How can we use AI to make things better for humans?
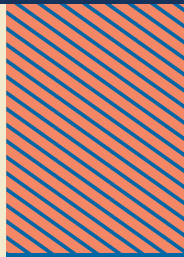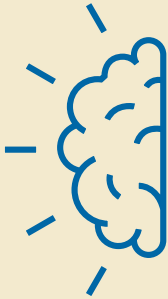
ideo.to/ai

How can we use AI to make things better for humans?

We believe that data science and machine learning can help us design intelligent products, services, and systems that improve people's everyday lives.

But in order to have a truly positive impact, AI-powered technologies must be grounded in human needs and work to extend and enhance our capabilities, not replace them.

To call attention to that distinction, we use the term "augmented intelligence" rather than "artificial intelligence." Data science is a tool that helps us build a smarter world, but humans remain the architects.

IDEO

How might we use augmented intelligence to solve dynamic, complex, and evolving systemic challenges in a human-centered way?

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About These Cards

These cards aim to help interdisciplinary teams remain human-centered while designing data-driven, intelligent products, services, and systems. These new systems can adapt to better achieve their intent over time, which presents both familiar and unfamiliar challenges for design—familiar because human-centered design has long sought to augment humans' capabilities by helping them solve problems; unfamiliar because intelligent systems have the potential for such massive scale that humans can no longer evaluate at every phase.

IDEO joins this ongoing conversation from a place of optimism. The cards reflect IDEO's effort to illuminate common challenges when designing with data. Awareness of our own human tendencies is the first step in thinking about ethical considerations. The following exercises help ensure that the work is more ethically responsible, culturally considerate, and humanistic. The activities do not offer definitive direction, but rather initiate a set of actions and prompts to stimulate conversations. They are tools to be used and modified as you see fit.
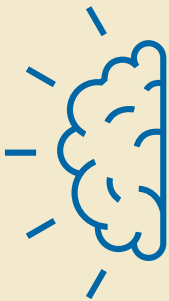
IDEO

PAUSE

Collaboration Is Key

When tackling the challenges that data can help answer, it is often best to lean on your teammates.

All team members should be empowered to trust their instincts and raise this Pause flag (found on the other side of this card) at any point if a concept or feature does not feel human-centered, even if they can't quite put their finger on why. It's important to discuss issues early, before project momentum leads the team astray. There is a good chance someone else is having similar thoughts and these conversations will help align the team.

Design
Principles

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Design Principles

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Data is Not Truth

Data is human-driven. Humans create, generate, collect, capture, and extend data. The results are often incomplete, and the process of analyzing them can be messy. Data can be biased through what is included or excluded, how it is interpreted, and how it is presented. Unpacking the human influence on data is essential to understanding how it can best serve our needs.

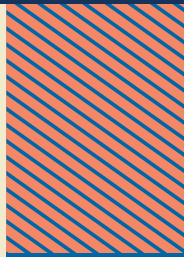## Don't Presume the Desirability of AI

Just because AI can do something doesn't mean that it should. When AI is incorporated into a design, designers should continually pay attention to whether people's needs are changing, or an AI's behavior is changing.

Respect Privacy and the Collective Good

While there are policies and laws that shape the governance, collection, and use of data, we must hold ourselves to a higher standard than "will we get sued?" Consider design, governance of data use for new purposes, and your communication of how people's data will be used.

Unintended Consequences of AI are Opportunities for Design

Just as with any design endeavor, we know that we're not going to get it right the first time. Use unanticipated consequences and new unknowns as starting points for iteration.

IDEO

When to Use These Cards

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When to Use These Cards

There are four primary use cases for when these cards will be of particular help.

Project Onset

To help us think about what data we are gathering (and deriving) and how it affects what we design. What is missing? Is it representative? Is it biased?

Early Prototyping

To help teams think through how people may interact with a design and set them up for successful user testing and concept evaluations. How might users feel about intelligent systems that learn and change over time? How much transparency should be built into the design?

Decision and Planning Moments

To think about how proposed approaches and solutions might affect the people they're trying to serve. What are the potential future use cases for the output? What are the long term effects, and how will it change as system learns?

Anytime Exercises

Don't feel limited by these moments. Many cards contain exercises that should make the team feel confident that they are making good decisions. The cards offer prompts to help us remember the people behind the numbers and those who will encounter the system we're designing.
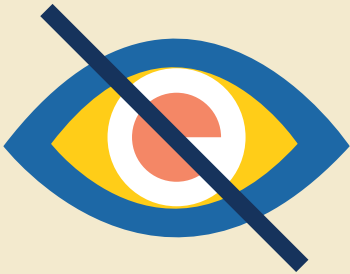
IDEO

Blind Spots Check

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IDEO

How might we reduce biases in our data?

