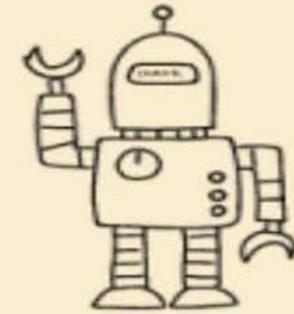
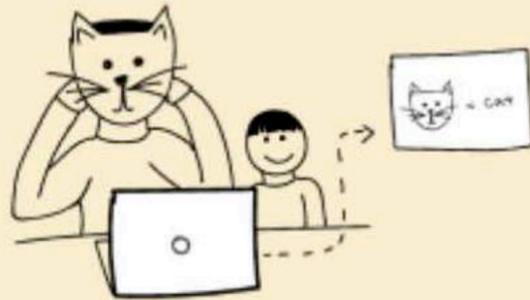
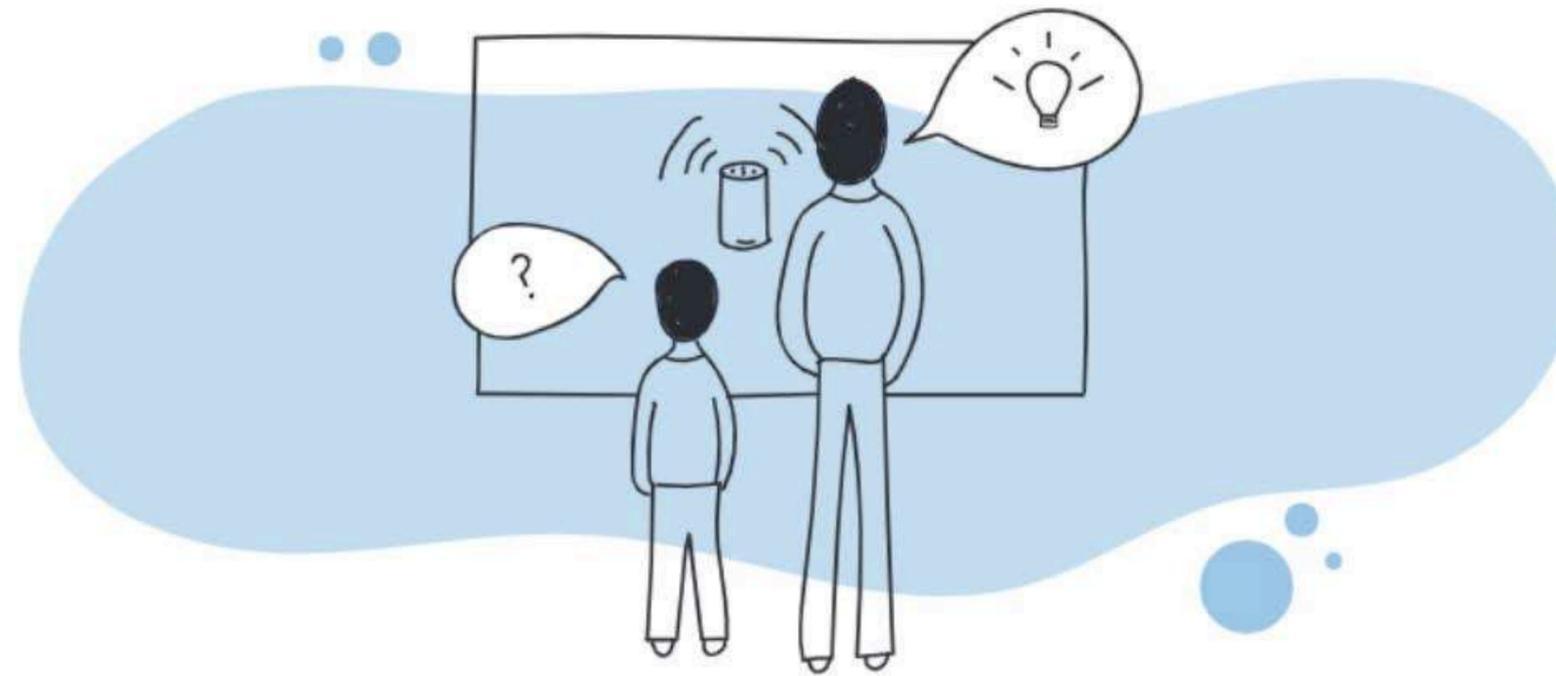


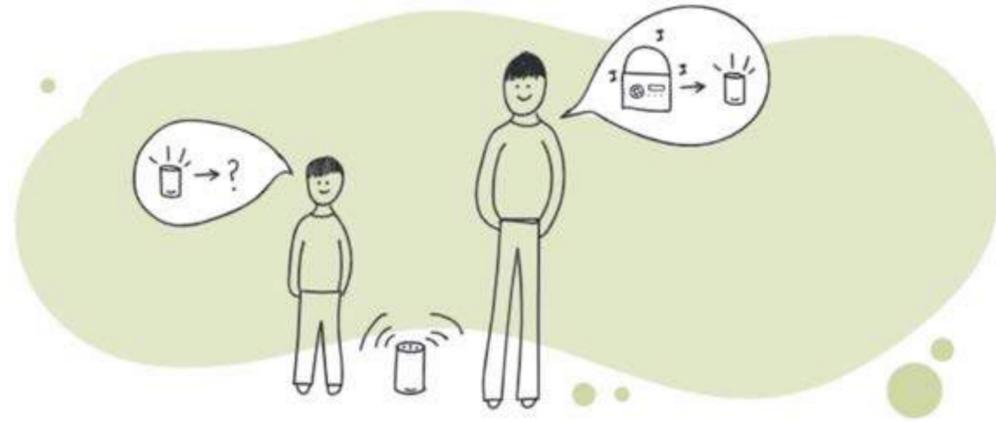
Family as Third Space for AI Literacy



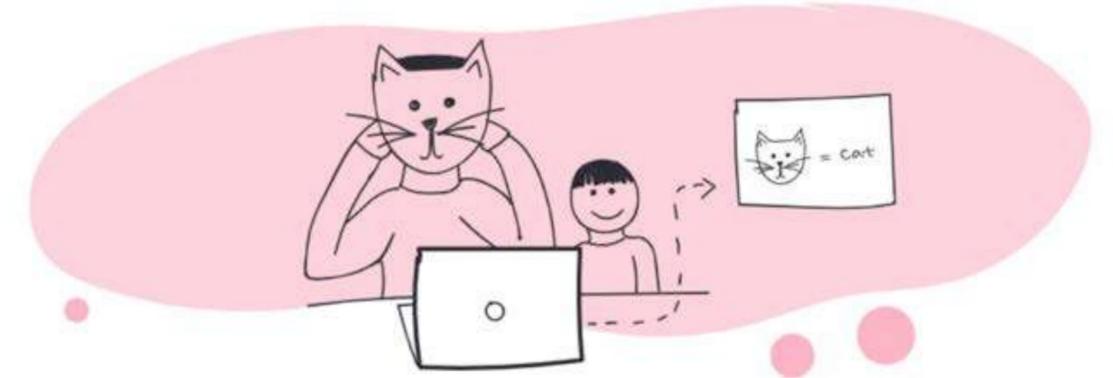
Growing up with AI



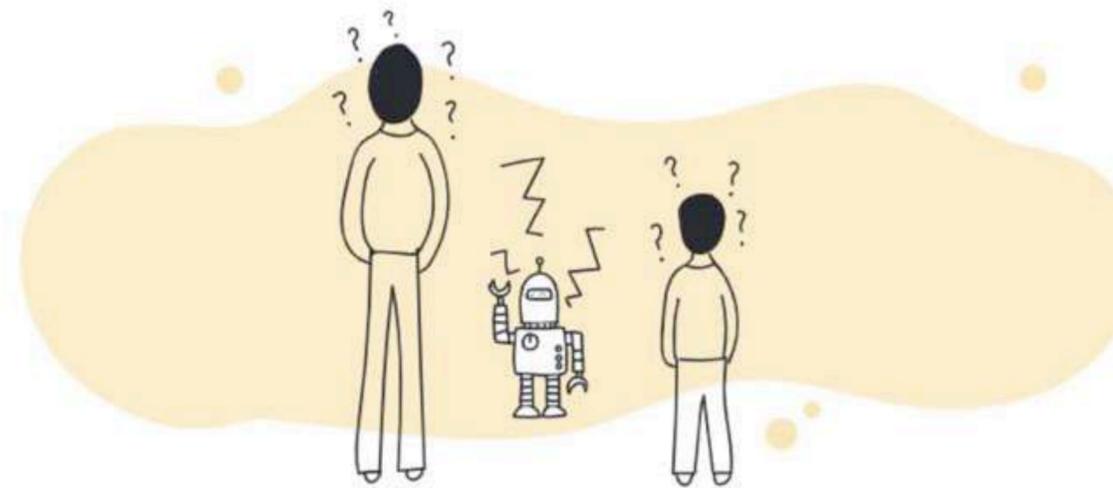
What we know



Family learning & Technology
(Barron et al. 2009)



Family AI Literacy
(Druga et al. 2020
Long et al. 2020)

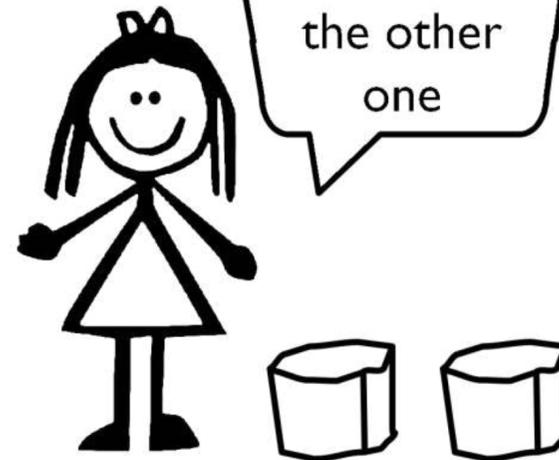


Family Media Join-Engagement
(Stevens & Takeuchi 2011)

