AI as Design Material — Collaboration & GenAI

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Today

— **W08:** How much should the system do? (Agency)

— **W09:** When should it act? (Proactivity & Timing)

— **This week:** How do human and AI **work together?**

— Two new principles: **P11** (Generative Variability) and **P12** (Productive Imperfection)

Agency sets the level. Timing sets the moment. Collaboration defines the relationship.

W08 ➜ W09 ➜ W10

	W08: Agency	W09: Proactivity	W10: Collaboration
Core question	How much should the system do?	When should it act?	How do they work together?
Framework	Parasuraman et al. (2000)	Horvitz (1999)	Johnson et al. (2014)
Design tool	Four factors + HAX	Four questions + Act/Ask/Wait	OPD + collaboration spectrum
Key tension	Control vs. convenience	Helpfulness vs. interruption	Autonomy vs. interdependence

Part 1: Human-AI Collaboration

Tools or collaborators? What real collaboration requires.

What Makes Collaboration?

Grosz (1996) distinguishes **interaction** from **collaboration:**

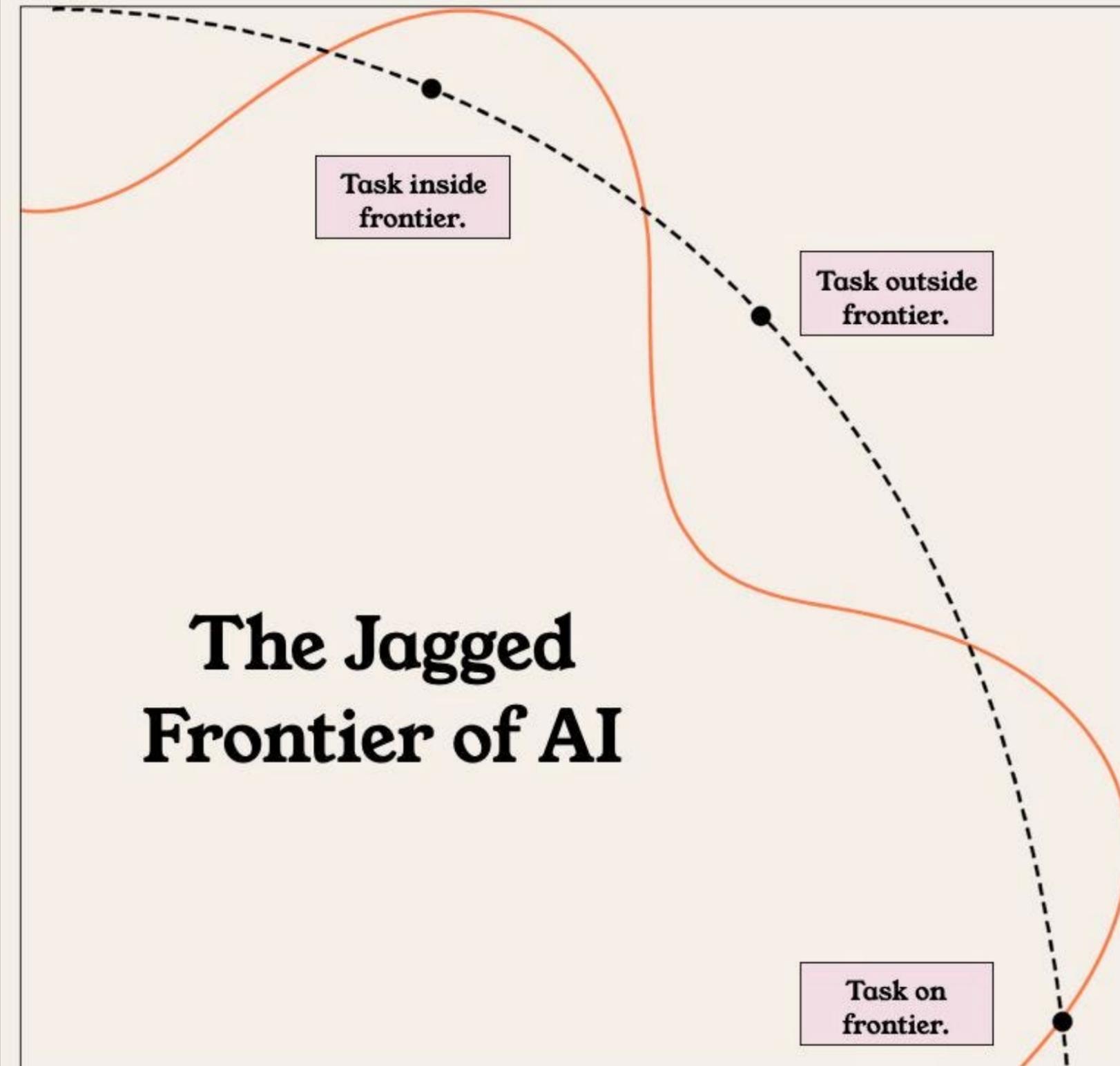|	Interaction (W08-W09)	Collaboration (W10)
Goals	User defines; system executes	Both work toward a shared outcome
Understanding	System follows instructions	Both track what the other knows
Commitment	System serves user's agenda	Both invest in the result
Metaphor	Tool	Partner

