Thinking Young

A Design Thinking Manual

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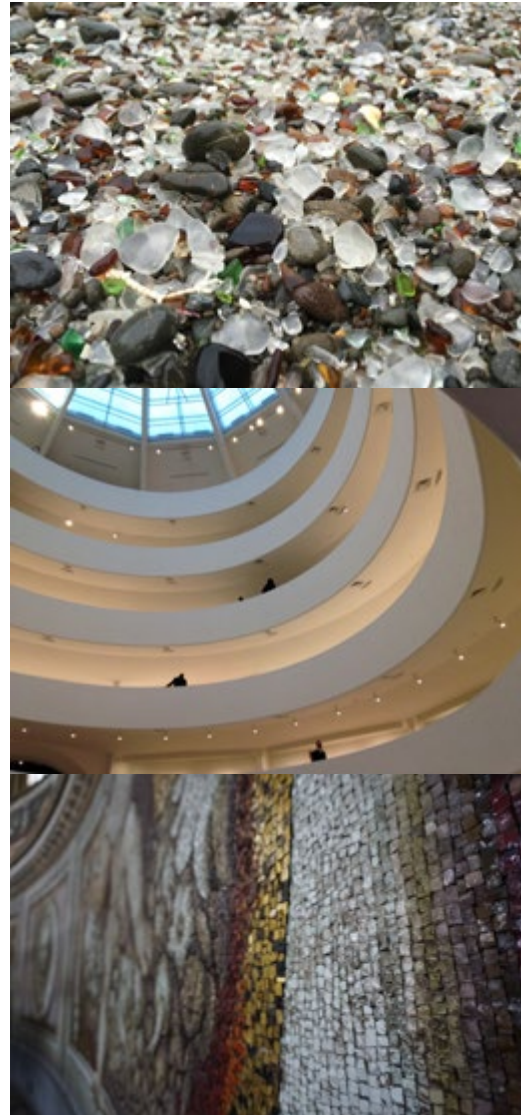### Making Meaning

Publisher's Note

Different people think about creativity in different ways. The same holds true for design thinking. Over the last few decades, dozens of designers, managers, entrepreneurs, scientists, architects and engineers have weighed in with their definition of design thinking. Some believe it is a designated process for problem solving while others think it's a physical process of making things. It's said to be a tool-kit, a never ending loop and a step-by-step intervention. Through my education on this subject, I have learned there is no sweeping definition or cure-all for creativity. Everyone has their own approach and each one of them hold value.

I believe design thinking is a practice that helps you break assumptions, reframe your approach and create new meaning in the process. Only by stepping away from what you know to be true, can you begin to explore new possibilities and unmarked boundaries. There is no one that does this better than the un-knowing hooligans themselves: kids.

This visually-infused guide explores ways for readers to see the world differently by thinking young. Through stories, creative insights, interactive activities and a bit of design theory, readers can discover the inner workingings of the creative practice. The eight articles within this guide are organized by category, but can be read in whatever order you prefer. Upon completion of this guide, readers will better understand design thinking and how to apply it in everyday life. To be clear, this is not a call to forget who you are today or trade in your maturity. The real magic happens when you can combine your current experience with a fresh, curious way of thinking about the world.

Enjoy and embrace thinking young.

Learning

Noticing

Kids notice everything. Whether they are pointing out a scab on your knee or asking about a newly-formed freckle on your face, it's fair to say that young ones are keenly attuned to changing environments. It suggests that their newness in the world generates an instinctive curiosity about what things are, how they work and why they exist. When practiced by adults, this child-like observing, and more specifically, noticing, helps to form empathy: the heart of good design.

All of us observe, but it takes practice to start noticing what has been previously overlooked. In John Mason's book Researching Your Own Practice: The Discipline of Noticing (2002) he states, "To develop your professional practice means to increase the range and to decrease the grain size of relevant things you notice, all in order to make informed choices as to how to act in the moment, how to respond to situations as they emerge (xi)."

Noticing entails both an internal reflection and an outward noticing. In Mason's book (2002) he introduces the three levels of noticing: intentional noticing, marking, and recording. Intentional noticing is more of a passive observation. For example, you might walk through the halls of Carnegie Mellon and see a flyer, but quickly move to the next thing in sight. The next level is to mark. Marking means you remember something long enough that you might mention it to someone later or recount a fairly accurate description. In this case, we would tell a friend that we saw a flier to a play coming up next month. Recording is the highest level of

noticing and is a tool for further reflection. When we record, we write down our observation, reflections, feelings and analysis. For example, we might notice that our friend was just talking about how much they loved that play. Then we might write down the name, date and time in a Google invitation and send it to them with a note asking if they are free to join.