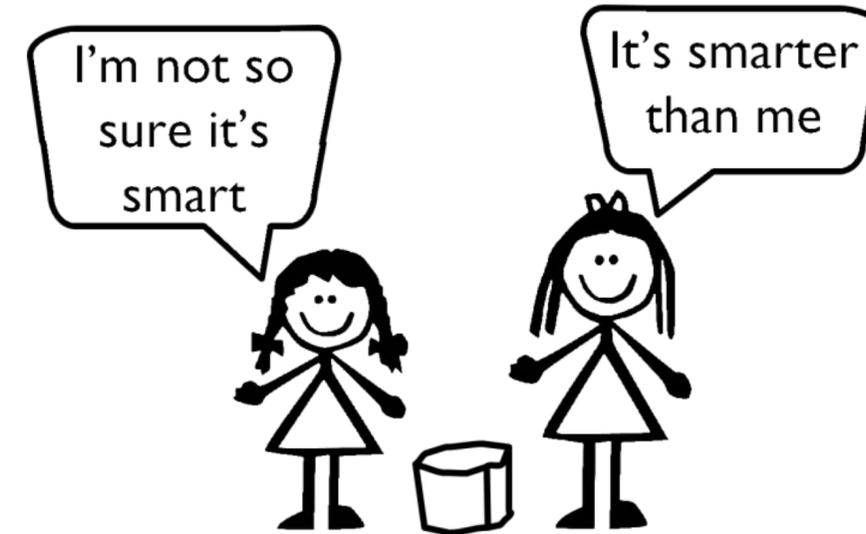
Initial Perceptions Matter



Children perceived agents as friendly and truthful

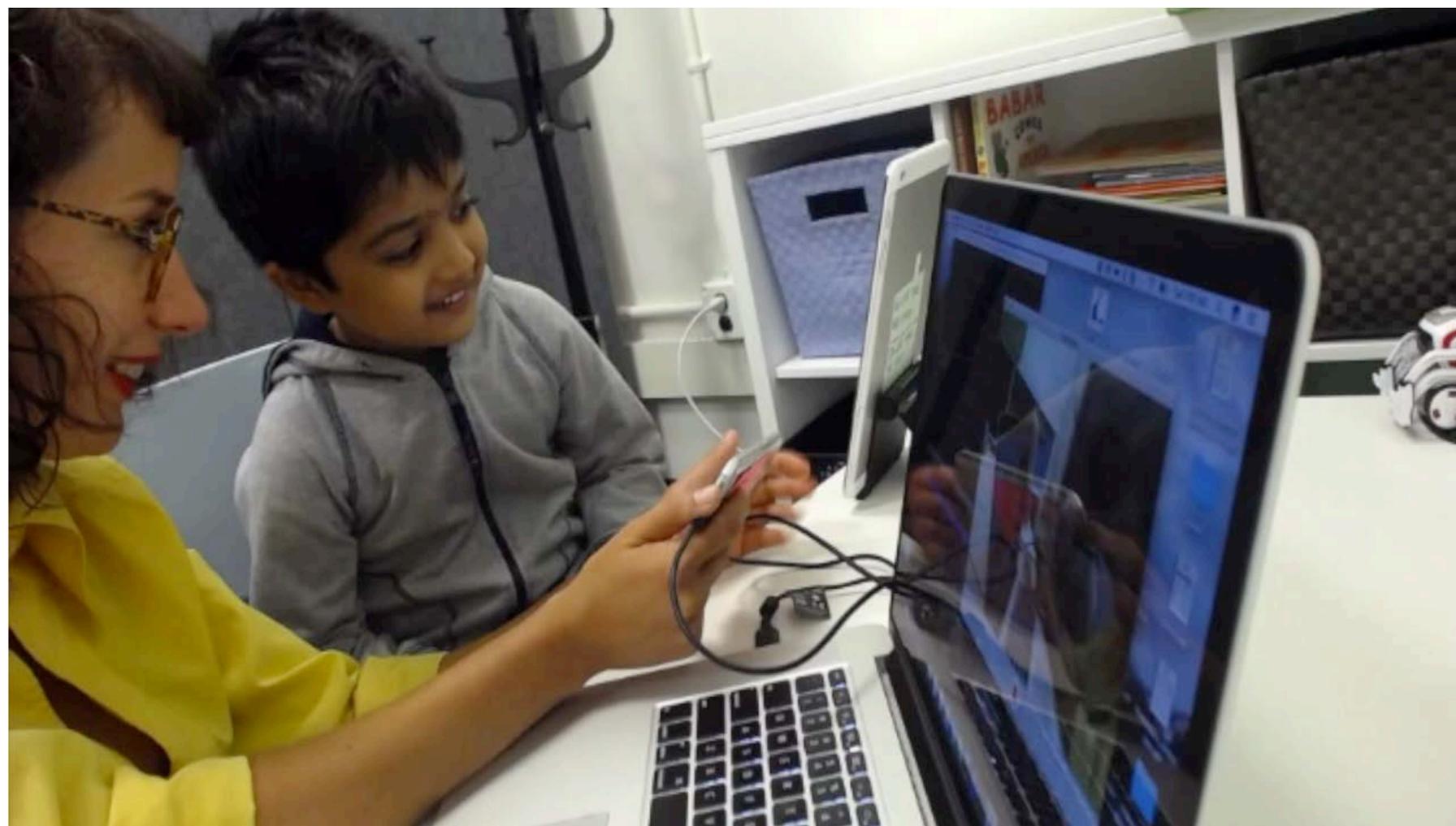


Children treated different devices (e.g. two Alexas) as completely independent



Age made a difference in how intelligence was perceived

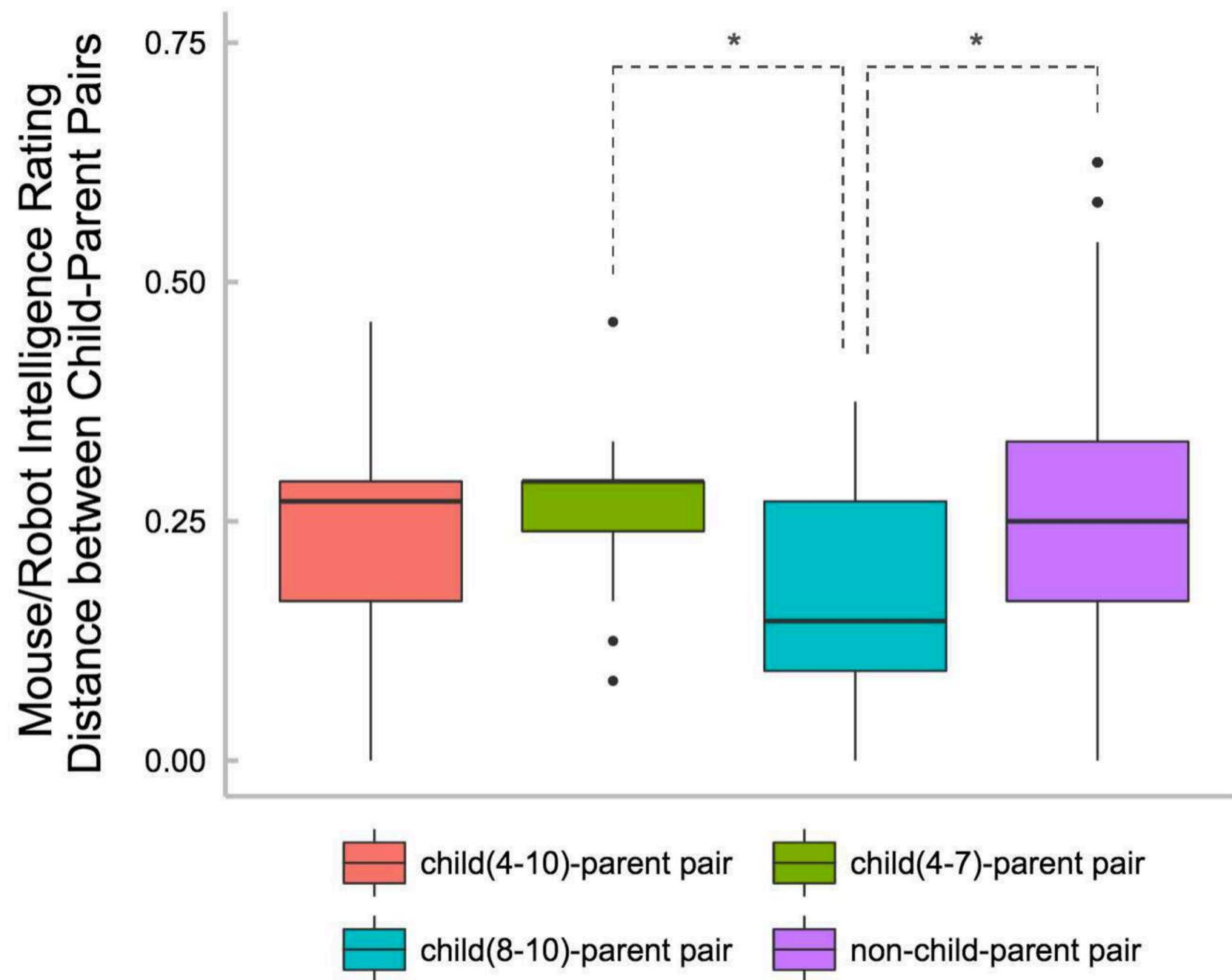
How smart are the smart toys?



- *"I would choose the mouse as smarter because the mouse is an animal, the robot is programmed by humans"- Olivia, 9 years old.*
- *"Either the robot is being driven by a person with a remote control, or by software, and either way it's not smart because it's not alive."- Lucas's mom.*
- *"The robot was more fluent. It's similar to the mouse, but since the robot was programmed by humans it could go through the maze more easily."- Mason, 8 years old.*

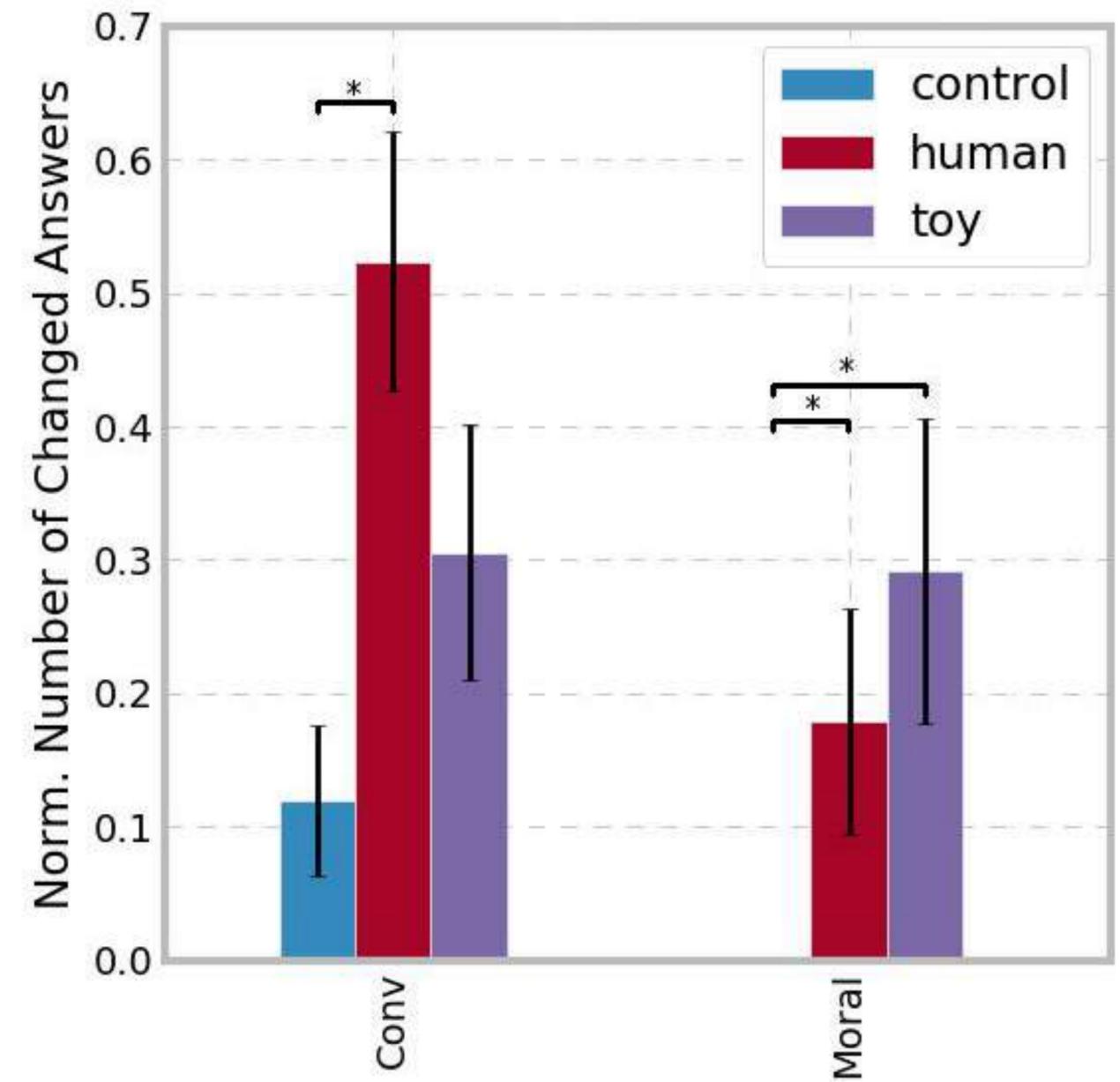
Stefania Druga, Randi Williams, Cynthia Breazeal. "How smart are the smart toys ?"- Children's and parents' attributions of intelligence to computational objects." IDC. 2018

Older children attribute to AI more similarly to their parents



Study participants:
30 pairs of children(4-10
years old) parents. Children
mirrored parent's choices
and arguments for more
intelligent agent.

