POVs, HMWs, Experience Prototyping

Team 8 – GR2

Our Project

Team 8:
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Our original problem domain explored educational AI use in the corporate and academic worlds.

Our problem domain has been revised to include almost anyone. However, we have still kept a focus on corporate and especially academic users.

Further Needfinding

Our Interviewees

In the **corporate world...**

- We wanted to expand on previous corporate needfinding to further understand the specific applications that AI is applied for
  - What does AI teach in a work setting?
- We wanted to clarify when it teaches and when it simply does work
- We sought out those in AI-adjacent fields

So, we interviewed **Nikola:** a 37yo software engineer

- He currently uses AI in various capacities
- He's currently homeschooling his children

In the **academic world...**

- We wanted to expand on student needfinding to understand how AI is actually used as a learning partner
- We focused on when AI helps students learn vs. when it just speeds up completing task and see how trust, confidence, and curiosity change
- We sought out a student who regularly reads research and works with academic papers

So, we interviewed **Ellie**: a 20yo psychology student at UCSB

- She uses AI in her research papers for implications
- She also relies on friends for harder questions rather than AI

Interview #1
Nikola (37) - Software Eng.


We learned that he…
- Is an **average user**
- Likes using AI to bootstrap a product into a working result
- Doesn't get frustrated by AI usage because he views it as just a tool
  - "Sometimes the requirements are so vague that humans can't do it. So it's not to blame the AI."
- Likes how AI can show him all the options
- He homeschools his kids, and constantly adapts to how they're feeling
- He likes using AI in a conversational manner
  - He appreciates AI asking clarifying questions
- He thinks that if he was offered a tool that both helped him do and learn something, he'd use it over traditional AI tools (that just do it)
- He often uses AI to learn about traditional things like taxes

Empathy Map

SAYS
Observations: What did this person SAY that surprised you?

"Sometimes the requirements are so vague that humans can't do it. So it's not to blame the AI."

"The thing cannot think. I'm talking to a, you know, tool that cannot think."

"I can just have some results within hours."

"I forgot that, or I forgot this … I don't mind."   "Coming up with sound requirements is hard."

"I've been impressed by how the tools understand my prompts."

"You know, it implements something, and I'm like, oh, wow, this idea is really good. I didn't think about this."

"My main focus is to solve the problem."   "it can show you the options."

"So I can see, uh, corporate environments using these tools [that use AI to educate] to train their employees in the future."

"Maybe ask … what prerequisites … you need … that may assess your previous knowledge, and based on that, come up with a program."

"sometimes I need to visualize what I'm [learning]"   "I'm sure I'll use [AIs tools] to learn with my son."

Nikola
37yo Software Engineer
Homeschooling 2 kids

THINKS
Inferences: Based on what they SAY and DO, what might they be THINKING?

AI has the same shortcomings as humans do   AI is better than I thought

Humans are better educators than AI

AI has saved me time and done tedious work

I don't have the time nor energy to try and learn while using AI to do work, but in an ideal world, I'd like to

I see AI more as a tool to do things than a tutor to teach

AI can help teach you in a way better than traditional schooling

AI will change in the next few years drastically and becoming more adopted

I know that AI knows things outside my specialty better than I, and I can leverage that

I homeschool my kids because the school system is too rigid and not adaptive enough

DOES
Observations: What did this person DO that surprised you?

Even when using AI for tasks that can be lower quality, he checks the output.

Isn't really frustrated by prompt engineering.   Thinks that a conversational AI helps him learn the best

Uses AI to continually bootstrap a minimum-viable product, even when there are gaps in his knowledge or if he's not satisfied

Learned from, with no frustration, AI failing to formatting XML properly

Likes how it asks clarifying questions   Learns from the output

Sometimes uses AI to "simulate" a conversation with a coworker he doesn't want to bother

Uses ChatGPT to learn about general things like taxes or housing, but prefers speaking to coworkers for technical stuff

