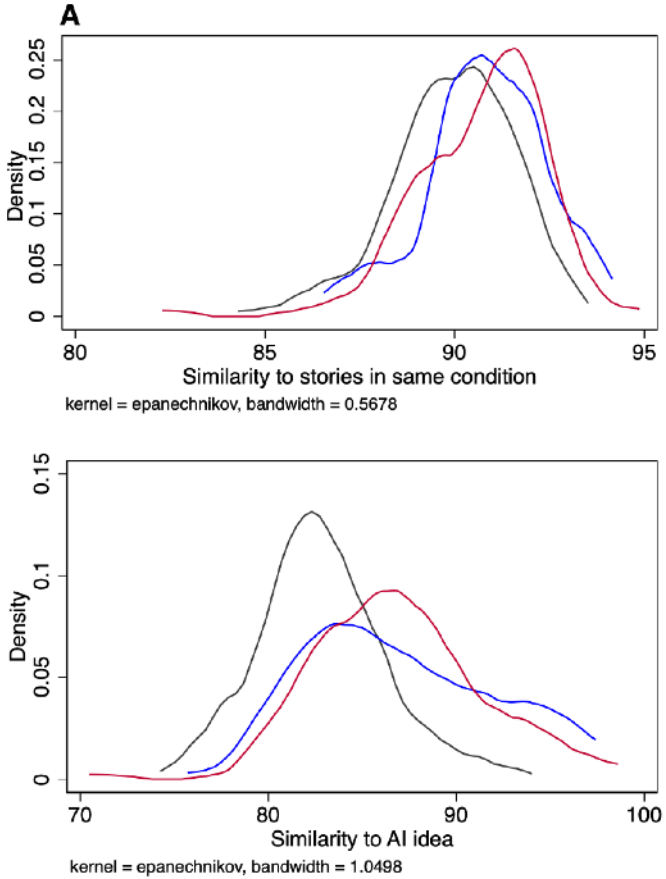


Up to five ideas: novelty **+8.1%**, usefulness **+9.0%**

Writers with low creativity scores gained most

Doshi & Hauser, Science Advances 2024, Fig. 2A and Results (CC BY 4.0)

Similarity between stories



Top: closeness to the other stories
Bottom: closeness to an AI idea

With AI ideas, both curves move **to the right**.

grey: no AI
blue: one idea
red: up to five ideas

Doshi & Hauser, Science Advances 2024, Fig. 4A

“With generative AI, writers are individually better off, but **collectively a narrower scope of novel content is produced**.”

Doshi & Hauser, Science Advances 2024, abstract

Brainstorming with **ChatGPT**



With ChatGPT, people's ideas **overlapped more** with each other's.

Anderson, Shah & Kreminski, C&C 2024, Fig. 1 and p. 421

Brainstorming with **ChatGPT**

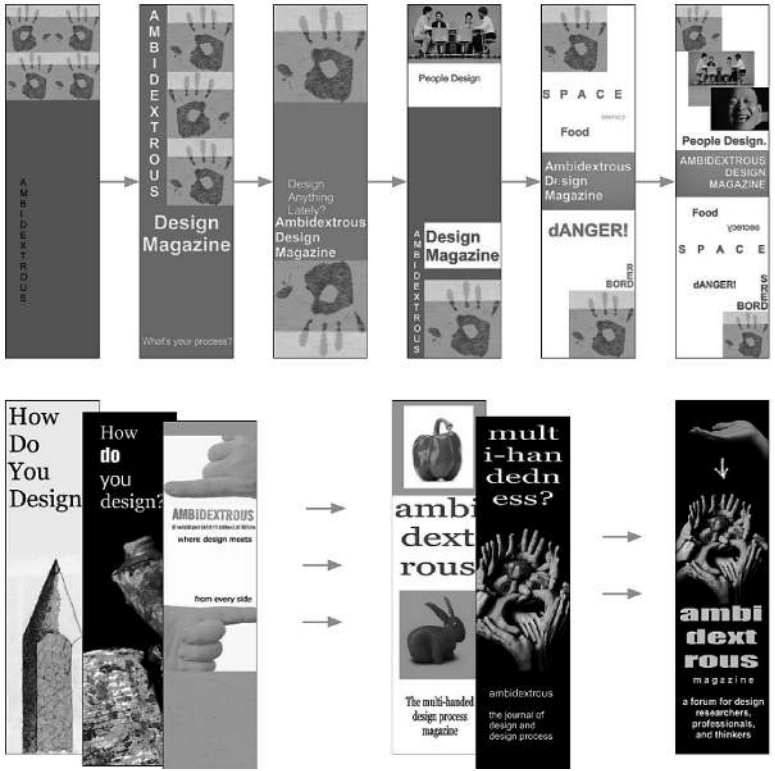


With ChatGPT, people's ideas **overlapped more** with each other's.