Running example: You ask Figma AI to "design a budget tracker." Is this interaction (you command, it executes) or collaboration (you share a goal and build together)?

Why Collaboration? The Jagged Frontier

AI capability isn't a smooth line — it's a **jagged frontier** (Dell'Acqua et al., 2023).

— Hard-seeming tasks may be **inside** — AI handles them well

— Easy-seeming tasks may be **outside** — AI fails unpredictably

— The boundary **shifts** with every model update

You can't just "automate the easy parts." Collaboration is the durable strategy.

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Task inside frontier.

Task outside frontier.

The Jagged Frontier of AI

Task on frontier.

OPD: Three Requirements for Collaboration

Klein et al. (2004) studied what makes human teams work; Johnson et al. (2014) distilled those into three design properties:

Property	Question	Design Implication
Observability	Can each party see what the other is doing?	Reveal status, progress, reasoning
Predictability	Can each party anticipate the next action?	Behavior must be consistent, learnable
Directability	Can each party influence the other?	Users must be able to redirect or override

Running example: Figma AI generates your budget tracker. Can you see **why** it chose that layout (O)? Will it produce something similar next time (P)? Can you change just the header (D)?

The Collaboration Spectrum

W09 introduced Horvitz's (1999) mixed-initiative interaction — when to act. Collaboration extends this to how the work is shared:

Mode	Who leads?	OPD Focus	Example
Human-led	Human creates; AI assists on request	D: high directability	Spell check, code completion
Turn-taking	Human and AI alternate contributions	O+P: see and predict turns	Chat-based image generation
Shared	Both contribute simultaneously	All three critical	Real-time co-editing
AI-led	AI generates; human evaluates	O: observe AI's work	Figma AI First Draft

Running example: Your budget tracker starts AI-led (First Draft generates layout), shifts to shared (you evaluate and tweak), then goes human-led (you manually polish brand details).

Where the Budget Tracker Breaks Down

The critical moments are the **handoffs**. OPD explains why they fail:

| Handoff in our example	OPD Gap	What goes wrong
You prompt "design a budget tracker" → AI generates	Low **O**	AI picks a layout but you can't see why
You want to change just the color scheme	Low **D**	You can't direct the AI to modify one aspect — only re-prompt from scratch
You finish editing → re-prompt for new labels	Low **P**	Unclear whether AI will modify or start over

Good collaboration design focuses on the handoff, not just the generation. OPD tells you what's missing at each transition.

Designing Better Handoffs

How would you fix each OPD gap?