Diversity is essential to ensuring that our learning and algorithms are robust, and the product is culturally sensitive and inclusive. By thinking about inclusion (and exclusion) in the data, we can better uncover biases and begin anticipating consequences.

ACTIVITIES TO TRY

- List what data you currently have and create another list with examples of data needed to create a more complete picture. What additions will make your data more representative of the entire population or context?

- List what information you have directly and what is a proxy. Challenge yourself to explore whether the proxy has built-in assumptions or biases that may impact what you're capturing.

IN PRACTICE

An international hospitality brand wanted to know why potential customers were abandoning their online travel booking before completing their purchases. Company leaders believed that a better interface would solve the issue. However, research revealed that travelers preferred to speak to a representative by phone in order to customize and plan their trip. This insight illuminated a blind spot—the call center systems, which were antiquated, complex, and didn't "speak" to each other. By identifying and fixing the blind spot, the company increased bookings.
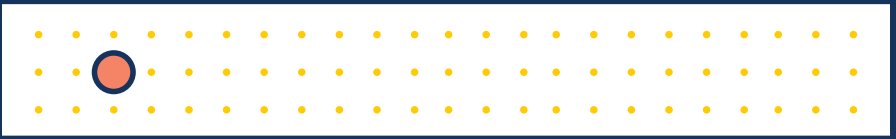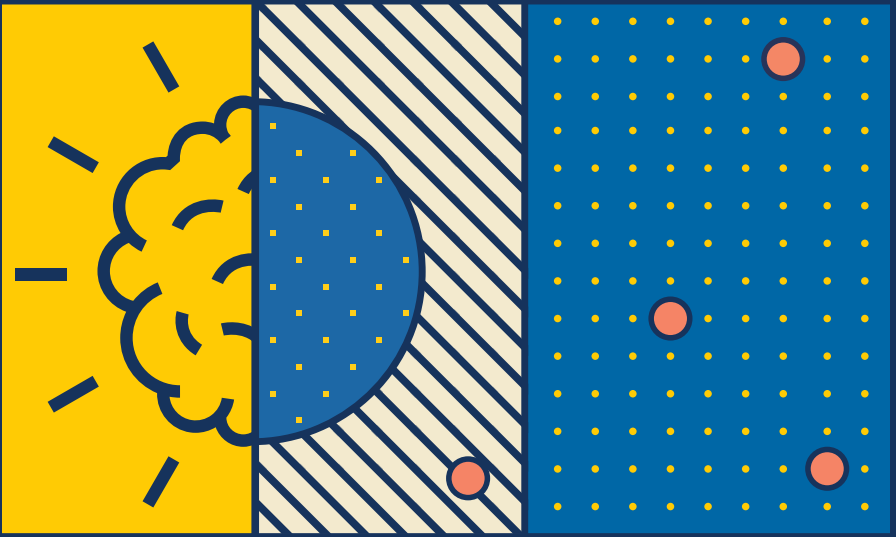
The People Behind the Data

IDEO

Humanize the stories behind the numbers

Sometimes qualitative research helps us understand what additional data we need. Other times, reviewing data sets first helps focus our ethnographic research. Most design challenges benefit from a combination of both big and small data. Use this to your advantage—talk to the people behind the numbers. A human story alongside your data creates empathy.

ACTIVITIES TO TRY

- Richly characterize some of the actual people whose stories are being represented in the data. Discuss what could explain the patterns, both typical and extreme, that you are seeing. What are the underlying behaviors, events, or mitigating circumstances? This probing can help you determine what questions to ask next.

- "Translate" a few rows or columns of data into human stories— especially when those stories highlight a range of experiences. Give each story humanizing touches taken from actual stories you heard in the field. What new considerations does this high-light? Remember that you're designing for a person, not a number.

IN PRACTICE

A large equipment company wanted to explore the tradeoffs between usage-based repair and time-based. Rather than present graphs and charts to show the difference between the two approaches, the team created two contrasting stories demonstrating what happened in each case. One told of an operator who overspent on parts that were replaced before new ones were needed. In the other scenario, the operator had to send his entire team home due to a part failure. Adding these simple, relatable stories helped everyone in the room understand the real-world implications of a data-driven solution.