Used AI to quickly write a script he couldn't figure out right before a meeting

If offered a tool that both explained how to do something and helped do it, he'd use it over traditional tools
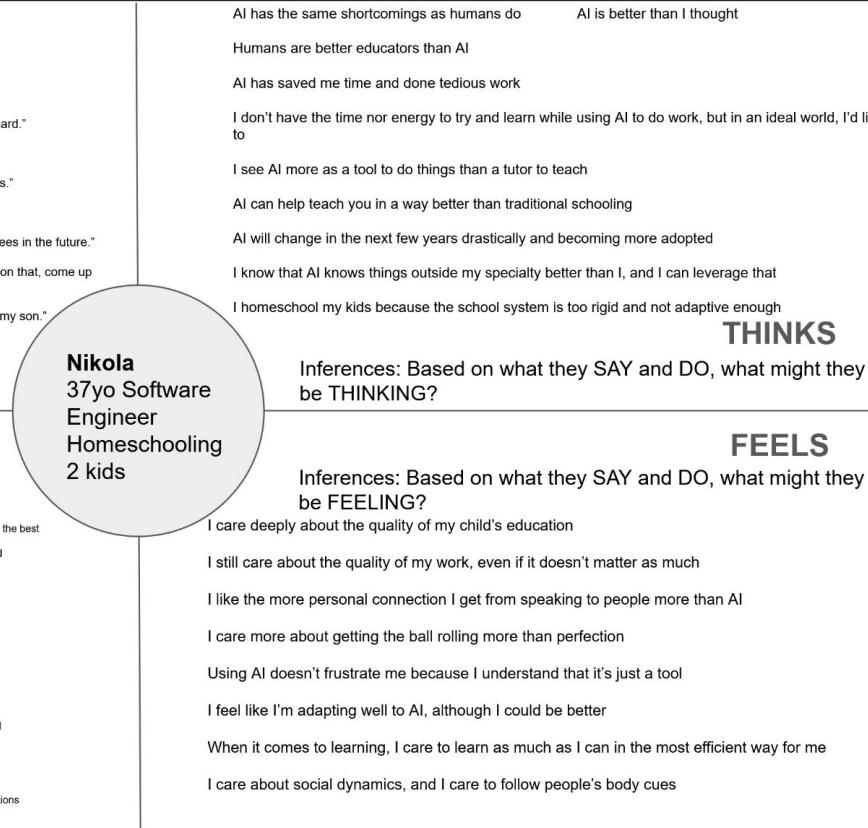
Believes an ideal tutor is flexible, focusable (to specific topics), adaptive (to specific learning styles), and keeps you in control

When teaching his 4yo, he can tell immediately through body cues if his son gets it

When teaching his 4yo, he doesn't push his son too far and changes up his strategy often

Believes that schools force people to learn things they don't care for, but maintains that they should be able to look at the options

Likened AI tools guiding the user to Netflix guiding you to a movie

FEELS
Inferences: Based on what they SAY and DO, what might they be FEELING?

I care deeply about the quality of my child's education

I still care about the quality of my work, even if it doesn't matter as much

I like the more personal connection I get from speaking to people more than AI

I care more about getting the ball rolling more than perfection

Using AI doesn't frustrate me because I understand that it's just a tool

I feel like I'm adapting well to AI, although I could be better

When it comes to learning, I care to learn as much as I can in the most efficient way for me

I care about social dynamics, and I care to follow people's body cues

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Key Insights

Results > Learning

At Nikola's job, getting results quickly is ultimately more valuable than long-term growth. However, if he could get *both*, he would, suggesting that learning cannot compromise quick results.

AI > School – Flexibility

The traditional school system is rigid and not adaptable enough, while AI can quickly adapt to be the most personable teacher possible.

AI is just a tool

Nikola doesn't get frustrated while using AI or prompting, because he views it as just a tool. Reframing AI in this way can minimize general frustration.

Always Checks the Output

Even for work that doesn't demand high quality work, he still checks the output. This suggests that people still care for the quality of their work.
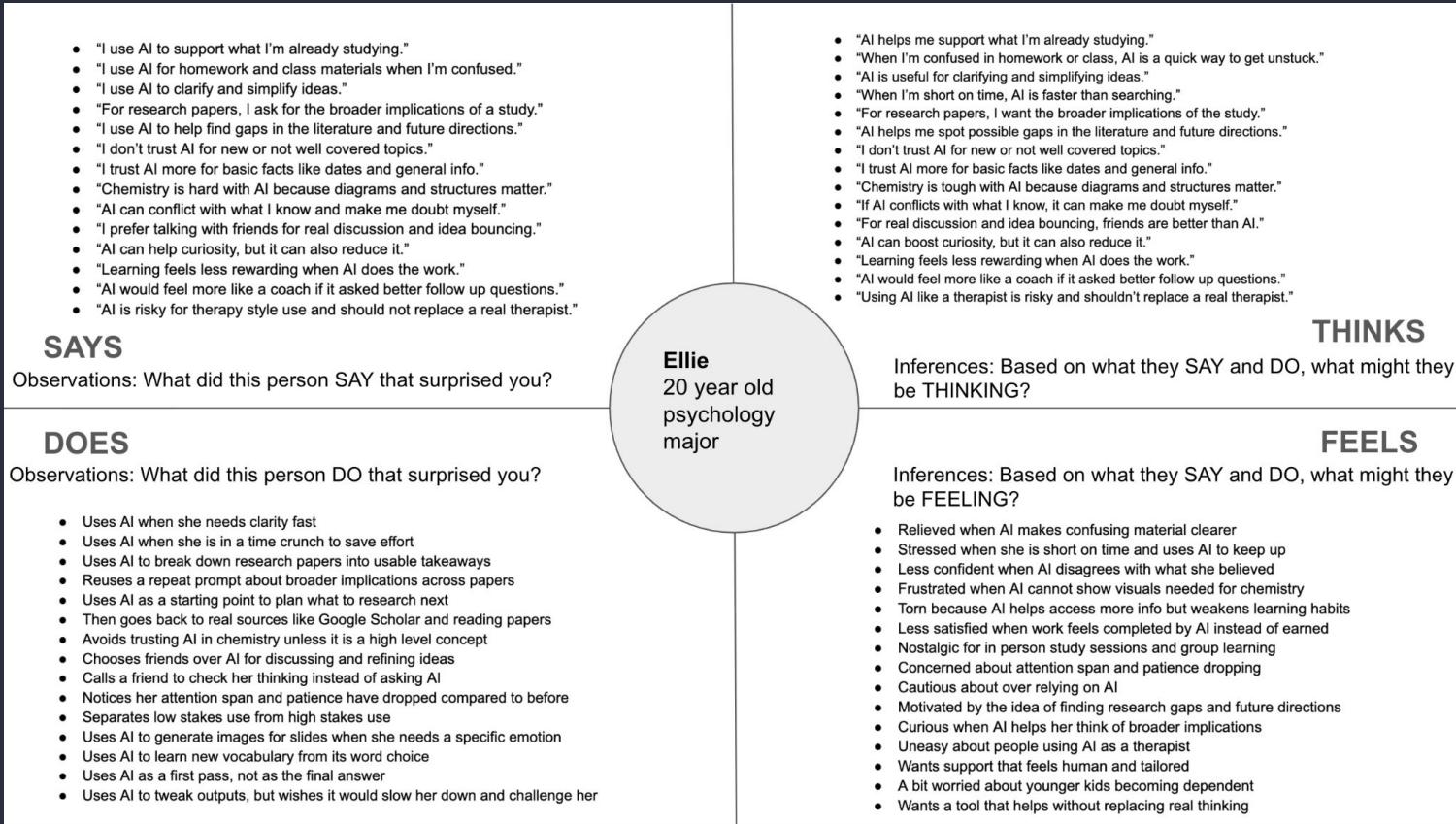
Interview #2
Ellie (20) - Psychology Major