1. **Low O** (can't see why) → Show a rationale: "Layout based on finance app patterns; prioritized balance visibility"

2. **Low D** (can't scope changes) → Let the designer constrain: "Keep layout, change color scheme only"

3. **Low P** (modify or start over?) → Signal the mode: "Editing existing design" vs. "Generating new draft"

OPD doesn't just diagnose — it tells you what to design.
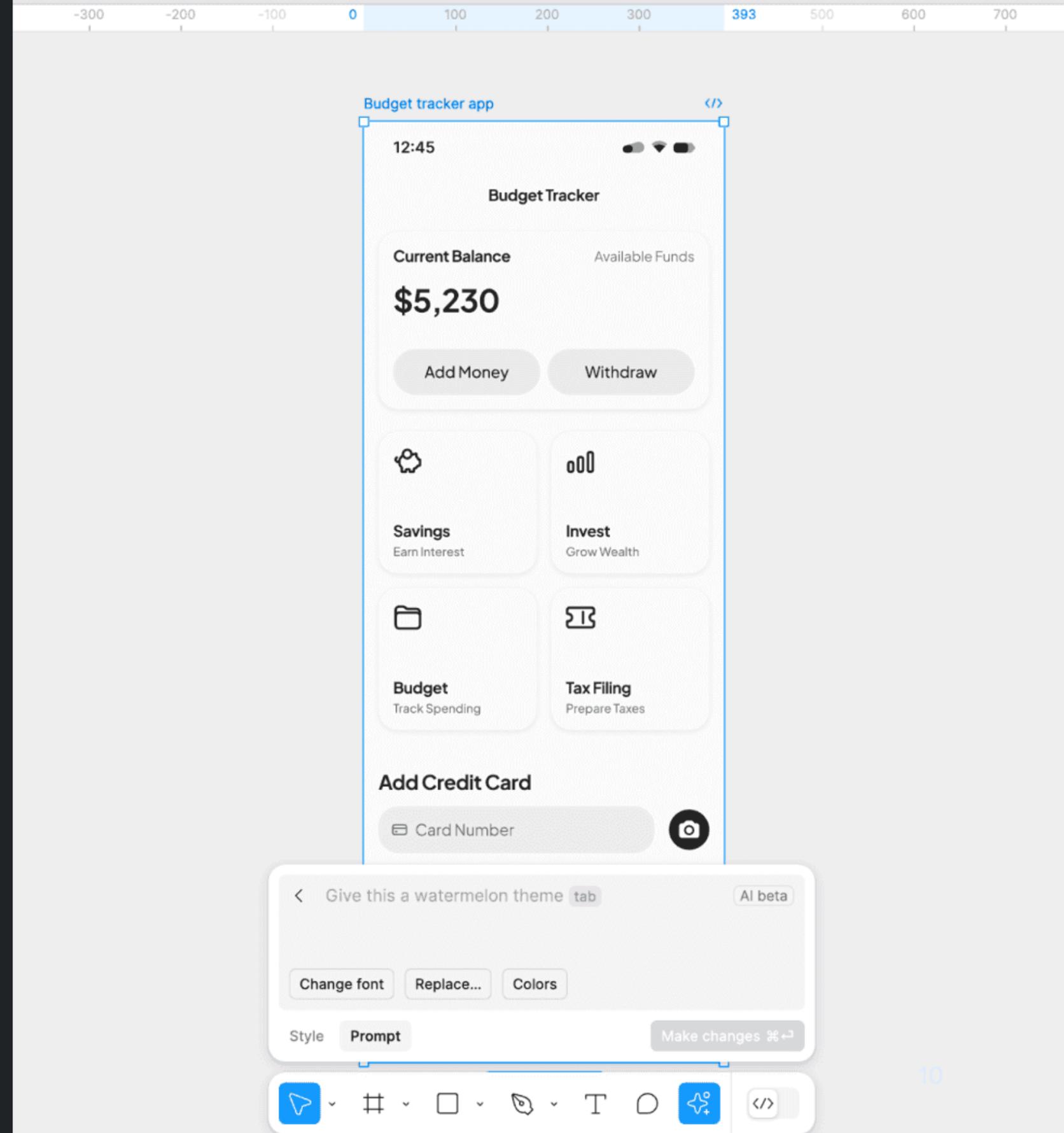
Collaboration Patterns