Capturing Minimum Viable Data

ideo.to/ai

IDEO

Limit the amount of data to gather and retain

Rather than collecting all the data we could, minimize privacy concerns and maintain trust by capturing only information we need and retaining it only as long as we need it. Ask yourself how much detail you actually need to accomplish your project. Do you need to sense who is in a room, or simply that someone is there? Do you need to know what someone said, or just the tone and volume of their voice?

ACTIVITIES TO TRY

- List what data you are thinking about gathering and clarify why you're collecting each item and for how long it would be needed. As a team, determine if there is less specific information you could gather to get what you need and how you might be able to retain it for as little time as possible. The European Union's GDPR regulations compel this kind of analysis.

- Imagine that a close and skeptical relative is one of your users. How would you explain what you are collecting, what you are going to do with it, and why? Share these explanations with potential users to get their feedback. Voicing concerns aloud reveals weaknesses in your thinking that might otherwise go unnoticed.

IN PRACTICE

A team designing an in-home security system was charged with making it easier to use, while also offering a greater sense of protection. Users wanted the system to monitor activity in and around the home but also preserve privacy. To understand the line between protection and privacy, the team mapped out all human interactions that occur daily at home. This allowed them to pinpoint times when visual recording was critical for protection and when it wasn't. Inspired by analog camera shutters, the team designed a "privacy shutter" to open and close automatically at specific points.
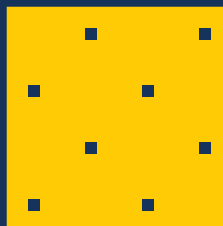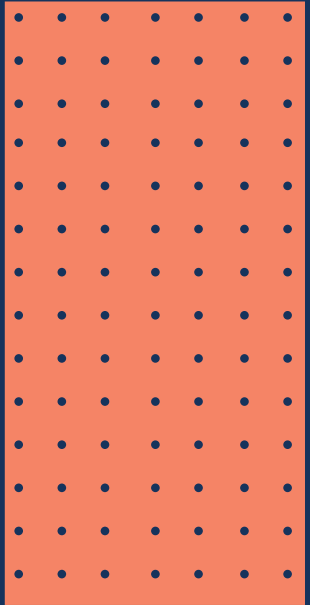
Mapping the System

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IDEO

Create and share a big-picture view of how data flows

All data is shaped by humans; we decide what to collect, how to capture it, and how to use it. Having a precise knowledge of any data's journey— its origin, path, and how it may have been transformed—can reveal ambiguities, redundancies, inconsistencies, biases, gaps, and other opportunities for design. Crucially, it also helps uncover key pieces of the picture that can lead to unexpected (and often vital) insights.

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ACTIVITIES TO TRY

- On a whiteboard, draw a large-scale map of what you already know about the part of the system you are interested in. Include the big elements you're aware of and leave plenty of whitespace. Use Post-its to layer on details such as people, roles, tools, events, and transformations. Then identify knowledge gaps and consider how to fill them in. For example, you might ask more probing questions of users, observe specifics more closely, role play how the system works, or ask experts to fill in parts that are missing.

- Recruit participants who have roles in the system. Ask each person to walk you through their role and how they perform it. Pay close attention to the tools and information they use and how that information is captured. Map your findings to a timeline so you can see the overlapping contributions of all stakeholders at a glance.

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IN PRACTICE

A call center wanted to improve the customer service experience. Through interviews, the design team heard that poor customer service was leading callers to give up before fulfilling the purpose of their call. Design team members observed calls and noticed that customers had to repeat them- selves often and agents had trouble finding the information they should have had easy access to. The team mapped all the people and data in the system, charting the flow of information. Seeing pain points and bottle- necks helped the team design a new experience in which agents had easy and intuitive access to information and customers had less need to repeat themselves, leading to higher satisfaction for everyone.
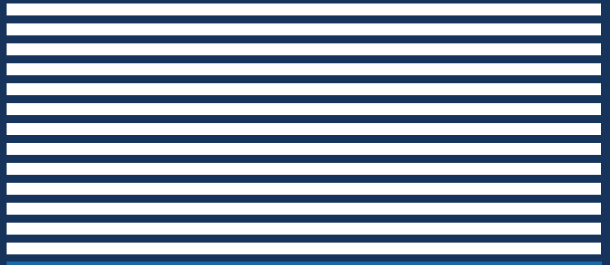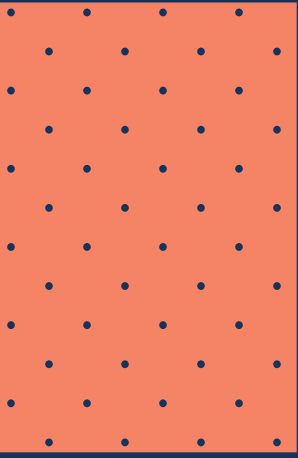
Monitoring to Correct Course