Intelligent toys are influencing children moral decisions



Randi Williams, Christian Vazquez, Stefania Druga, Pattie Maes, Cynthia Breazeal. "My Doll Says It's OK: Voice-Enabled Toy Influences Children's Moral Decisions." IDC. 2018

Programming with AI



Shady Hill Private School



ESCS Public school

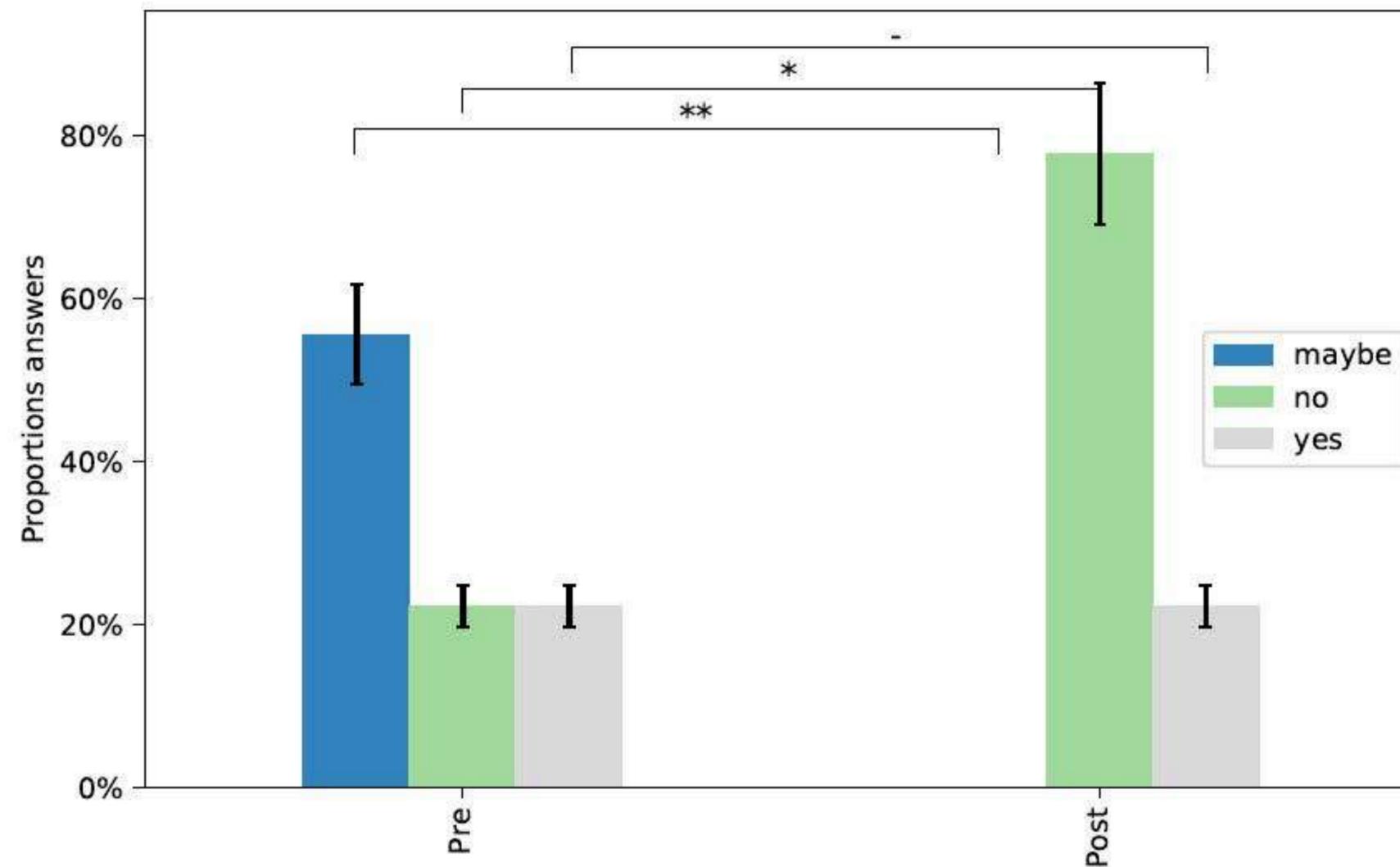


EPH Public Center



Empower Private Center

Is it smarter than you? (pre/post)



AI literacy for families

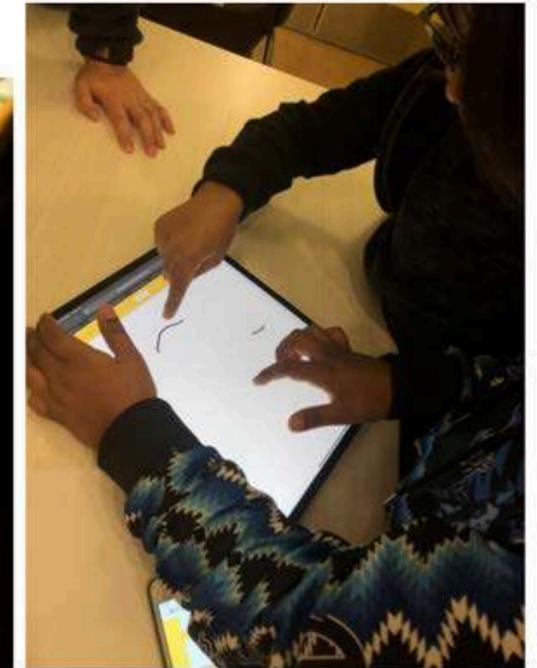
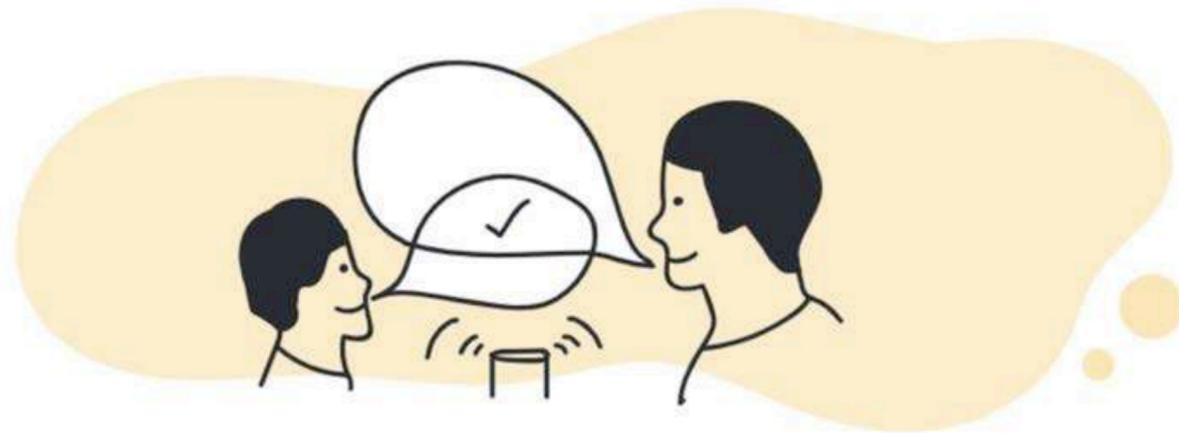


Figure 10: Examples of ways in which children were trying to trick the AI

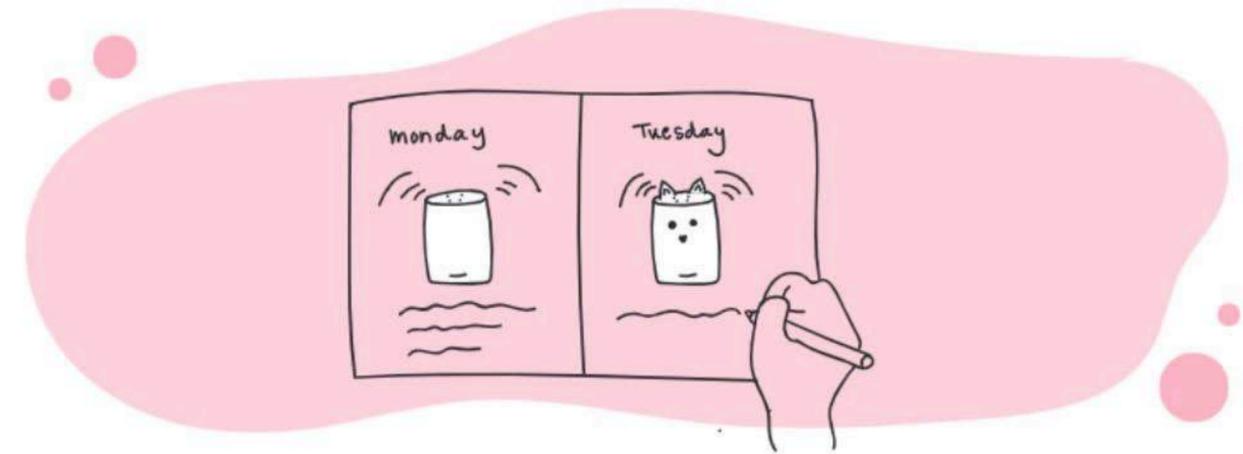
AI literacy for families



What we want to learn

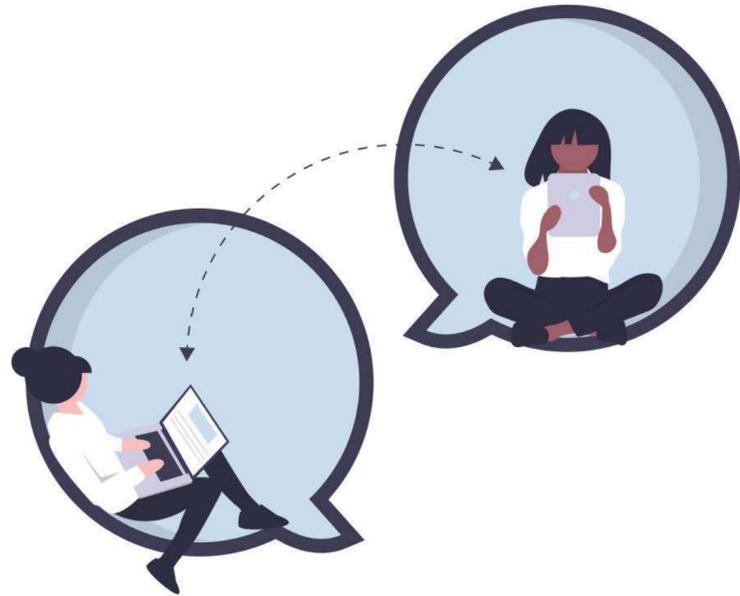


RQ1: How do children and parents learn about AI together?