We learned that she
- Is an **average** user
- uses AI as a research booster, not a replacement for thinking
- uses AI to move faster through papers and spot possible gaps
- trusts AI differently depending on the topic, and finds it weak for chemistry
- can feel less confident when AI makes her doubt her own intuition
- still feels human interaction is the best way to learn deeply
- wants AI to act more like a coach by asking better follow up questions

Empathy Map

SAYS
Observations: What did this person SAY that surprised you?

- "I use AI to support what I'm already studying."
- "I use AI for homework and class materials when I'm confused."
- "I use AI to clarify and simplify ideas."
- "For research papers, I ask for the broader implications of a study."
- "I use AI to help find gaps in the literature and future directions."
- "I don't trust AI for new or not well covered topics."
- "I trust AI more for basic facts like dates and general info."
- "Chemistry is hard with AI because diagrams and structures matter."
- "AI can conflict with what I know and make me doubt myself."
- "I prefer talking with friends for real discussion and idea bouncing."
- "AI can help curiosity, but it can also reduce it."
- "Learning feels less rewarding when AI does the work."
- "AI would feel more like a coach if it asked better follow up questions."
- "AI is risky for therapy style use and should not replace a real therapist."

THINKS
Inferences: Based on what they SAY and DO, what might they be THINKING?

- "AI helps me support what I'm already studying."
- "When I'm confused in homework or class, AI is a quick way to get unstuck."
- "AI is useful for clarifying and simplifying ideas."
- "When I'm short on time, AI is faster than searching."
- "For research papers, I want the broader implications of the study."
- "AI helps me spot possible gaps in the literature and future directions."
- "I don't trust AI for new or not well covered topics."
- "I trust AI more for basic facts like dates and general info."
- "Chemistry is tough with AI because diagrams and structures matter."
- "If AI conflicts with what I know, it can make me doubt myself."
- "For real discussion and idea bouncing, friends are better than AI."
- "AI can boost curiosity, but it can also reduce it."
- "Learning feels less rewarding when AI does the work."
- "AI would feel more like a coach if it asked better follow up questions."
- "Using AI like a therapist is risky and shouldn't replace a real therapist."

Ellie
20 year old psychology major

DOES
Observations: What did this person DO that surprised you?

- Uses AI when she needs clarity fast
- Uses AI when she is in a time crunch to save effort
- Uses AI to break down research papers into usable takeaways
- Reuses a repeat prompt about broader implications across papers
- Uses AI as a starting point to plan what to research next
- Then goes back to real sources like Google Scholar and reading papers
- Avoids trusting AI in chemistry unless it is a high level concept
- Chooses friends over AI for discussing and refining ideas
- Calls a friend to check her thinking instead of asking AI
- Notices her attention span and patience have dropped compared to before
- Separates low stakes use from high stakes use
- Uses AI to generate images for slides when she needs a specific emotion
- Uses AI to learn new vocabulary from its word choice
- Uses AI as a first pass, not as the final answer
- Uses AI to tweak outputs, but wishes it would slow her down and challenge her

FEELS
Inferences: Based on what they SAY and DO, what might they be FEELING?