Mitigate potential negative outcomes

Intelligent systems are dynamic, constantly learning from information being generated and touched by humans. They do not exist in isolation; they connect to and reflect the ever-changing contexts around them. This means that over time, designs may veer off course. Good intentions aren't enough. Teams need to explore, identify, and properly communicate the dependencies within a system so they can monitor its progress as it learns.

ACTIVITIES TO TRY

- Describe two future scenarios—one best-case and one worst-case— that could impact your system through changes in input signals and/or the humans participating. Don't spend a lot of time working on accuracy or likelihood of outcomes. The intention is to define extreme contexts to explore different possible evolutionary paths.

- What metrics could help you understand that your design is having unintended consequences? Select a key set of metrics to help you monitor progress early and often. As a team, explore how you can build in safeguards, redundancies, or alerts to signal your design is no longer acting as intended.

IN PRACTICE

A company in the service industry wanted to leverage millions of customer data records to improve the purchasing experience. Based on interviews with customers and sales agents, the design team defined the different categories of information that these agents used and wished to have at their fingertips. The team conceptualized a new software interface that could surface multiple customer data points at once, including past spending totals. But a review of the new interface revealed that showing such financial data put customers at a disadvantage if they were talking to an aggressive salesperson. A sales agent could use a customer's average spending amount as a proxy for wealth, and be tempted to sell a more expensive service. In the end, financial data was removed from the new interface.

Respecting Culture

IDEO

How might we ensure that our design is sensitive to people's contexts?

Machine learning and artificial intelligence systems are usually constructed to provide efficiency and proficiency. While people find these attributes valuable in certain contexts, humans may prioritize privacy, routine, politeness, etc. in others. Such human priorities will be compromised unless designers take care to introduce appropriate cultural and contextual considerations into the system.

ACTIVITIES TO TRY

- Think about people's real lives. How will our design impact their activities? Are there cultural rules, rituals, or taboos that the system will force people to confront? When might they prefer not to engage and why? Can we create solutions that accommodate and support them?

- List some culturally appropriate behaviors for the population that will interact with the design. How rigid are they, and what happens if they are broken? How close to violating these does the design come, and what can be done to avoid this?

IN PRACTICE

In 2007, Facebook launched Beacon. It gathered data about users' transactions with external commerce websites and posted those activities on their wall. The idea was to promote merchants, but these posts were made without the consent of the users, sharing information they may not want have wanted to be made public. One user who received calls of "congratulations" after Beacon revealed he'd bought his girlfriend an engagement ring, but before he had a chance to even propose to her.
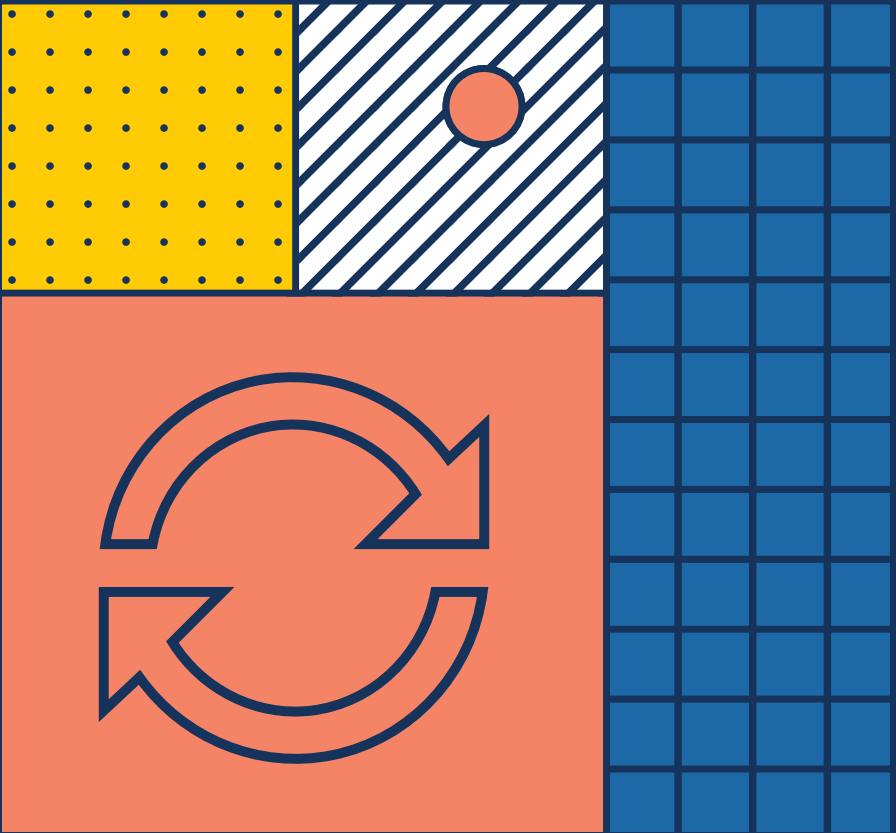
Designing the Seams