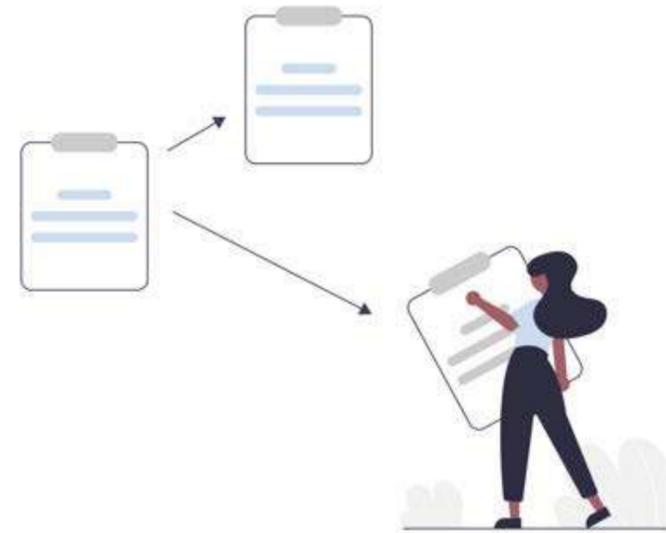


RQ2: How can we design learning supports for family AI literacies?

Study design



15 families
34 participants
11 languages
10 USA states



5 Weeks In-Home
11 activities
5 sessions/family



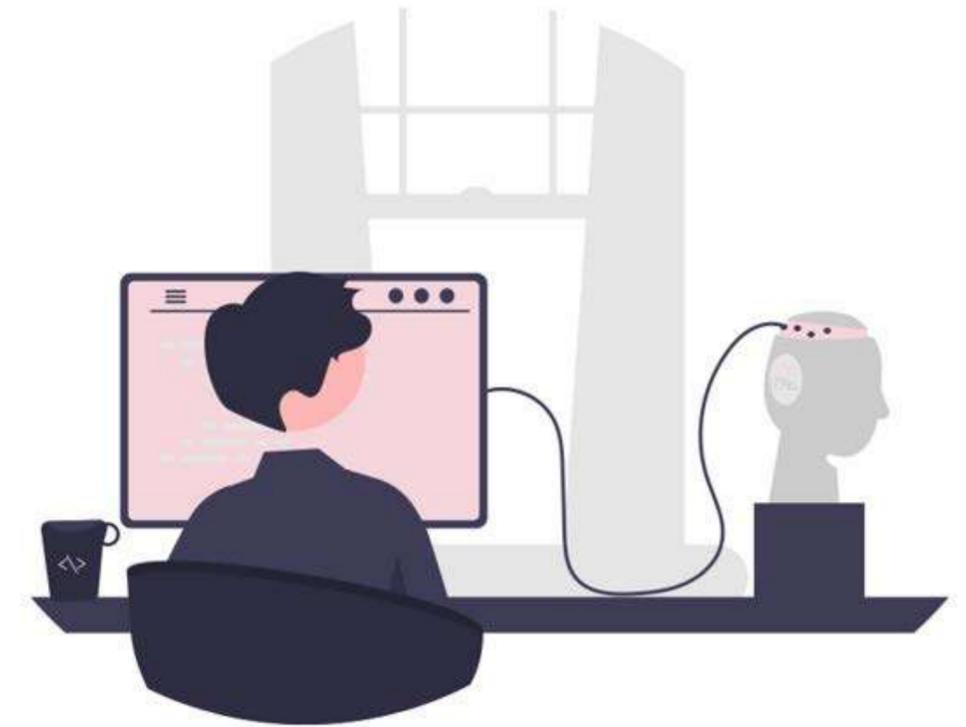
Theory of Multiple Literacies

1. Situated Practice
2. Over Instruction
3. Critical Framing
4. Transformed Practice

(New London Group 1996)

Initial perceptions of AI

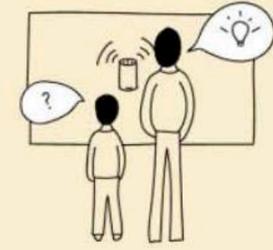
“I would like an app where you can add personal information. It’d be nice if they [AI devices] don’t know unless you give them that information. Otherwise, it seems creepy” — R., mom F11.



“Siri has a lot trouble recognizing my voice, which annoys me.” — J., mom F9, who speaks Spanish as a first language

Session 1 - Image Classification

Learn more about how computers classify images



Coral Learning Activity

Image classification for families



Classification Game

Classify Coral Images



Anchor Game

Pick Segments of Coral Images

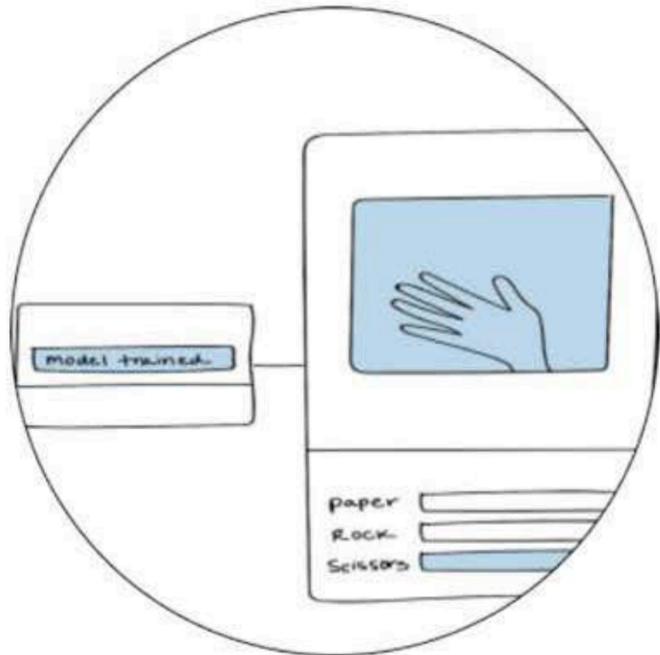
Findings Image Classification



“A computer would make mistakes because everything makes mistakes. Because computers, they are just people programming something new.” — L., daughter F8.

Session 2 - Machine Learning

Teach a machine to learn from your examples



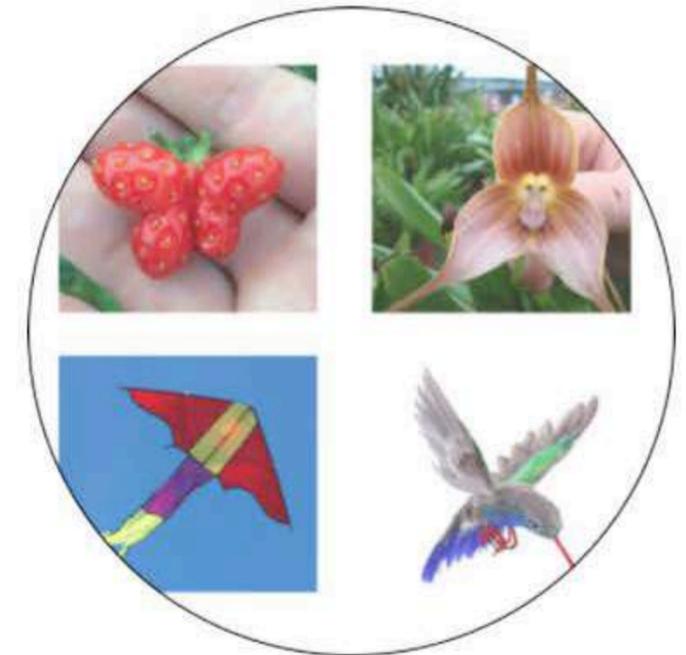
Scavenger Hunt

Machine Learning Game



Detect Home Objects

Mobile Apps for Object Detection



Guess Prediction Game

Guess Machine Object Predictions

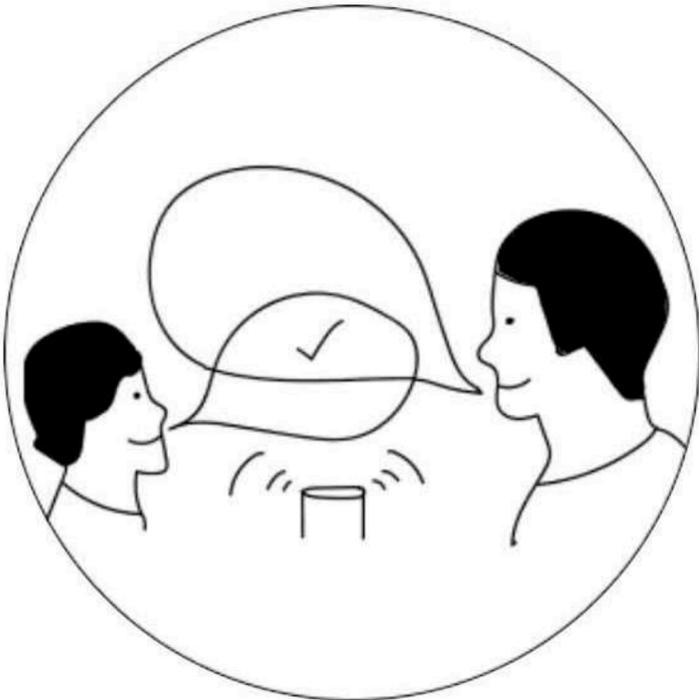
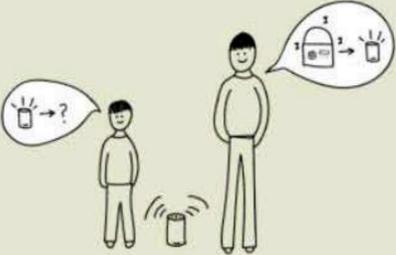
Findings Machine Learning

The screenshot displays a machine learning training interface. On the left, two classes are defined: 'Zoo Pass' with 33 image samples and 'Xbox One Controller' with 30 image samples. Each class has 'Webcam' and 'Upload' buttons. A central 'Training' panel shows 'Model Trained' and an 'Advanced' dropdown. On the right, a test image of a hand holding a green can is shown. Below it, the 'Output' section displays prediction bars for 'Gum' (99%), 'Zoo Pass', 'Xbox One Contr...', and 'Zoo Pass'.

“We should probably aim it at the ceiling, cause we have a bunch of pillows [in the background].” — A., son F11, suggesting how to fix the background being noisy when training the AI.

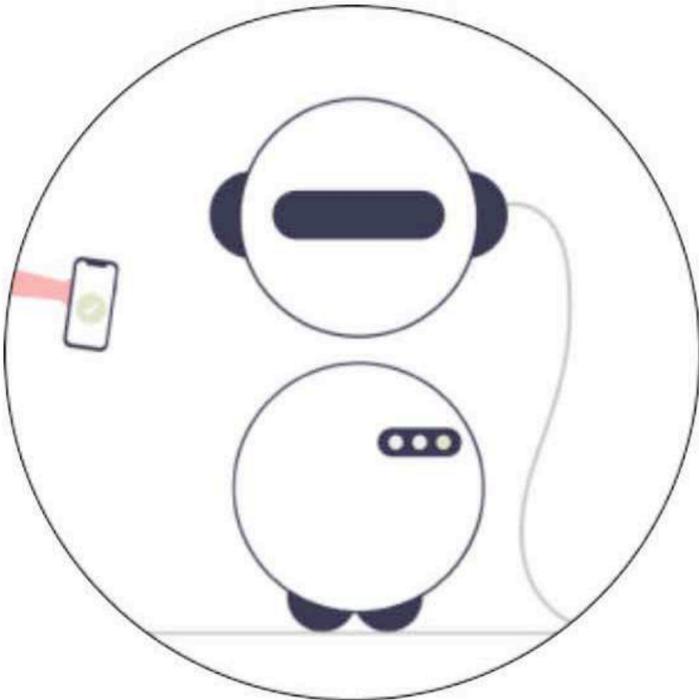
Session 3 - Voice Assistants

Learn how to play with & better understand voice assistants



Ask AI

Voice Assistants Family Game



Draw How it Works

What is inside Alexa?