- Relieved when AI makes confusing material clearer
- Stressed when she is short on time and uses AI to keep up
- Less confident when AI disagrees with what she believed
- Frustrated when AI cannot show visuals needed for chemistry
- Torn because AI helps access more info but weakens learning habits
- Less satisfied when work feels completed by AI instead of earned
- Nostalgic for in person study sessions and group learning
- Concerned about attention span and patience dropping
- Cautious about over relying on AI
- Motivated by the idea of finding research gaps and future directions
- Curious when AI helps her think of broader implications
- Uneasy about people using AI as a therapist
- Wants support that feels human and tailored
- A bit worried about younger kids becoming dependent
- Wants a tool that helps without replacing real thinking

Key Insights

AI Should Interrupt, Not Smooth

The most helpful version of AI would slow her down at the right moments. Asking better follow-up questions would turn AI from a shortcut into a thinking partner.

Human Interaction Still Anchors Understanding

Friends provide challenge, tone, and back-and-forth that AI lacks. Real dialogue helps her test ideas in ways AI responses cannot fully replicate.

Learning Without Effort Feels Hollow

When AI removes struggle, the outcome feels less earned. Even correct answers feel less satisfying, which weakens motivation and long-term engagement with learning.

AI Works Best as a First Pass

She treats AI like a rough sketch, not a finished product. Its real value is helping her orient herself quickly before she turns to primary sources and human discussion.

Expanding on past Needfinding

From **Nikola**, we expanded on previous interviews to learn that...

- Using AI doesn't have to be frustrating if it's presented right
- In the corporate world, results matter more than learning. However, workers would still like to learn if they can still get results
- Following the traditional curricula of a school or professional course can be too rigid; AI has the flexibility to adapt

From **Ellie**, we expanded on previous interviews to learn that...

- Trust in AI depends heavily on the subject; it feels reliable for general ideas but weak for visual or precision-based fields like chemistry
- Confident AI responses can cause users to doubt their own correct understanding
- Human discussion still feels essential for deep learning, idea testing, and motivation
- AI would be more helpful if it acted like a coach by slowing users down and asking better follow-up questions

POV Development

Initial POVs – Nikola

POV #1:

1. **We met** Nikola, a 30-year-old software engineer at Box, Inc. and a homeschooling father of 2
2. **We were surprised to learn** that he would "absolutely" use a tool that both taught and helped him do something over current tools that just do his work
3. **We wonder if this means** that people inherently want to learn, or know they should try to learn something, when they use AI to do something
4. **It would be game-changing if** Nikola were able to be quickly taught when he uses AI to do something

POV #2:

1. **We met** Nikola, a 30-year-old software engineer at Box, Inc. and a homeschooling father of 2
2. **We were surprised to learn** that Nikola dislikes the traditional school system and how it forces students to study things irrelevant to them
3. **We wonder if this means** that giving students full control over their learning journey will allow them to learn the best
4. **It would be game-changing if** students had a system that allowed them to control how and what they learned fully

Initial POVs – Nikola

POV #3:

1. **We met** Nikola, a 30-year-old software engineer at Box, Inc. and a homeschooling father of 2
2. **We were surprised to learn** that Nikola rarely gets frustrated while using AI, even while prompt engineering or when it makes mistakes
3. **We wonder if this means** that it's possible to reframe AI or emphasize that it's just a tool in such a way
4. **It would be game-changing** to present AI in a way that redirects and lowers frustration

POV #4:

1. **We met** Nikola, a 30-year-old software engineer at Box, Inc. and a homeschooling father of 2
2. **We were surprised to learn** that Nikola notes that AI has the same shortcomings that people do
3. **We wonder if this means** that many of the problems that AI has while teaching are more so user errors
4. **It would be game-changing** to try to mitigate these user errors

Initial POVs – Ellie

POV #1

1. **We met** a psychology student who uses AI to clarify research papers and identify broader implications for research direction.
2. **We were surprised to learn** that confident AI answers can conflict with what she already knows and make her doubt her own judgment.
3. **We wonder if this means** that trust and confidence, rather than access to information, are the main bottlenecks in using AI for research help.
4. **It would be game changing** to help students use AI for research synthesis while keeping their confidence and judgment intact.

POV #2

1. **We met** a student who uses AI to simplify confusing class content and save time when studying.
2. **We were surprised to realize** that when AI makes learning too easy, it can reduce motivation and make studying feel finished rather than rewarding.
3. **We wonder if this means** that the problem is not just accuracy, but that AI often removes the struggle that makes learning stick.
4. **It would be game changing** to make AI feel like a coach that builds understanding and curiosity without doing the work for the student.

Selected POVs

POV #1 - Ellie

1. **We met** a psychology student who uses AI to clarify research papers and identify broader implications for research direction.
2. **We were surprised to learn** that confident AI answers can conflict with what she already knows and make her doubt her own judgment.
3. **We wonder if this means** that trust and confidence, rather than access to information, are the main bottlenecks in using AI for research help.
4. **It would be game changing** to help students use AI for research synthesis while keeping their confidence and judgment intact

POV #4 - Nikola

1. **We met** Nikola, a 30-year-old software engineer at Box, Inc. and a homeschooling father of 2
2. **We were surprised to learn** that Nikola notes that AI has the same shortcomings that people do
3. **We wonder if this means** that many of the problems that AI has while teaching are more so user errors
4. **It would be game-changing** to try to mitigate these user errors

POV #2 - Ellie

1. **We met** a student who uses AI to simplify confusing class content and save time when studying.
2. **We were surprised to realize** that when AI makes learning too easy, it can reduce motivation and make studying feel finished rather than rewarding.
3. **We wonder if this means** that the problem is not just accuracy, but that AI often removes the struggle that makes learning stick.
4. **It would be game changing** to make AI feel like a coach that builds understanding and curiosity without doing the work for the student.