IDEO

Clarify each moment in a person's relationship with an intelligent system

In an intelligent system, a "seamless experience" may not be appropriate. People need to know when they are about to cross a critical threshold— like when the system transitions from autonomous decision-making to requiring human intervention. Identifying these moments and providing visible seams help build trust with the user.

ACTIVITIES TO TRY

- Create a journey map of the system, highlighting what it is doing and how it "understands" why it should take an action based on external context. Explore how this map intersects with a human-centered map of the user experience, and prototype ways to minimize ambiguity between human and machine agency.

- For each moment, list all the ways in which the intelligent system can take action on behalf of users (direct and indirect). Discuss where each action falls on this spectrum:

System knows best   **Decide together**   **Person knows best**

← →

IN PRACTICE

In semi-autonomous vehicles, there are moments when the car can safely control itself as well as moments when a human driver must take the wheel. How might design best convey the vehicle's capabilities and limitations to drivers? The design team set up a driving simulation to explore a variety of channels including voice, sound, and lights. Observing how and why drivers react to these signals revealed critical moments in which they wanted to take control, even though the vehicle was capable of driving autonomously.

Balance Giving and Getting

IDEO

Provide reciprocal value to people who share their data

In many cases, human systems rely on clear, fair exchanges of value between people and a product or service (e.g. money for pizza). Other systems may rely upon contributions from participants and highlight evident in-kind benefits of collaboration (e.g., a potluck dinner). But exchanges of value can be distorted when a system is tracking behavior, monitoring clicks, and stockpiling personal information, because people may never learn the true value of the information they have contributed, and may not benefit from the exchange.

ACTIVITIES TO TRY

- List the information you're receiving from people in one column and the benefits that you are providing in another (anything from a smoother experience, to honoraria, to promoting positive social change). Is the give-get loop balanced? Are the benefits obvious to people when they share their information?

- Interview potential users to learn how fair your system feels to them. You might develop a "trading game" (see In Practice below) to determine a mutually agreeable exchange.

IN PRACTICE

A company that hosts thousands of public events wanted to improve the attendee experience. During research, the team noticed that event staffers spent an enormous amount of energy capturing attendee data. Attendees complained about having to give personal information, but also said they didn't mind giving up information if they saw a benefit. So the team created a game, turning data such as email addresses and credit card numbers into "currency." Playing the game, attendees "bought" benefits they felt were most relevant to their needs. For example, one person bought a free ride to the event by giving his name, email, address and zip code as currency. This exercise allowed customers to learn the value of their data, and helped the company better solve customers' needs without asking for too much.

Anticipating Future Use Cases

IDEO

Guard against undesirable uses of data

We gather and use information about people and communities, intending to do so for their benefit. But others may have different agendas. Teams change, strategies pivot, and data may be sold to other companies. Always guard against potential future harm.

ACTIVITIES TO TRY

- Imagine that your database gets hacked. Or your company is subject to a hostile takeover. Or that your assets are put up for sale after a bankruptcy. List a few companies, governments, or groups that might try to use these assets—for good or bad. What might they use the data for? How might you change what you collect, how you store it, or how you structure it to avoid these potential consequences?

- List what, if any, data should be excluded, guarded, limited, or specially governed within your service. How could you accomplish this without jeopardizing the beneficial intent of your design? For example, would it be easy to anonymize names to make it more difficult to cross-reference with other sources?