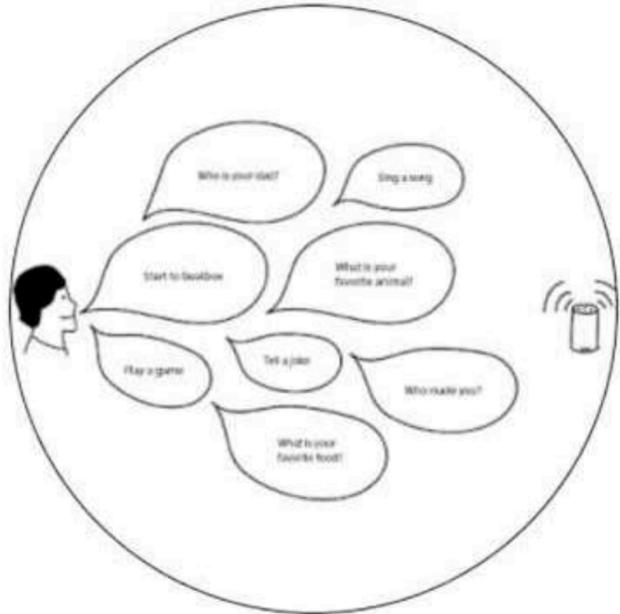
Findings Voice Assistants

Questions	Family members' answers	AI's answers
Do I have any pets?	Yes you do.	I couldn't say.
How's the weather today?	It is sunny and warm; there are some clouds.	It is cloudy and 70 degrees... 69 degrees at night...
Can you recite the first 10 digits of pi?	The answer is 3.1457629...	Okay... the first 10 digits of pi... here is... (showing websites)
Which came first : the chicken or the egg?	That's a trick question... If I knew the answer to this question, I would be the... philosopher...	It appears that human civilizations awfully preoccupied by this question...
Come up with your own questions!		
Why does a t-rex have tiny arms?	Because they run around using their legs and they don't need big arms...	National geographic... (showing articles related to t-rex).

“If Alexa was smart enough, she could have seen (...) we don't order any of the pet products, which probably means that we don't have pets.” — R., son F3 talking to his mom.

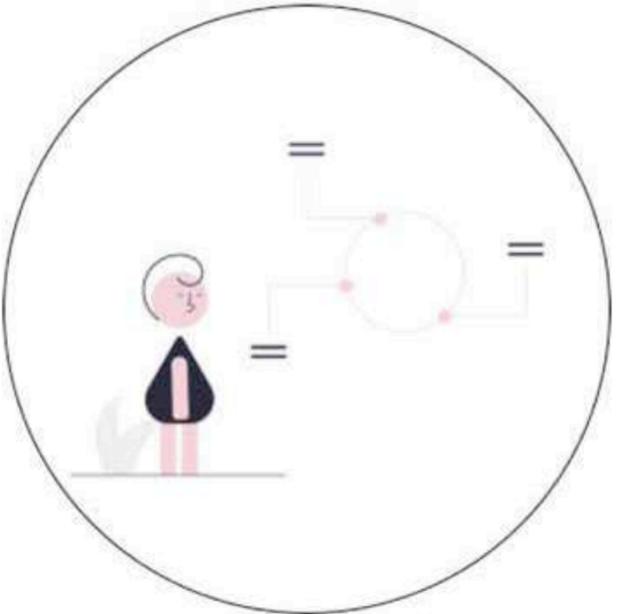
Session 4 - Design & Analyze AI

Design your own AI device



Design AI

Design Smart Assistants



Analyze AI

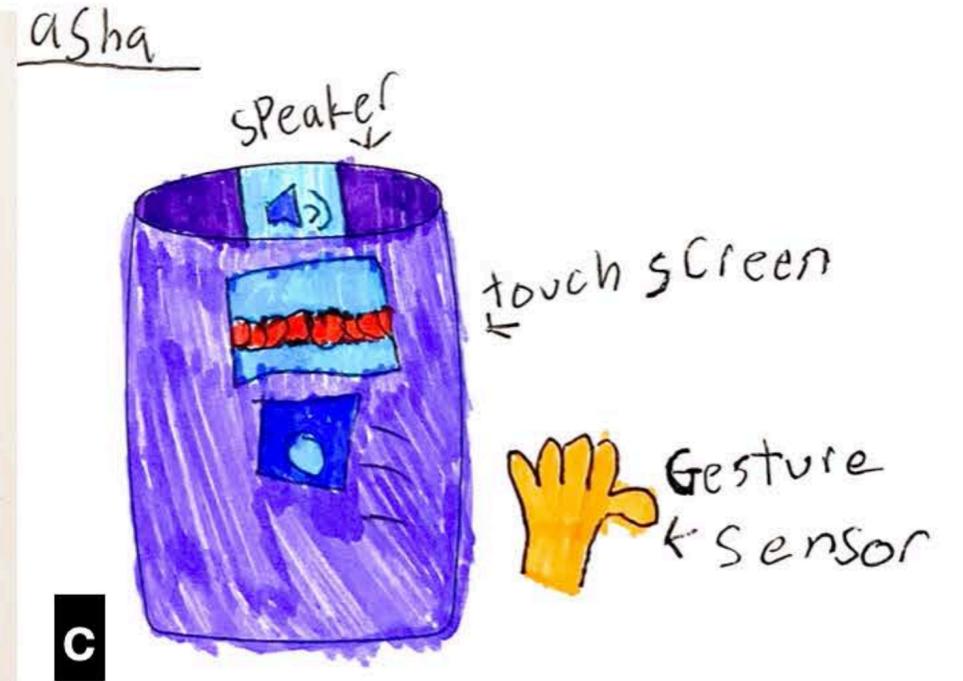
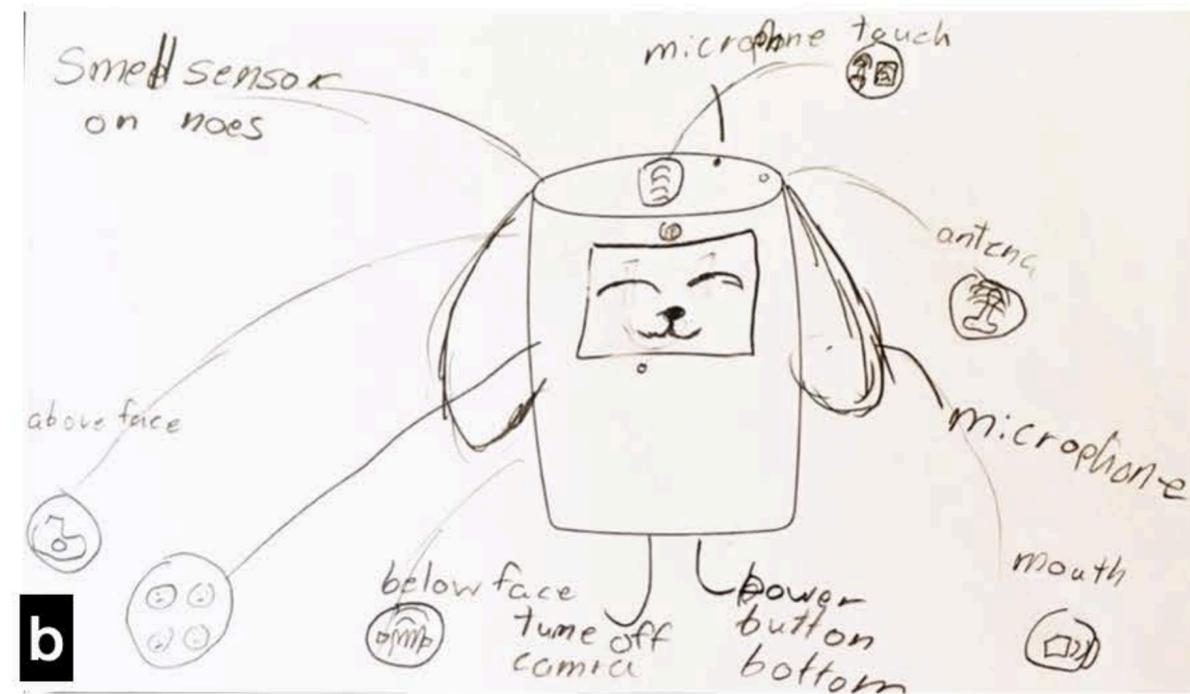
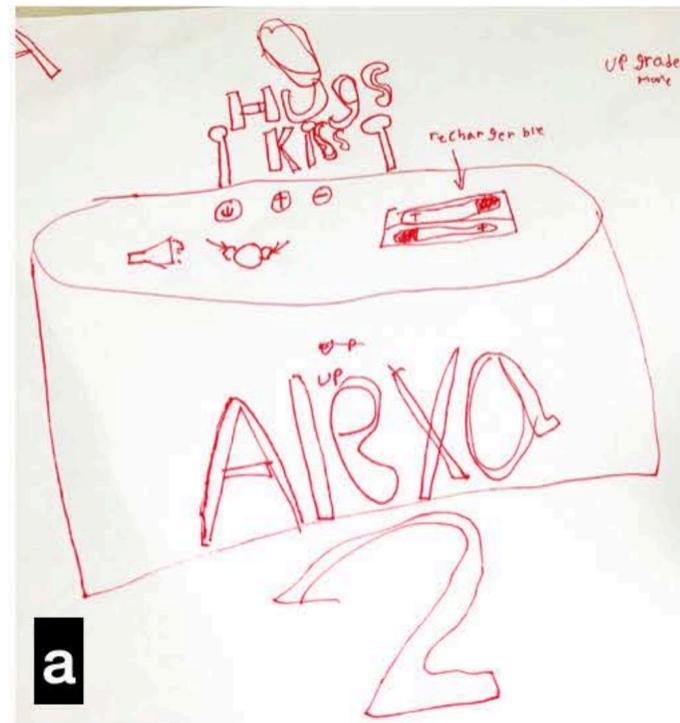
AI Friend or Foe?