Our budget tracker used **AI drafts, human refines** — but that's just one pattern:

Pattern	Description	Example
AI drafts, human refines	AI generates first version; human edits	Figma First Draft → manual adjustment
Human drafts, AI enhances	Human creates base; AI adds/improves	Write paragraph → AI rewrites for tone
Parallel generation	Both produce options; human curates	Midjourney grid + designer sketches
Iterative dialog	Back-and-forth refinement	ChatGPT conversation with revisions

The best collaborative tools support multiple patterns
— because different tasks call for different relationships.

Part 2: Figma AI — Intelligence in Your Design Tool

AI collaboration you can touch — building on the W06 Figma workshop

Why Figma AI?

You already know Figma from the W06 workshop. Now Figma has embedded AI — and it demonstrates every collaboration pattern we just discussed.

— **Text tools:** Rewrite, translate, shorten, adjust tone

— **Image tools:** Generate, remove background, expand, edit with prompt

— **Design tools:** First Draft, replace content, rename layers, add interactions

— **Figma Make:** Generate functional prototypes from prompts

You have 3,000 AI credits/month on your education plan — more than enough for Wednesday's studio.

Figma AI as Collaboration

First Draft: Type a description, get a layout.

— AI-led → human refines
— AI generates; human evaluates and edits

Two characteristics shape this (more shortly):

— **Variability:** Generate again — different layout each time
— **Imperfection:** Output needs work — spacing, hierarchy, content

Imperfection is what makes collaboration possible. If it were perfect, you'd be a spectator.
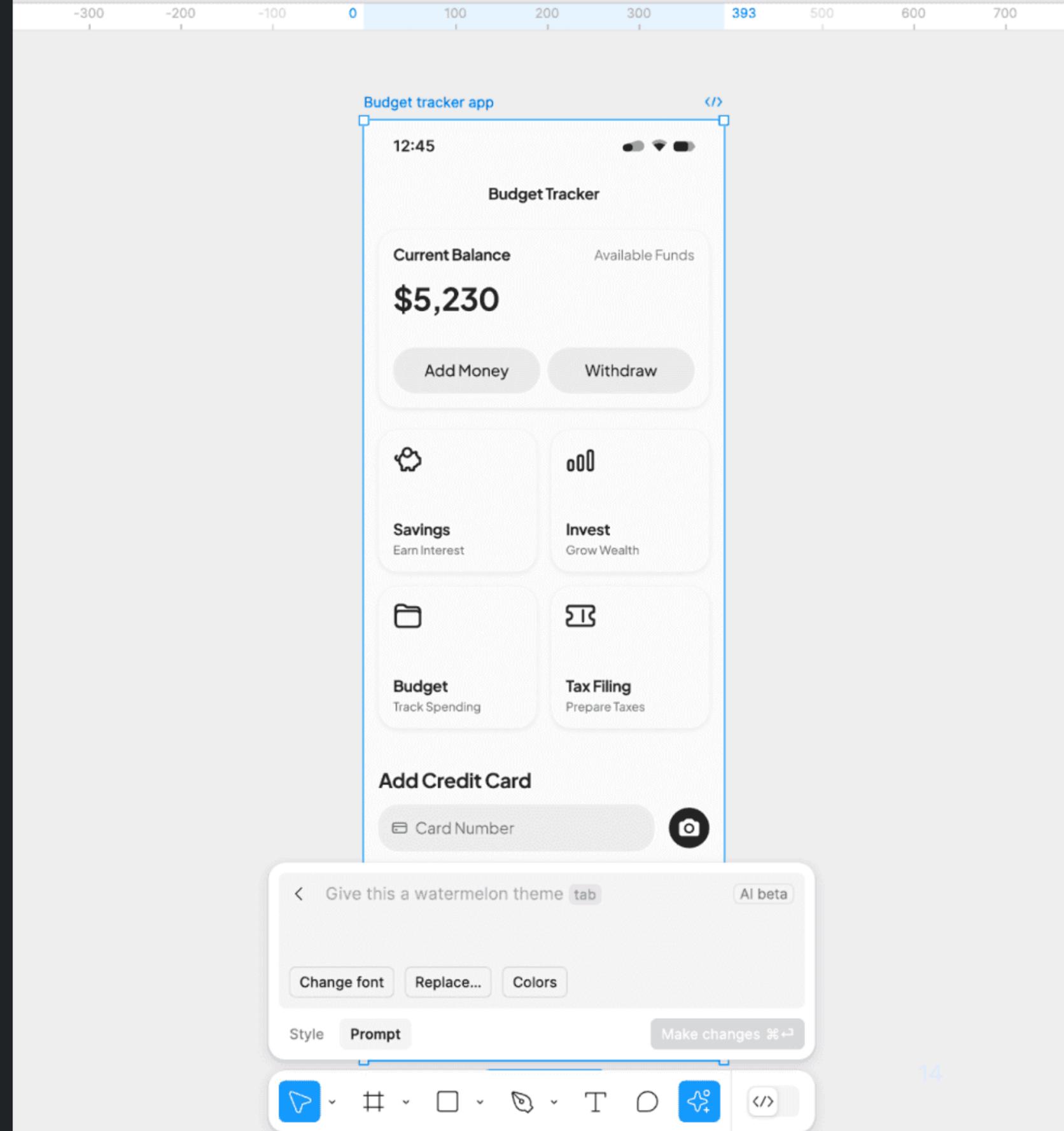
Part 3: Two New Principles