“When I want more, I want different more.”

Anderson, Shah & Kreminski, C&C 2024, Fig. 1 and p. 421

Parallel prototyping



Parallel: three ads, feedback, two more

Serial: feedback after each ad

Parallel ads got more clicks and higher ratings, and were **less alike**.

Dow et al., TOCHI 2010, Fig. 1 and Section 4

Several options per prompt

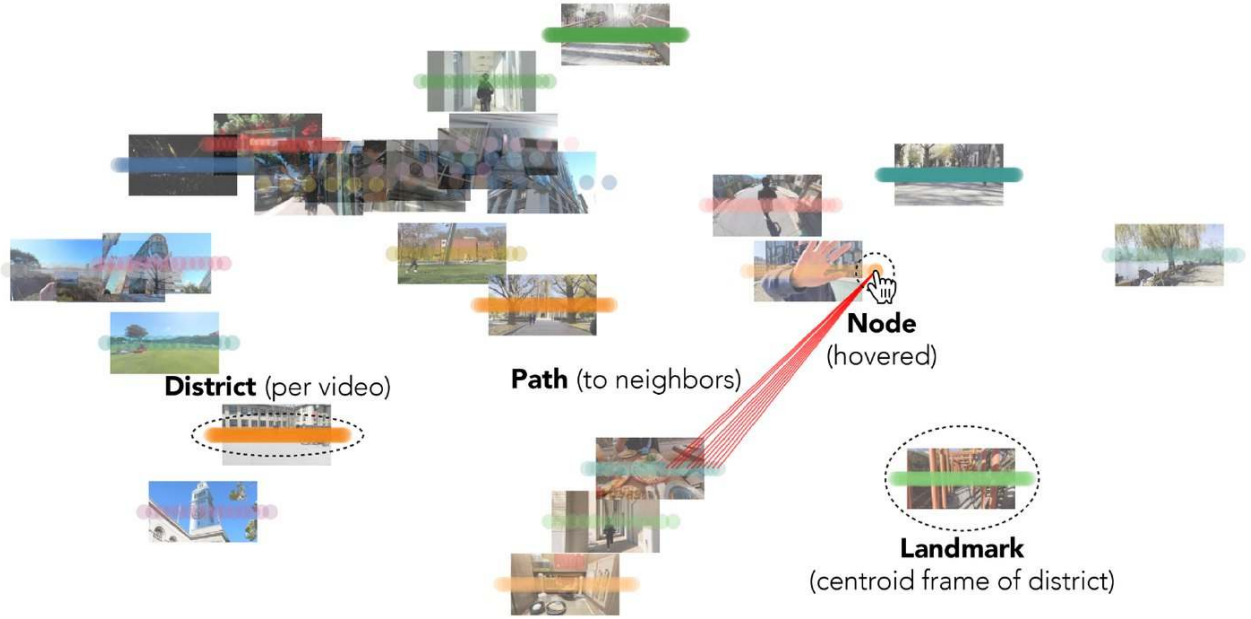
This appears to be the case for Mr. Allen, who experimented with over 600 prompts before he "select[ed] and crop[ped] out one 'acceptable' panel out of four potential images … (after hundreds were previously generated)."

Review Board letter, September 5, 2023, page 7

Each Midjourney prompt gave four images.
Allen made hundreds and picked one.

All of these images came from the **same model**.