Bingo Game

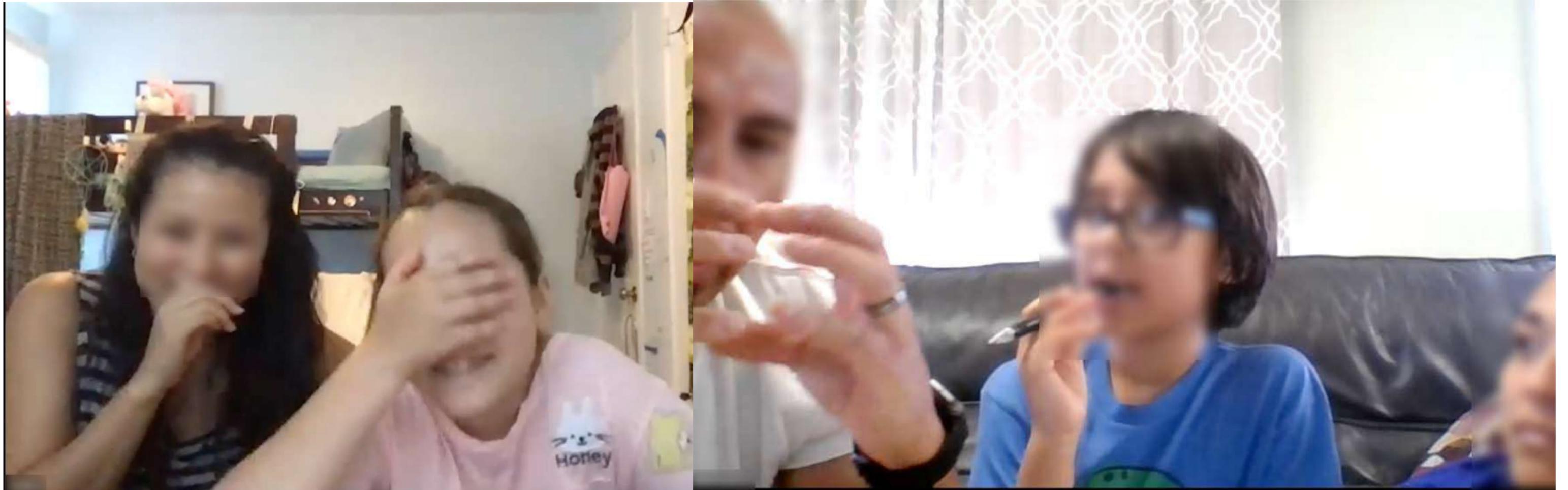
Prompt & Trick AI

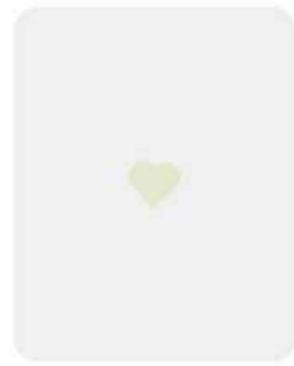
Findings Design & Analyze AI



“What if it was like a face that looked more like a robot face? Would that still be creepy? [C. nods]” — N., mom F12, suggesting potential modifications to their AI design.

RQ 1: How do children and parents learn about AI together?

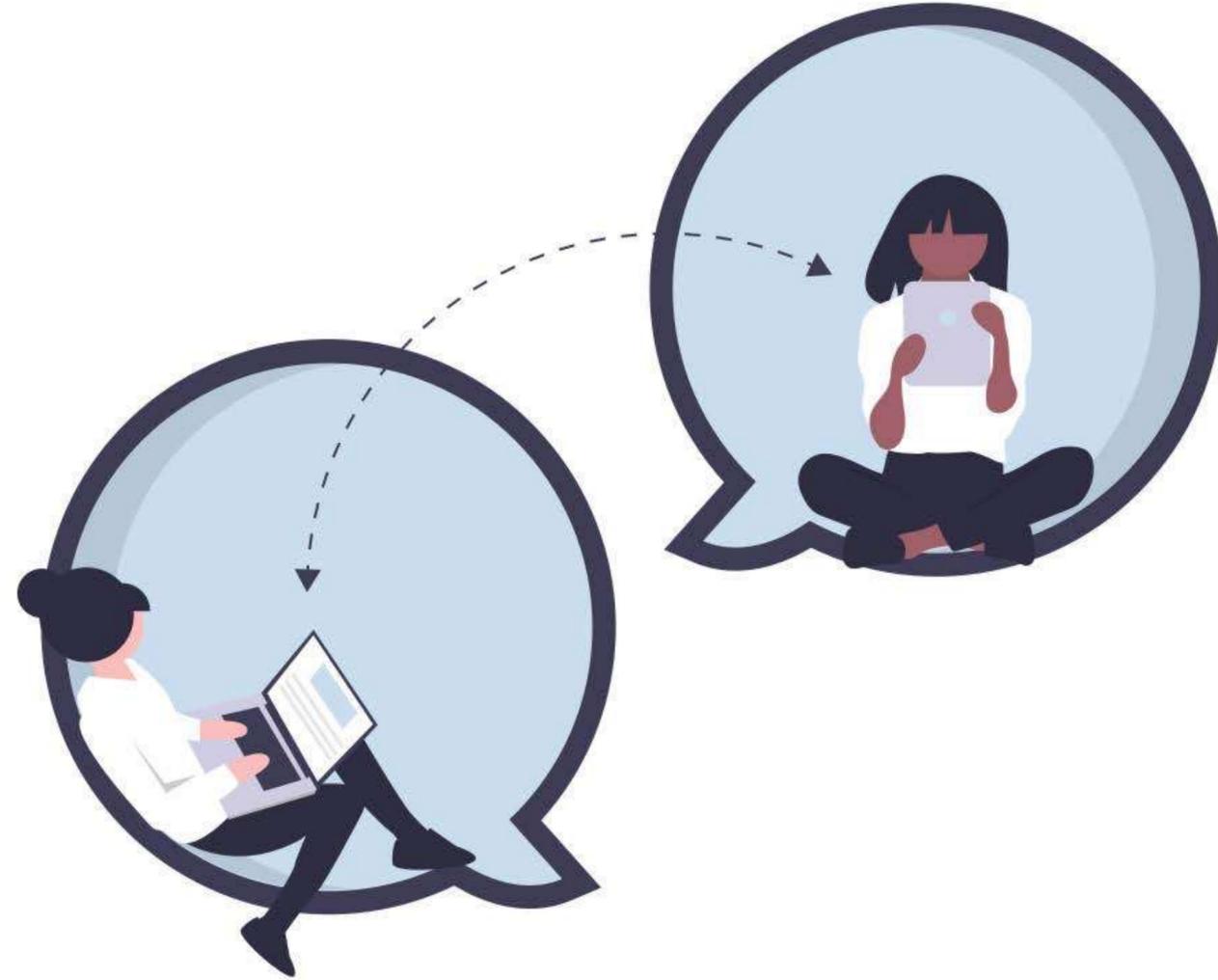




Parents Roles

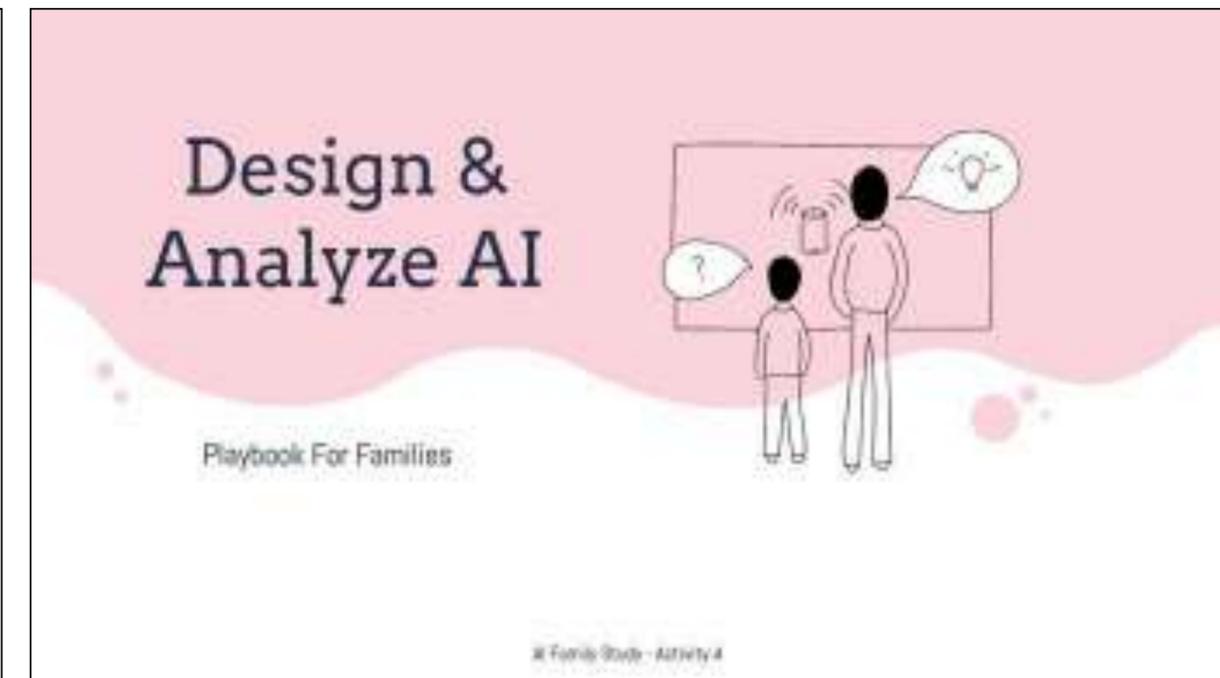
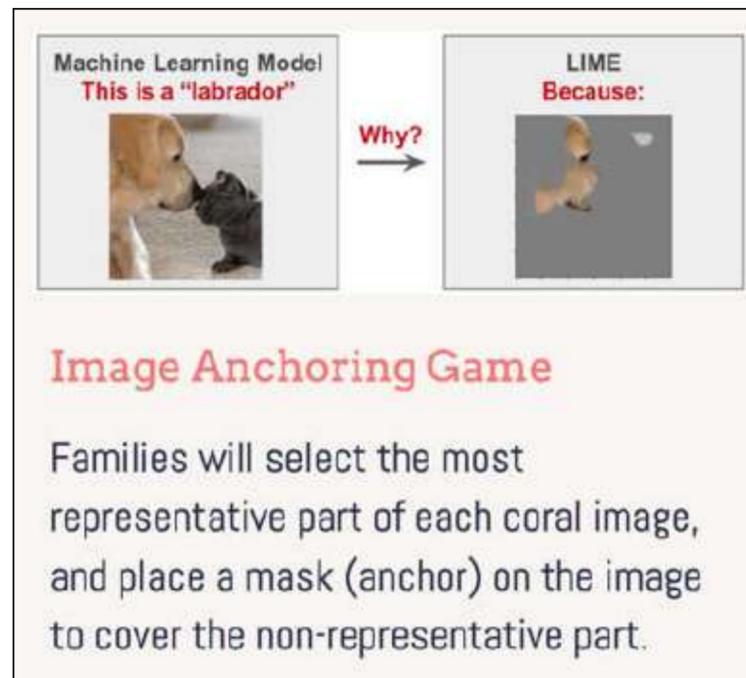
Cheerleader	Emotionally support the child during an activity or display excitement.
Mediator	Mediate between siblings and help them work together. Direct a child's attention or explain task instructions.
Mentor	Guide the child to a more nuanced understanding. Encourages child to explain and clarify their reasoning.
Student	Learn a new concept or a new practice from the child. Change perspective towards AI functionalities.
Teacher	Explain a new concept or a new practice to the child. Provide guidance to use AI functionalities.
Observer	Let the child do the activity alone. Step in when help is needed or asked for.

Joint Roles



Tinkerer	Encourage the child to break, fix, and test the AI. Model this tinkering behavior.
Collaborator	Work with the child as a friend, and be actively engaged in the activity.