P11: Generative Variability and P12: Productive Imperfection

The Generative Shift

Traditional AI	Generative AI
Same input → same output	Same input → **different output** every time
Correct or incorrect	**Good enough** — on a spectrum
User evaluates accuracy	User evaluates **fit and quality**
One right answer	**Multiple valid outputs** to navigate

P1-P10 were designed for intelligent systems broadly. P11 and P12 address what's unique about generative AI — variability and imperfection as fundamental characteristics, not bugs.

P11: Generative Variability

Help users navigate multiple varied outputs and understand that repetition may yield different results.
— Weisz et al. (2024)

The same prompt produces different outputs each time. This is a feature — but only if the design helps users work with it.

P11: Four Strategies

1. **Show multiple outputs** — let users compare and choose
2. **Visualize the journey** — show history and exploration paths
3. **Enable curation** — favorites, collections, annotations
4. **Highlight differences** — make variation visible

Midjourney makes variability central (4-up grid). ChatGPT hides it (one response, regenerate replaces). Figma sits in between.

P12: Productive Imperfection

Design for the reality that generative outputs are inherently imperfect, providing tools to evaluate, improve, and learn from flawed outputs.
— Weisz et al. (2024)

Generative AI outputs are never "finished." They're starting points — drafts that invite refinement. **This is not a bug.**

If AI were perfect, there'd be nothing to refine together.

```python
from openai import OpenAI

# Set your API key
client = OpenAI(api_key= environ.get('OPENAI_API_KEY'))

def get_response(prompt):
    # Create a request to the chat completions endpoint
    response = client.chat_completions.create(
```

P12: Four Strategies

From <u>Weisz et al. (2024)</u>:

1. Make uncertainty visible
Show confidence levels, disclaimers, or visual cues that signal "this might not be right."
ChatGPT: "I'm not sure, but..."

2. Use domain-specific metrics
Help users evaluate quality using criteria relevant to their task.
Grammarly: readability score, tone analysis

3. Offer improvement paths
Provide ways to regenerate, edit, or refine outputs.
Figma AI: regenerate button, manual editing

4. Collect feedback
Let users signal quality so the system learns.
GitHub Copilot: accept/reject signals improve future suggestions

P11 + P12 Together

P11 gives you **options** — multiple starting points

P12 gives you **tools** — ways to refine what you chose

They form a cycle:

Prompt → Generate (P11) → Evaluate (P12) → Refine (P12) → Re-prompt (P11) → ...