Our Top 3 HMWs...

And Associated POVs

HMW #1
HMW help users stay curious and feel the reward of effort after getting an explanation?

From **POV #2 - Ellie**
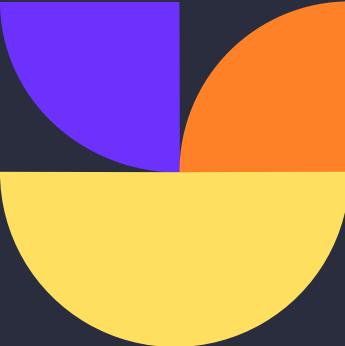
HMW #2
HMW adapt to different students' learning styles, needs, and responsibilities while staying personal?

From **POV #4 - Nikola**

HMW #3

HMW get users to build a habit of using their own judgement and intuition on an explanation before accepting so that they trust themselves more?

From **POV #1 - Ellie**

Our Initial Solutions

Solution #1
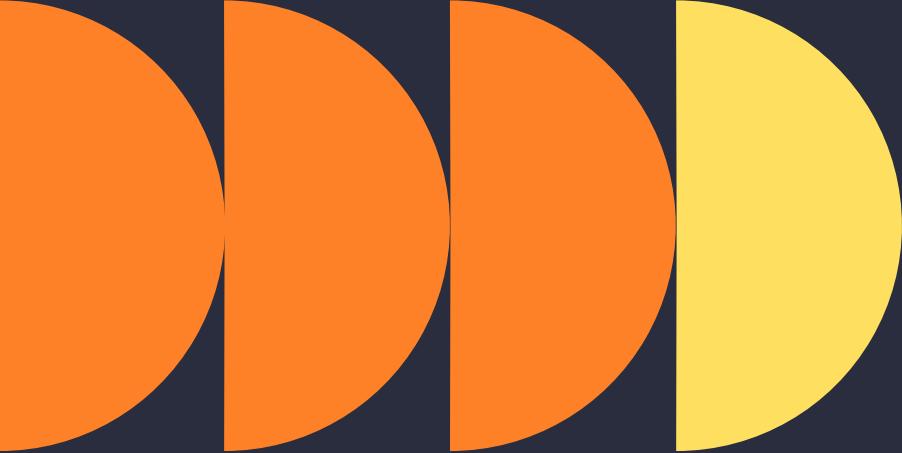
An open-world game that explains topics by treating each one as a quest that sends users across the map to unlock varying explanations and quizzes

Solution #2

An argumentative AI that "fights" the user to gain further context, stimulate the user, and targetthe specific areas that they need help with using adaptive teaching modes

Solution #3

Contradiction detector that asks what you thought before and then flags where the AI answer disagrees with that belief.

Experience Prototypes

Solution #1 Experience Prototype

Solution #1

An open-world game that explains topics by treating each one as a quest that sends users across the map to unlock varying explanations and quizzes.

Critical Assumption

Students will stay engaged through the full loop and finish the quiz instead of skipping ahead or quitting early.

Description

- A google doc detailing the time constraints, quest, and goal of the game
- A series of questions detailing the game, similar to a text-based RPG

Results

- High user satisfaction
- We learned that the game's format gave users control, which they liked
- Users said they'd do this instead of doomscrolling, etc.

Solution #1 EP Results

We learned…

- This learning format was engaging, as users enjoyed having freedom to explore
- The open structure encouraged curiosity, but did not consistently push users to reflect on what they already knew
- One user described it as "interesting, but easy to skim through"
- It sparked interest in topics, but did not always fill gaps in understanding
- Our assumption was partially verified
- We would likely refine this by adding more structure and checkpoints

Our Experience Prototype:

Quest study
Calculus edition

Mission
Unlock the chain rule and beat the final quiz boss.

Rules
You choose A or B at each step.
You answer the checkpoint in each scene to move on.
You can ask for one hint one time during the whole quest.

Start choice
A. Go to Pattern Town
B. Go to Example Street

If you pick A go to Scene 1A
If you pick B go to Scene 1B

Scene 1A
Pattern Town

Quick idea
The chain rule is for a function inside a function. You take the derivative of the outside, then multiply by the derivative of the inside.

Checkpoint 1
In one line, tell me what the chain rule does.

Choose next
A. Go to Inside Out Gate
B. Go to Derivative Match Camp

Scene 1B
Example Street

Quick example
Differentiate (3x plus 1) squared.
Outside is something squared. The derivative of u squared is 2u.
Inside is 3x plus 1. The derivative is 3.
Multiply them to get 2(3x plus 1) times 3.

Solution #1 EP Results

Checkpoint 1
In one line, what is u in this example.