IN PRACTICE

In 2018, the City of Chicago launched CityKey, a single card that could serve as an ID, library card, and public transit farecard. The card was specifically designed for residents of Chicago who might have a hard time acquiring a driver's license or state ID—including undocumented immigrants. In designing the CityKey, the City Clerk's office wanted to avoid replicating the experience New York City had faced with its own IDNYC card. New York City had to go to federal court to protect the personal information contained in its applicant database, which the Trump administration sought to use for immigration enforcement. Unlike New York's program, Chicago's CityKey database does not retain images of any documents, nor any personal information about CityKey holders.
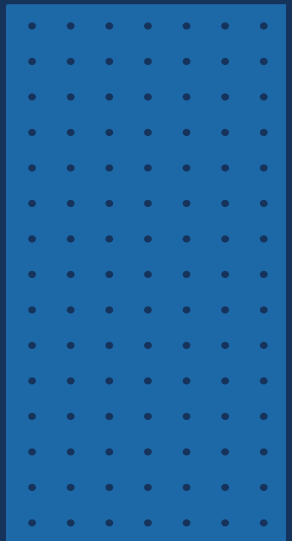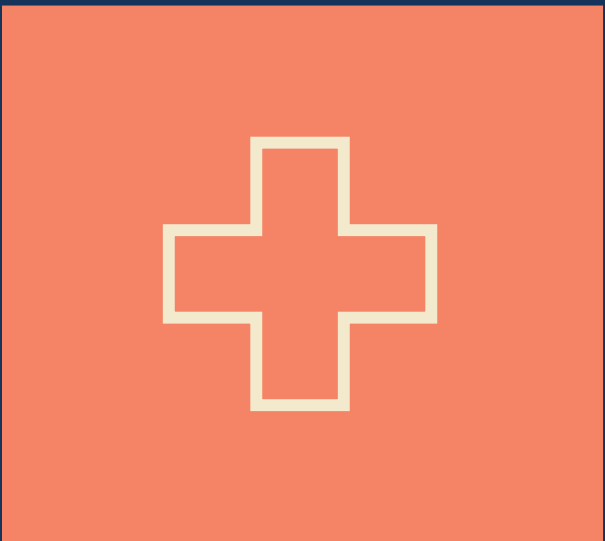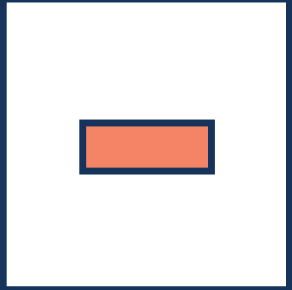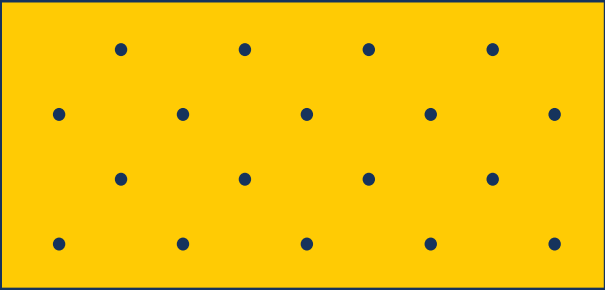
Considering the System

IDEO

Ensure human-centered benefits for individuals, communities, and humanity

Interdependencies within the systems we design affect everyone. Where we direct our focus will determine these choices and influence outcomes across all levels of interaction. It's important that we zoom between micro to macro levels.

ACTIVITIES TO TRY

- Create a matrix to examine the potential human consequences of design outcomes at multiple levels, positive and negative. The prompts in the sample matrix below are not intended to be comprehensive.

	Potential Human Benefits	Potential Problems
Individuals & Families	Reciprocity Robust information Trusted guidance or decision-making Loyalty Reduced cognitive load	Invasion of privacy Misuse of data Distrust Loss of control/agency Erroneous decisions
Groups & Communities	Diversity, inclusion Fairness, justice Access to services Participation Network benefits	Bias or exclusion Unfairness Exploitation Misunderstanding Sabotage
Society & Civilization	Effective sharing of resources More opportunity; greater diversity Simpler or more equitable systems	Inequity Destabilization Environmental harm Systemic neglect Cultural exclusion

Referencing this matrix, generate or evolve concepts to maximize beneficial outcomes and mitigate problems at each level.

IN PRACTICE

An automotive company was interested in designing the future of autonomous vehicles. The design team went beyond considering how these vehicles would interact with their owners, imagining how they might interact with other "smart cars" and "smart cities" as well as pedestrians, infrastructure, communities, and neighborhoods. These future considerations were incorporated into the final design concepts, proposing new avenues of ownership and suggesting ways for autonomous vehicle owners to communicate externally with other cars and traffic systems.