Back to our budget tracker:

1. Prompted → got a layout (P11)
2. Labels were generic (P12)
3. Refined labels and spacing (P12)
4. Re-prompted for new labels (P11)
5. Kept 2 of 4, edited the rest (P12)

This cycle IS human-AI collaboration. P11 and P12 are the engine that keeps it moving.

The Authorship Question

When human and AI collaborate, who is the author?

— You used Figma AI to generate the budget tracker, then spent an hour refining it. **Whose design is it?**

— A writer uses ChatGPT to draft an outline, then rewrites every paragraph. **Whose writing is it?**

— A programmer uses Copilot for 40% of their code. **Whose code is it?**

Not just philosophical — affects portfolios, credit, and professional identity. We'll revisit in W13 (Ethics).

Quick Check: OPD in the Wild

In pairs (2 min): Pick an AI tool you both use — ChatGPT, Copilot, Grammarly, anything.

Evaluate it with OPD:

— **O:** Can you see what it's doing and why?
— **P:** Can you predict what it will do next?
— **D:** Can you redirect it mid-task?

Then: Which collaboration pattern does it use — AI drafts, human drafts, parallel, or iterative dialog?

2-3 pairs share out. We'll use this same lens on Figma AI Wednesday.

This Week

Reflection, studio, and preparation for Wednesday

Reflection: Collaboration Safari

Due before Wednesday | Graded: ✓ / ✓- / ✓+

Find **3 examples of human-AI collaboration** in tools you already use. For each one:

1. **What happened** — one sentence describing the collaborative interaction
2. **Who led?** — classify: human-led, turn-taking, shared, or AI-led
3. **P11 check** — did the tool show you multiple options or variations? How?
4. **P12 check** — was the output imperfect? How did you refine it?
5. **One-sentence redesign** — suggest one change to improve the collaboration

Submit a **screenshot with annotations** and your answers for each example.

This primes Wednesday's studio — you'll audit Figma AI using the same lens you apply here.

Wednesday Studio: Figma AI Audit + Collaborative Flow

Part 1 — Figma AI Audit:
Explore Figma AI features and evaluate them using P1-P12.

— Generate layouts with First Draft

— Try image tools (generate, remove background, expand)

— Use text tools (rewrite, adjust tone, translate)

— Evaluate: How does Figma AI handle P11 (variability) and P12 (imperfection)?

Part 2 — Collaborative Flow Design:
Sketch a collaborative flow showing human-led, shared, and AI-led moments in a design task.

Come to class with Figma open and your education plan AI credits ready.

Before Wednesday

— **Observe:** Notice human-AI collaboration in the tools you use — who leads? When do you refine AI output?

— **Submit:** Collaboration Safari reflection on Canvas (3 examples with screenshots)

— **Prepare:** Open Figma, verify AI features are available (look for the AI sparkle icon in the toolbar)

— **Optional reading:** <u>Johnson et al. (2014)</u>, sections 1-3 — if you want more depth on OPD

Come ready to use Figma AI and evaluate it through OPD and P1-P12.

References

Core Frameworks:

— Johnson et al. (2014). "Coactive Design: Designing Support for Interdependence in Joint Activity" — JCEDM

— Klein et al. (2004). "Ten Challenges for Making Automation a 'Team Player'" — IEEE IS

— Grosz (1996). "Collaborative Systems" — AI Magazine

— Dell'Acqua et al. (2023). "Navigating the Jagged Technological Frontier" — Harvard Business School

GenAI Principles:

— Weisz et al. (2024). "Design Principles for Generative AI Applications" — CHI '24

Background:

— Horvitz (1999). "Principles of Mixed-Initiative User Interfaces" — CHI '99

— Amershi et al. (2019). "Guidelines for Human-AI Interaction" — CHI '19

Media Sources

Figma AI | Midjourney | DALL-E | GitHub Copilot |
ChatGPT | Grammarly | Jagged Frontier (Dell'Acqua et al.,
2023)