Choose next
A. Go to Inside Out Gate
B. Go to Derivative Match Camp

Scene 2A
Inside Out Gate

Quick idea
Step 1. Identify the inside function u.
Step 2. Differentiate the outside with u kept as a symbol.
Step 3. Multiply by du over dx.

Checkpoint 2
Differentiate (5x minus 4) cubed. Write your answer.

Choose next
A. Go to Spot the Trap Bridge
B. Go to Build Your Own Camp

Scene 2B
Derivative Match Camp

Quick idea
If you see parentheses with an exponent, that is a chain rule signal.
If you see sin, cos, ln, or e raised to something, that is also chain rule.

Checkpoint 2
Pick one that needs chain rule.
A. x to the fourth
B. (x to the fourth plus 2) to the fifth

Choose next
A. Go to Spot the Trap Bridge
B. Go to Build Your Own Camp

Scene 3A
Spot the Trap Bridge

Quick idea
A common mistake is forgetting the inside derivative.
Another common mistake is distributing the exponent wrong.

Checkpoint 3
True or false. The derivative of (2x plus 7) squared is 2(2x plus 7).
If false, write the correct derivative.

Go to Scene 4

Scene 3B
Build Your Own Camp

Quick idea
You get better at the chain rule when you can name the inside function quickly.
Say the inside out loud first.

Checkpoint 3
Let u equal 4x minus 1. Differentiate u to the fourth. Write your answer in terms of x.

Go to Scene 4

Scene 4
Final quiz boss

Answer without help first.

Q1
Differentiate (x squared plus 1) to the sixth.

Q2
Differentiate sin(3x).

Q3
Differentiate e to the power 2x.

Finish
Rate this experience from 1 to 5 for engagement.
4

Would you do another topic like this for calculus. Yes or no.
Yes

What part made you want to continue.
Picking between paths made it feel like I had control, and the checkpoints kept me locked in because it felt like I was actually progressing instead of just reading.

What part should be shorter?
Some of the explanations could be a little shorter, especially if I already understand the idea, so I can get to the next choice faster.

Did it feel like a game or work?
More like a game, because it had a clear mission and branching paths, but the quiz parts made it feel slightly like school in a good way.

Would you do this instead of scrolling social media for 5 minutes?
Yeah, especially if it's short and I can finish one quest fast and feel like I learned something.

Solution #2 Experience Prototype

Solution #2

An argumentative AI that "fights" the user to gain further context, stimulate the user, and target the specific areas that they need help with using adaptive teaching modes.

Critical Assumption

The AI will be able to fully gauge the user through its questions and determine what adaptive teaching modes to use

Description

- A google doc simulating an AI chatbot entry window
- The user will type in queries, and the simulated AI (played by Gautam) will give responses
  - The first response will ask the user to explain their existing understanding
- The AI will *not* immediately give a full response
  - It will give little bites of information before asking the user to think more

Solution #2 EP Results

We learned...

- This AI strategy worked well, as the user was very satisfied and learned strongly
- The constant prompting by the AI forced them to continue to think about what they already knew
    - They called it "almost a guided explanation to myself"
- It filled in the gaps in their knowledge
- Our assumption was verified
- We'll likely try to integrate this into our solution

Airgu - Argumentative AI

A *Challenging* AI.

What would you like to learn about today, David?

>> How do slot machines in Vegas work?

Slot machines in Vegas have users spin a lever in hopes of having three spinners land on the same icon. What research have you done so far – what do you know so far?

>> I haven't done any research and my knowledge is limited, but I have an understanding that these games are probably rigged in some way in the casino's favor.

Your understanding is correct in that the games are not truly random. If you were to make a "rigged" machine, what sort of mechanism, at a high level, would you use to make certain outcomes more possible?

>> I don't have much of an idea, maybe you could use the physical structure of the machine in some way, by weighting certain outcomes differently or adjusting the number of each potential option that could be landed on

That's not a bad idea, but in today's world, physics or probability theory has been replaced with software. Slot machines generate a spin through a software random-number generator (RNG). This random number is then used to look up a certain response stored in an internal "payout table". How do you think such a table can be rigged when given a single number?

>> There could be considerably more numbers associated with relatively low payouts or no payout at all, and many less associated with higher payouts or jackpots. Assuming the setup of the payout table is in the casino's control they could determine exactly what probability of winning they want the player to have.

Solution #2 EP Results

Good instincts! Within the table, the total range of inputs is partitioned into contiguous blocks, each block mapped to a specific outcome (symbol combination or prize). Large blocks correspond to common low-pay or losing outcomes, small blocks to rare high-pay outcomes. When the generator outputs one number, the software checks which block it falls into and returns the corresponding result. Because the block sizes are proportional to desired frequencies, long-run outcome frequencies converge to the programmed distribution. Inputs are encoded spatially, as you guessed!

Now, how do you think the spinning wheels work in relation to this?

>> I assume the spinning wheels are programmed to land on a result that gives the player the payout that has already been determined by the random number generator, in order to give the player an illusion of the physical randomness they may have gotten from older slot machines.