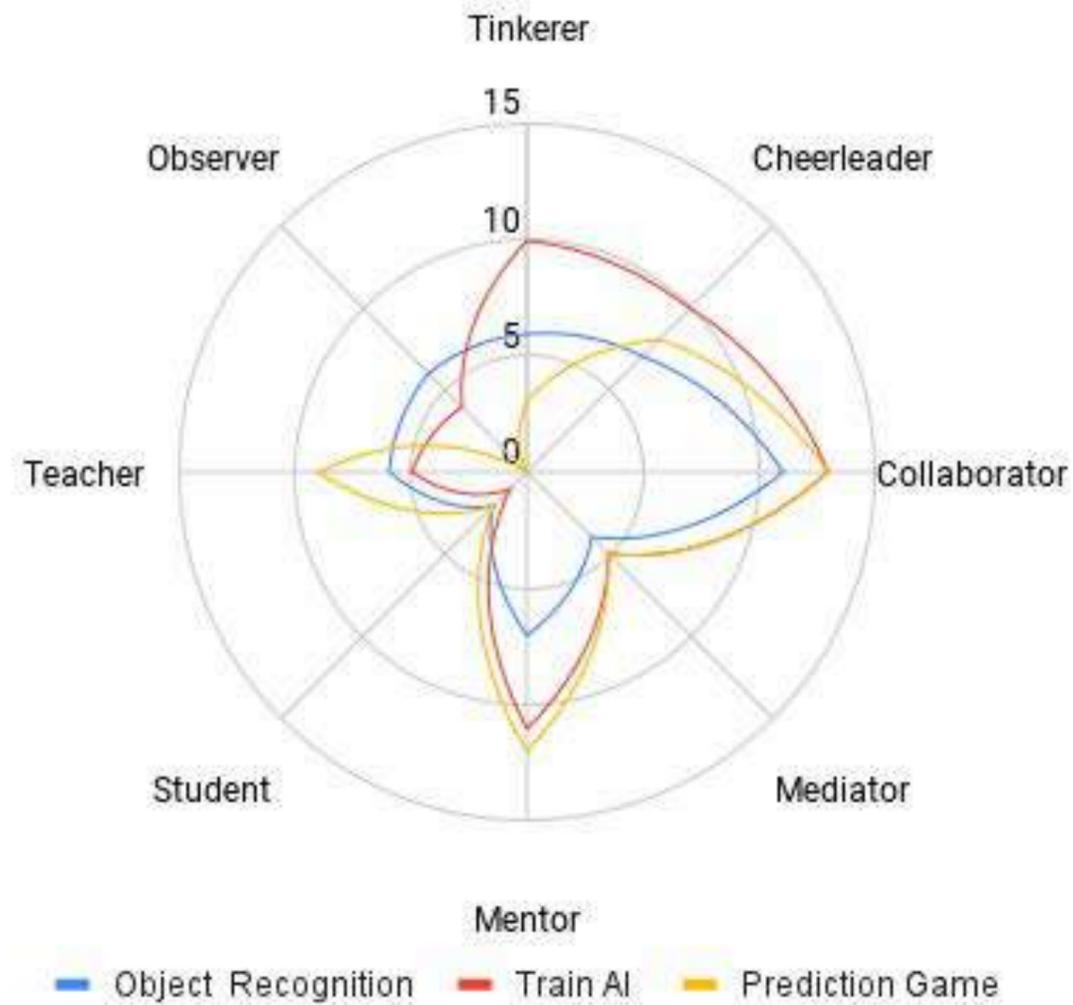
RQ 2: How can we design learning supports for family AI literacies?



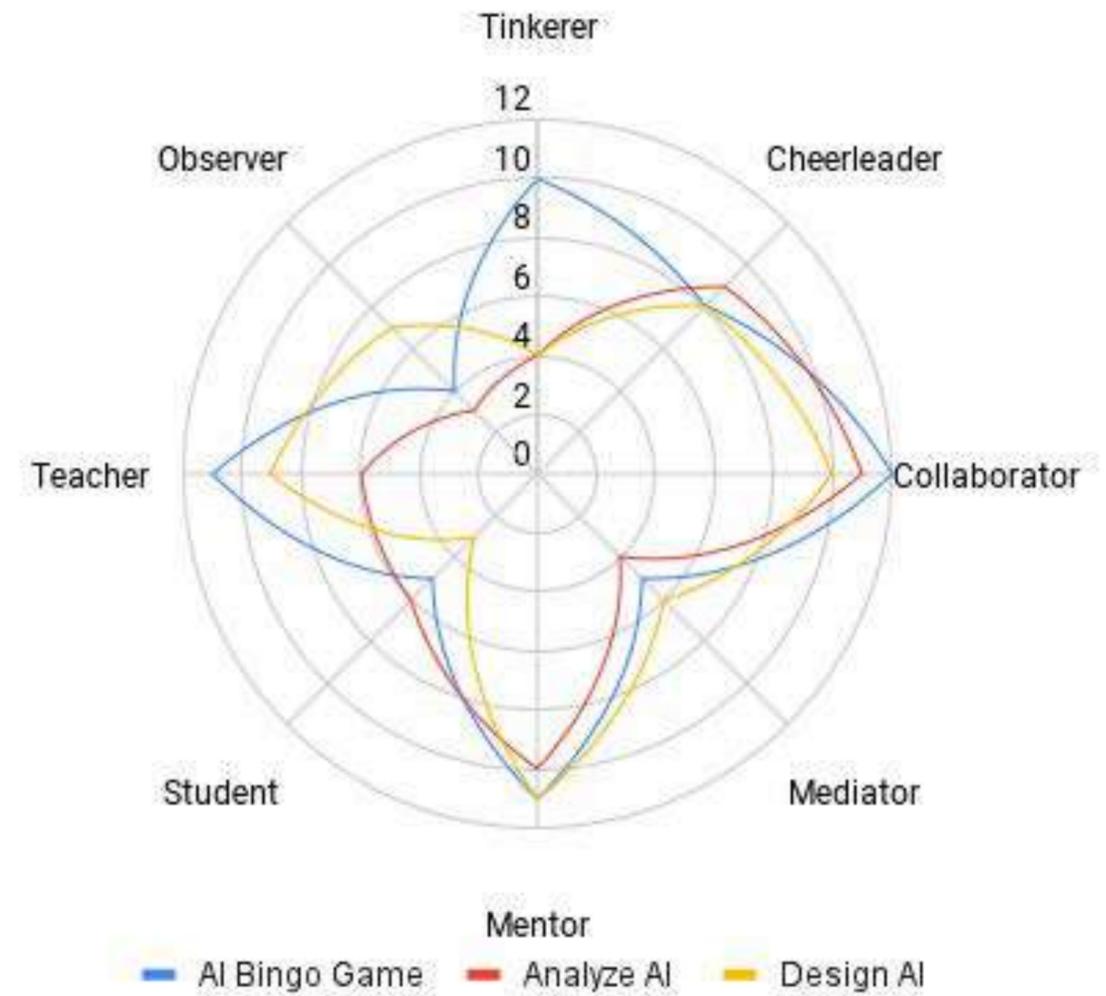
All study materials are available at aiplayground.me

RQ 2: How can we design learning supports for family AI literacies?

SESSION 2



SESSION 4

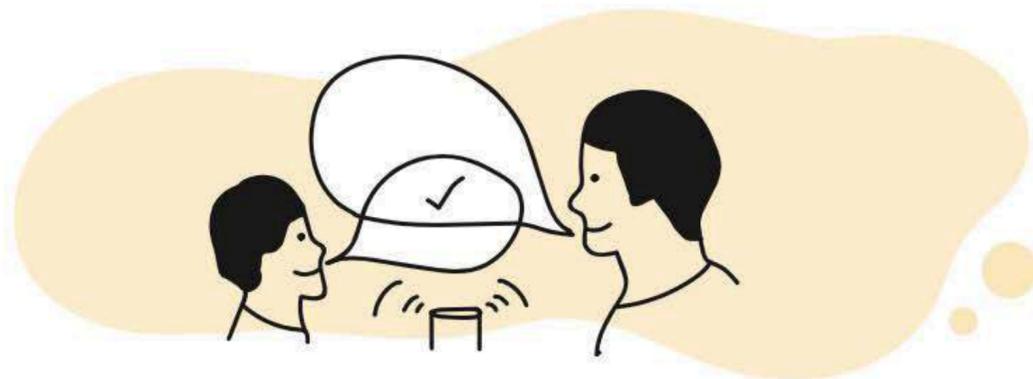
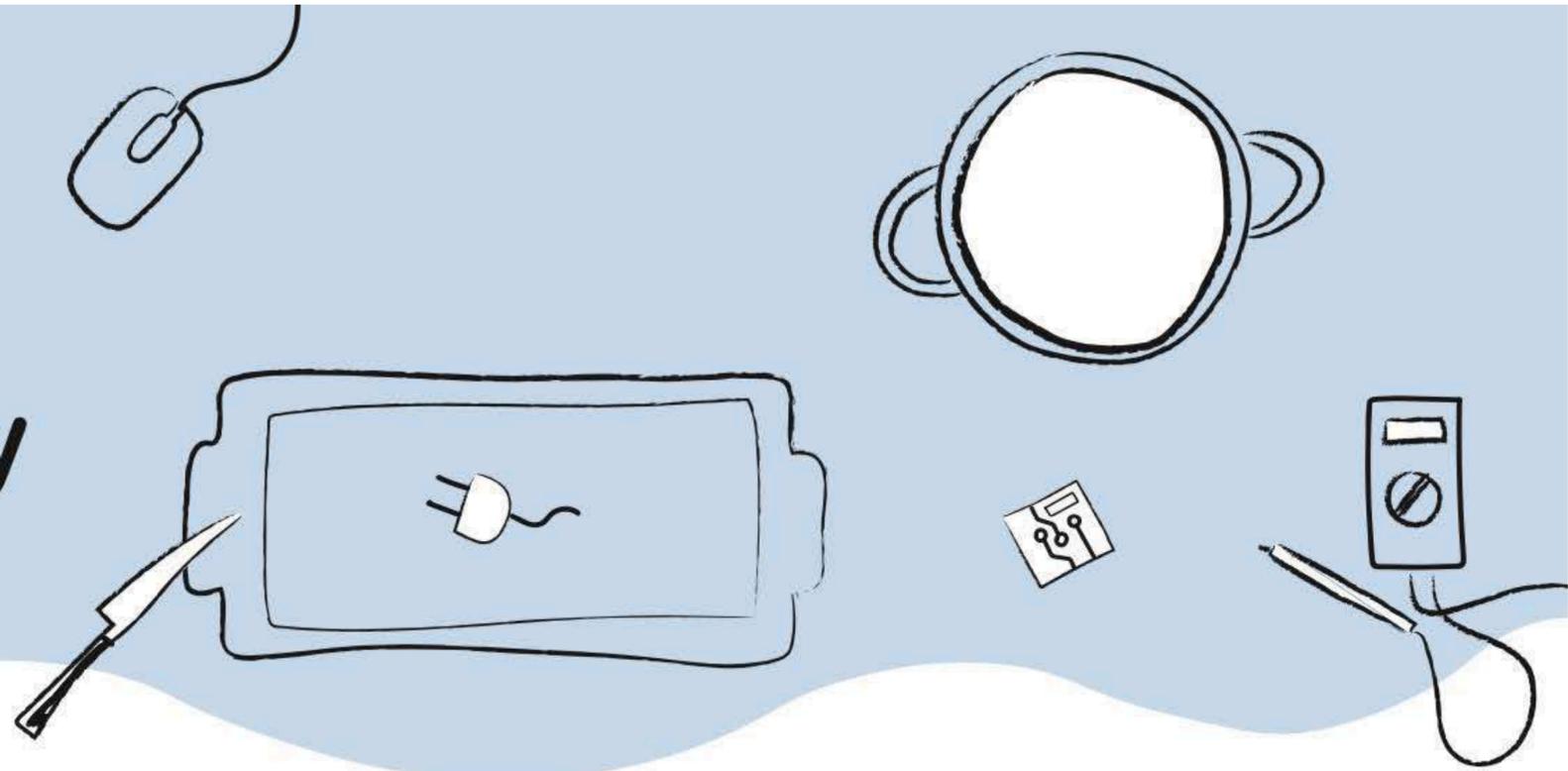