VideoMap

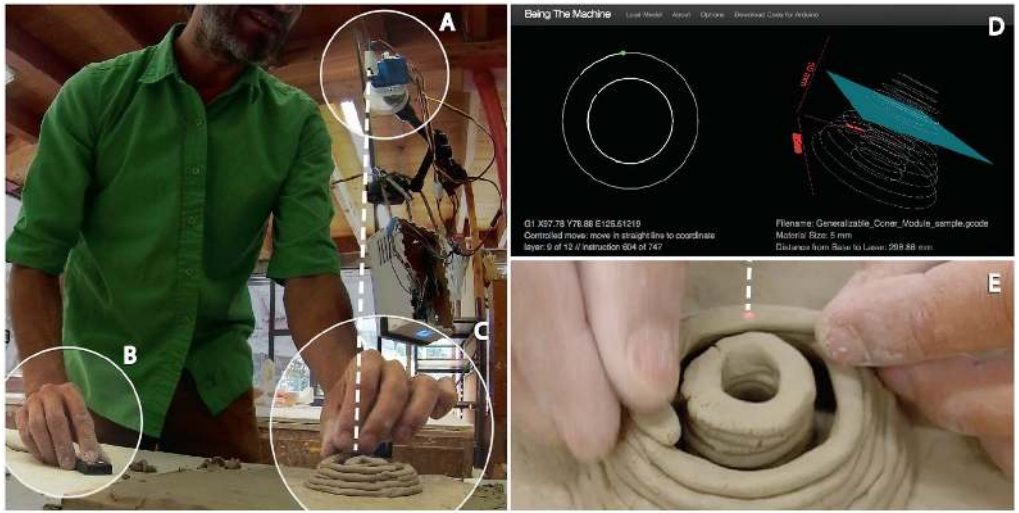


Video frames on a map, with similar shapes near each other.

Limit:
no comparison condition

Lin et al., C&C 2024, Fig. 1 and Section 8

Being the Machine



A person builds the object by hand, following a laser dot.

“The machine is only making the suggestion, I'm the one realizing it.”

Clare, a participant. Devendorf & Ryokai, CHI 2015, Fig. 2 and pp. 2482-2484

The Copyright Office on **prompting**

As the Office described in its March guidance, "when an AI technology receives solely a prompt from a human and produces complex written, visual, or musical works in response, the 'traditional elements of authorship' are determined and executed by the technology—not the human user."

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Doshi & Hauser's readers gave writers with AI ideas at least **25% less** ownership.

Doshi & Hauser, Science Advances 2024, Discussion

Designing AI tools for creative work

1. Show **several options**

Designing AI tools for creative work

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2. **Keep history**

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3. Let people **change direction**

Designing AI tools for creative work

1. Show **several options**

2. **Keep history**

3. Let people **change direction**

4. Show **what the model usually suggests**

Discussion: Shneiderman, Doshi & Hauser

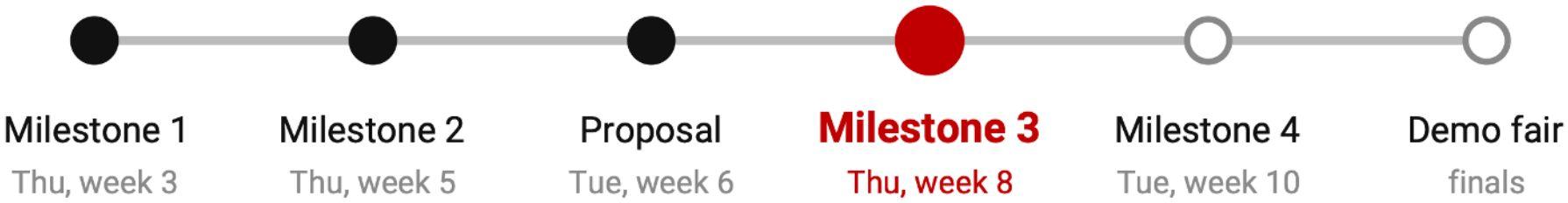
1. Did Allen **make** the picture by choosing it?

2. Who should deal with stories becoming more alike: the writer, the tool maker, or the publisher?

3. Would today's chat tools make the stories more alike, or less?

Milestone 3: Make it steerable

Due Thursday of week 8



Takeaways

1. People in a field decide what is **creative**
2. Good tools let people **try many options**
3. With AI ideas, stories were rated **higher**
4. Those stories were also **more similar**

Next: Lecture 15, Human-AI Collaboration

Read before class:

- Horvitz, “Principles of Mixed-Initiative User Interfaces,” CHI '99
- Lee, Liang & Yang, “CoAuthor,” CHI 2022

Reading post due at 9 pm the night before.