That's pretty close! Virtual reels, as they're called, are a *presentation* layer on top of this. Internally, each reel is a list with repeated symbols, where repetition count represents probability. The generated number either directly indexes into this list or selects a combination of reel stops derived from it. The payout table then maps the resulting symbol pattern to a payout amount. The expected value is computed in advance as (sum over all outcomes of probability × payout), and regulators require this value to match the declared return percentage.

>> Ok, thank you, I understand.

Would you like to learn more, like about other typical machines in Casinos?

>> No, thank you

Okay! Before you go, do you think you learned well? Did the conversational or argumentative style help you understand better?

>> Yes, I appreciated that my learning was built off of my existing knowledge, in which I was repeatedly asked to think about what I already knew about the topic, even if that knowledge stemmed from other contexts. This resulted in almost a guided explanation to myself, in which my general knowledge was applied to a specific topic, with the gaps in my understanding - which were fewer than I initially thought - were filled in.

Thank you!

Solution #3 Experience Prototype

Solution #3

A contradiction detector that asks what you thought before and then highlights the difference between your answer and the AI answer.

Critical Assumption

That users will gain any insight from seeing the difference between their answer and the AI answer.

Description

- A google doc simulating an AI chatbot entry window
- The user will type in queries, and the simulated AI (played by Gautam) will give responses
  - The first response will ask the user to explain their existing understanding
- The AIs responses will be highly comparative:
  - It will generate its own response
  - It will visually highlight the difference between its response and the user and explain

Solution #3 EP Results

We learned...

- This AI strategy was also good, and the user felt like they had learned about their mistakes
- They said that the visual highlighting made it easy to understand the gaps in their knowledge
- Our assumption was verified
- We will try to integrate this into our solution going forward

ContrAlon - Guess and Check AI

Simply type in what you think you know, and the AI will build on that!

What would you like to learn about today, Jordan?

>> explain solving first order differential equations

What do you know about that already?

>> Usually you may look to separate the dy and dx before integrating both sides of the equation, and then if given values you can plug them in.

Here's the difference between what you said and what I came up with:

You: "Usually you may look to separate the dy and dx before integrating both sides of the equation, and then if given values you can plug them in."

Me: "If the equation cannot be solved using integrating factors, and the independent and dependent variables can be separated, then you may move the terms of y to the left side and the terms of x to the right side (including dy and dx) using multiplication and division. Then, you can integrate each side, and then, you can simplify both sides so that the left side is just y. Then, if given an initial condition, you can substitute the given x for x and the given y for y and solve for C (the constant factor). Then you will have your final solution."

Here's where we differed:
- **Pink** - first, you can check if you can use integrating factors. For a first-order linear differential equation written as y' + P(x)y = Q(x), the integrating factor is a function built by taking the exponential of the integral of P(x); multiplying the entire equation by this function forces the left side to collapse into the derivative of a single product, specifically the derivative of (integrating factor × y), after which you integrate both sides with respect to x. Then, solve for that product and finally divide by the integrating factor to isolate y.
- **Black** - before plugging in "values", you need to simplify both sides
- **Green** - the given "values" are called an initial condition, which can vary depending on the specific solution to the differential equation. Because this can vary for every differential equation, it's important to clarify.
- **Blue** - To "plug them in", you substitute the generic values for your specific value, and solve for C.

Would you say you understand better, now? Did the visual highlighting help?

>> Yes, the visual highlighting made it more obvious which differences between my explanation and the given explanation were being identified, which helped me understand exactly where my existing knowledge fell short.

Our Final Solution

We are moving forward with a combination of solution #2 and #3

- We will create an interactive chatbot that forces the user to think by continually challenging them
  - Instead of giving them all of the information at once, it will spoon feed snippets of information and ask them to think harder
  - Additionally, when the user provides their own information or research, the chatbot will compare its own answer to that answer and visually highlight the difference
- **EVIDENCE:** We chose a challenging, step-by-step chatbot that drip-feeds information and pushes users to think, because users said it felt like "almost a guided explanation to myself" and it helped fill gaps in their knowledge. It also compares the user's answer to the AI's and highlights differences so students and early researchers can see what to fix without losing confidence.

Our Final Solution

We are moving forward with a combination of solution #2 and #3

- Our product, before any query, will have two text entry fields – one for the topic and one for their initial information
- This product will serve a wide variety of users, including both corporate and academic users.
  - By asking for research, it will force corporate workers to do more research that will lead to higher quality, faster work
  - By forcing users to think more, it will teach students better

Appendix

Extra Content

Solution Brainstorming (Final Solutions highlighted & underlined)

HMW help users stay curious and feel the reward of effort after getting an explanation

Before explaining, ask users what specifically excites them about what they're learning, and use that to explain more engagingly

A game that rewards users with XP or ELO for proving their understanding

A vocal chatbot that explains topics open-endedly, forcing the user to ask for clarification

An AI that generates visual explanations that also link to related, interesting topics throughout

An AI that generates videos explaining a subject that then autoplays related topics

An interactive AI that asks about a subject, quizzes the users on the topics they find the most relevant, and then teaches with that in mind