AI Literacy practices and skills led some families to consider making meaningful use of AI devices they already have in their homes and re-design their interactions with them. These findings suggest that **family** has the potential to act as a **third space for AI learning!**

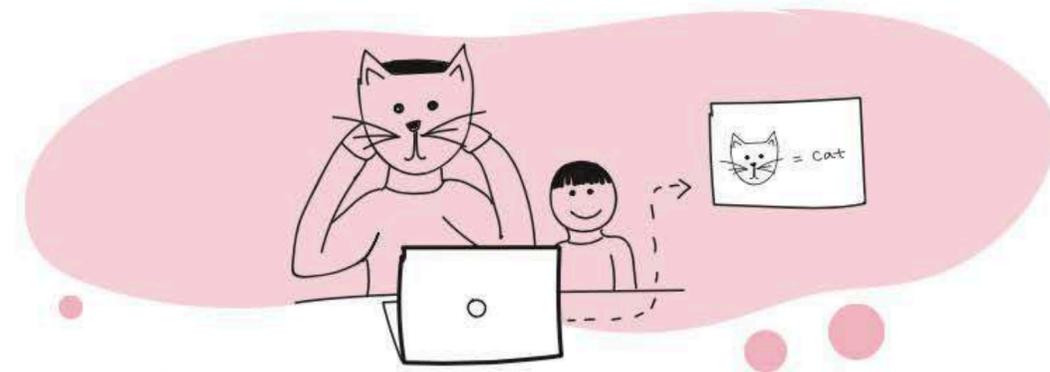


6 Ingredients For AI Literacy



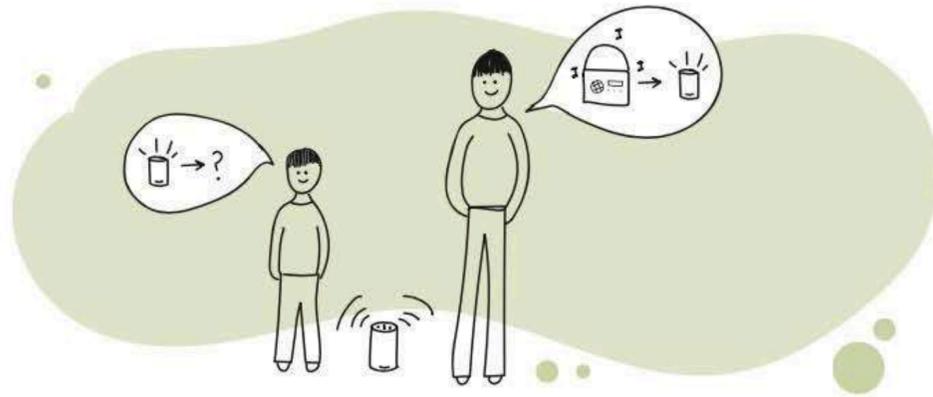
01 Mutual Engagement

Families are equally participating and engaging in the activity. Engage by asking your voice assistant (on your phone or in the house) a series of questions, like "assistant, what should we make for dinner tonight? Who made you? How do you learn?". Try to build off of the assistant's responses and each other's questions.



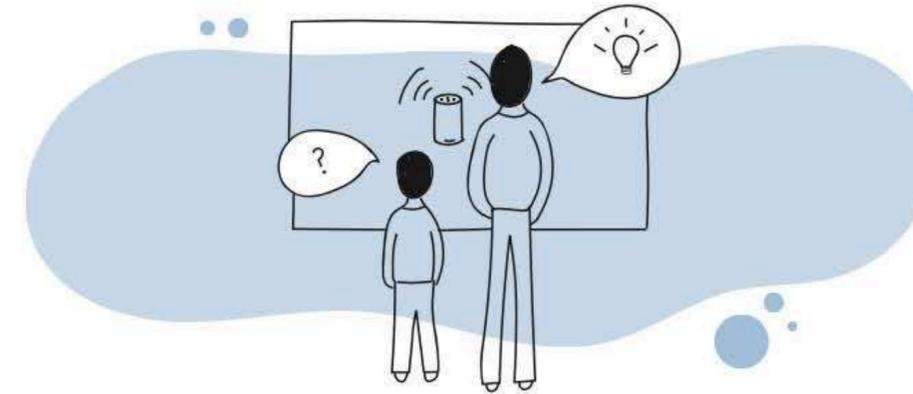
02 Co-Creation

Kids and parents use AI Technologies to create things together that are meaningful for their families. Go to TeachableMachine.com and teach the computer to recognize you and your family members. Once you are done, think of different ways to trick the computer together and improve the way you teach it.



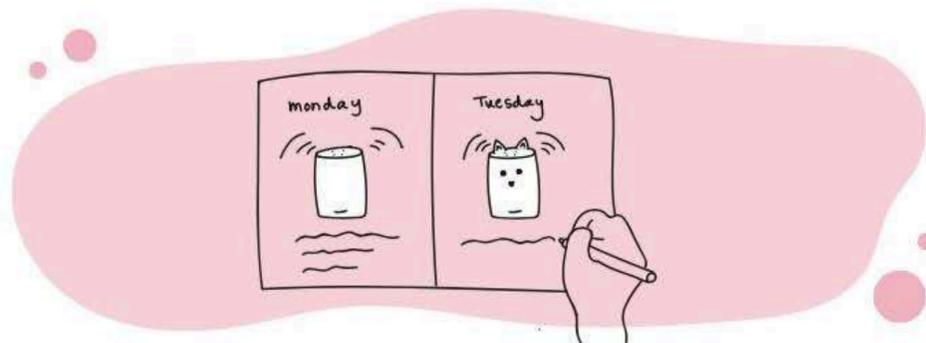
03 Boundary Crossing

Kids and parents share their past experiences and personal stories during the activity with AI. As a family share what past technologies voice assistants remind you of, and imagine what the future voice assistant may look like.



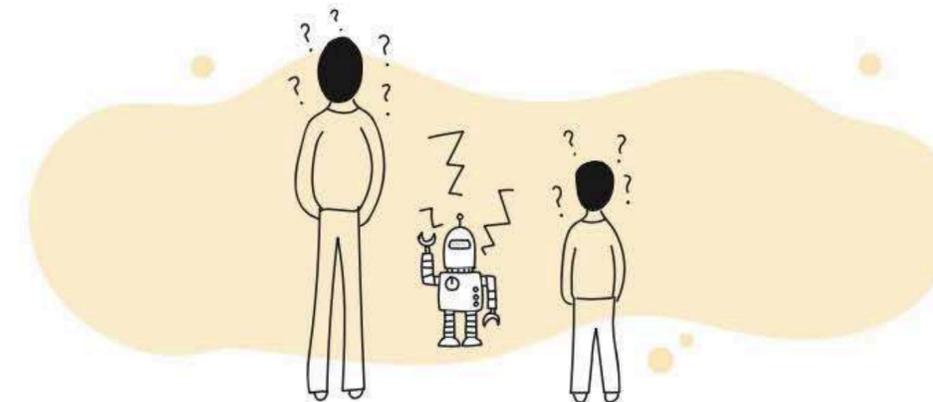
04 Collaborative Inquiry

Families collaborate to understand together how AI works. Try to understand how a voice assistant may work. Take turns and draw or discuss what you think is inside the device. As you are brainstorming, you may ask questions to the assistant to help you better understand how it works.



05 Intention to Develop

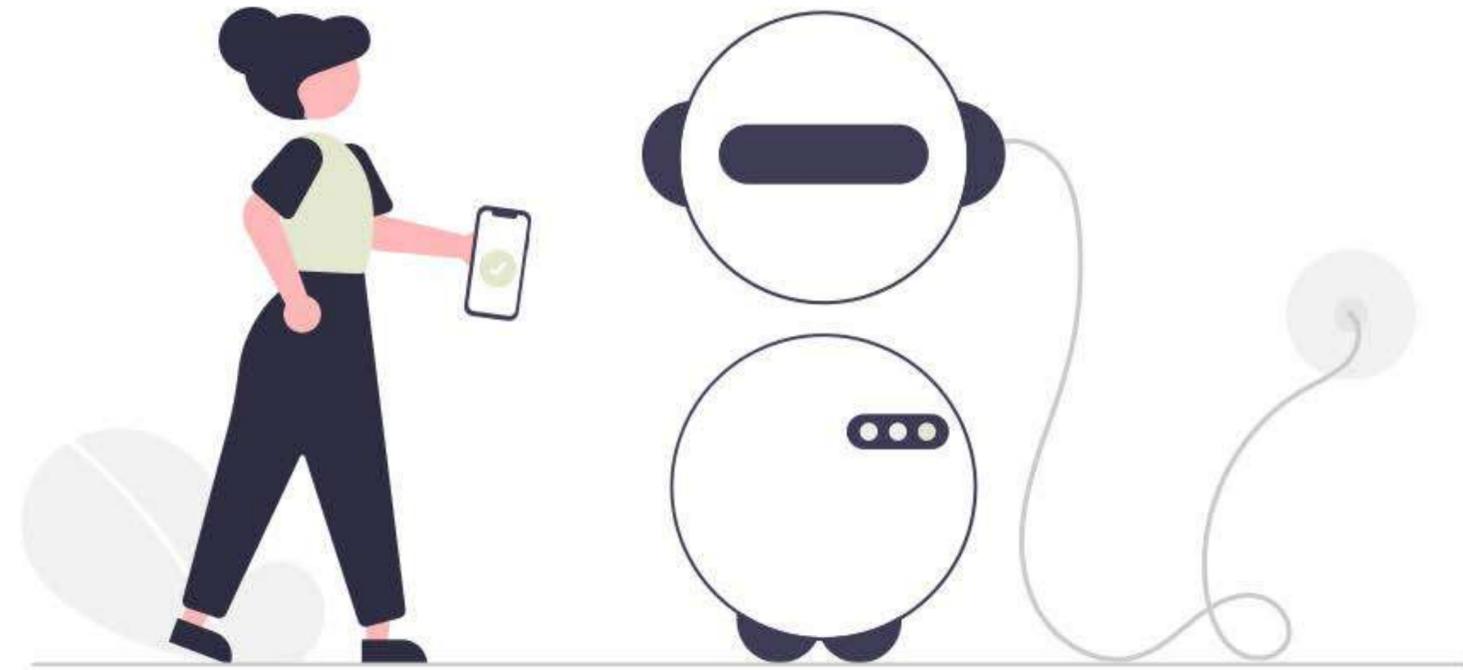
Families develop awareness of their own or their partners' needs and/or interests. Then, they help themselves or their partners to grow through the activity. Make a diary of your daily use of a specific AI technology. Write down interesting things, and see how it changes over time.



06 Focus on Content, Not Control

Families focus on the content and genuine interactions with AI, while minimizing the considerations for technical features and/or design elements. Try and compare the differences between your experience interacting with a complicated device and using something simple. How does it change the experience?

Thank you to all the families who participated in this study!



Paper: Family as a Third Space for AI Literacies: How do children and parents learn about AI together? Druga, Stefania, Christoph, Fee, and Ko, Amy J. CHI '22: ACM Conference on Computer-Human Interaction 2022

Study materials available at aiplayground.me

Illustrations by Sarah Strickler & <https://undraw.co/>.