An interactive "textbook" that adapts the contents of its pages for a topic, with interjections with related topics

A customizable level-based game, where each consecutive level is a deeper insight into a topic

An app that prompts users at specific times of the day to learn something new or to expand on a specific given topic

An AI that does a task but locks the full output through various explanations and quizzes

A conversational AI that asks users to extrapolate an explanation from hints
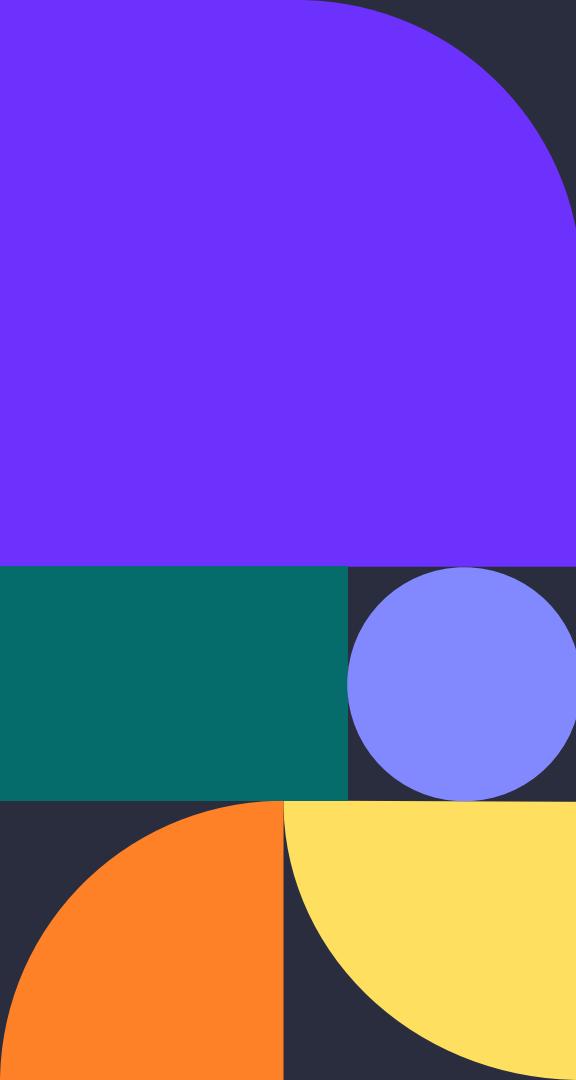
An open-world game that explains topics by treating each one as a quest that sends users across the map to unlock varying explanations and quizzes

HMW adapt to different students' learning styles, needs, and responsibilities while staying personal

1. An app that "onboards" users to personalize it
2. A conversational AI that embeds diagrams or other visuals with every explanation
3. An argumentative AI that "fights" the user to gain further context, stimulate the user, and target the specific areas that they need help with using adaptive teaching modes
4. An AI that, using camera input, analyzes body cues while prompting the user to understand their response or comfort level
5. An app that constantly switches between lecturing, games, and other tools to teach
6. A whiteboard app that positions the AI as just another user that draws and writes to explain (like a peer)
7. Learning style selector that saves preferences like examples first, steps first, visuals, or summaries.
8. Adaptive pacing that detects rushing or stuck moments and shifts between hints, full explanation, or practice.
9. Flexible scheduler that accounts for work shifts and busy days with smaller chunks and adjustable goals.
10. Personal context profile that remembers weak spots, current classes, and trusted resources to tailor responses.
11. Multi format toggle that converts one concept into a diagram style explanation, example, flashcards, or summary.
12. Quick check in prompts that ask what you know and what is confusing, then adapt the explanation.
13. Mode switching that offers coach mode, quick answer, or review based on time and stress.

HMW get users to build a habit of using their own judgement and intuition on an explanation before accepting so that they trust themselves more

1. First guess card that makes the user type their own answer before the AI response unlocks, then shows a side by side comparison.
2. Confidence slider on every answer that captures pre and post confidence and shows a weekly self trust trend.
3. Hint ladder UI that reveals one hint at a time and requires the user to choose the next step before the full solution appears.
4. Teach a back box that asks the user to explain the idea in two sentences and then gives targeted corrections in line.
5. Two path views that show the user's reasoning on the left and the AI reasoning on the right with overlaps highlighted.
6. Verify a bar that offers one tap checks like open a source link, run a quick example, or compare to class notes.
7. Red flag badges that label risky claims as uncertain, missing sources, or likely hallucination based on built in checks.
8. Contradiction detector that asks what you thought before and then flags where the AI answer disagrees with that belief.
9. Practice generator that turns the explanation into two similar problems and asks the user to solve one before moving on.
10. Socratic coach mode that responds mostly with questions and only gives the final explanation after the user attempts it.
11. Source trace panel that shows where each major claim came from and lets the user rate the source trust level.
12. Personal rules library that saves the user's own heuristics like check units or define variables first and surfaces them at the right time.
13. My mistakes gallery that stores times the user caught the AI wrong and turns them into quick drills for future recognition.
14. Trust badge system that rewards using verification steps and shows a confidence score based on real checks.

Thank you!