Noticing is a key distinction of a design thinker. It clears a path for understanding and shared feeling, which are basic elements of empathy. More broadly, empathy requires us to put aside our learning, biases and preconceived notions to better understand other people's experiences. By practicing empathy, design thinkers can become more aware of people's needs, desires and goals. They can also begin to see the world in a new, compelling way. Author and Stanford professor, Bob Sutton (2007) coined the term "vuja de" (the opposite as deja vu) to describe the ability to look at something familiar and suddenly see it fresh. In his book Weird Ideas That Work (2007), he talks about the vuja de mentality. This is the

ability to keep shifting opinion and perception. For example, shifting focus from objects or patterns in the foreground to those in the background. He also talks about the benefits of thinking of things that are usually assumed to be negative as positive, and vice versa. By reversing assumptions about cause and effect, or what matters most versus least, you train yourself not to travel through life on autopilot.

For innovators, professionals and design thinkers alike, this type of noticing is the holy grail of innovation. Dartmouth University professor Vijay Govindarajan and consultant Srikanth Srinivas developed a quick exercise to illustrate this cognitive challenge. In their class, they show the figure below:
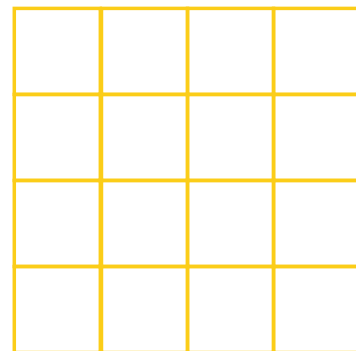
Students get to look for a few seconds before they cover it up and then ask students, "How many squares did you see?" The most common answer is sixteen. But the most observant students notice that you can count additional squares by configuring them differently. After showing students the square a second time, many notice that there are sixteen single squares, nine two-by-two squares, four three-by-three squares and one large four-by-four square, totaling thirty squares.

As design thinkers, close observation demands patience and persistence. In order to gain empathy in the user-centered design process, you can't stop looking too soon, or you'll fail to notice what's really there. To be a great noticer, channel your child-like curiosity. Study the details, step back, look upside down, search for clues, patterns and missing pieces. Challenge your assumptions, play devil's advocate and carve out the space to discover new realities through the design process.

"When the familiar becomes sort of this alien world and you can see if fresh, then it's like you've gone into a whole other section of the file folder in your brain. And now you have access to this other perspective that most people don't."

-Kelly Carlin

Framing

If kids can be design thinkers and so can adults, then who exactly is considered a design thinker? This is a question designers, managers, philosophers and professionals across disciplines have been asking for decades. Reputable theorists have differing opinions on who is qualified to design and to what extent. Nonetheless, there is broad consensus that, like it or not, design thinking has been adopted by dozens of industries to solve problems of all sizes.

In the early twenty-first century industrial designer Kees Dorst introduced a design practice called framing. Both an author and champion of the subject, Dorst explains that framing is a practical process that can help expand design across professional fields. Unlike traditional problem-solving, framing aims to work backwards, starting from the only "known" in the equation, the desired value, and then adopting or developing a frame that is new to the problem situation (Dorst, 2005). This strategy of reverse engineering a solution is called design abduction.

Design abduction has become an increasingly popular approach to problem solving as problems have become more complex. Moreover, in the last twenty years the rise of networked society has sparked interest in collective problem solving that takes place outside the confines of a single organization (Stacey, Griffin, Shaw, 2000). Because of this, designers and design thinkers alike are challenged to consider multiple perspectives and identify key concepts before coming up with a slew of possible solutions. Dorst explains that, to outsiders, this methodology may look like a childishly playful trial-and-error process (Dorst, 2005). Where in reality, it is a way to try out and think through
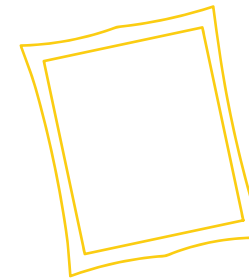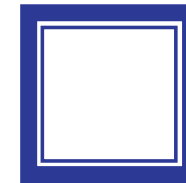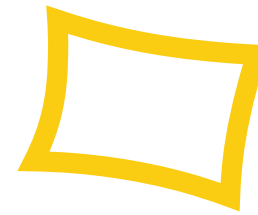
many possibilities before pursuing one in greater depth. Framing is one way the brain finds patterns in chaos and creates meaning. For example, let's consider renewable energy. Are renewable energy sources, such as solar, an economic burden, opportune innovation or socio environmental need? If you believe transitioning to solar energy from fossil fuels is essential in order to sustain the health of our planet, you will frame solar as a socio environmental need. If you are a fossil fuel supporter who thinks the government is wasting money in failing companies like Solyndra, then you will frame solar as an economic burden. Finally, if you are someone who identifies solar as a growing market because of consumer demand, then you will frame solar as an opportune innovation – and even a good investment.

Framing is one practice that allows people from all backgrounds to see situations from different perspectives. Just like noticing, framing has the power to generate empathy, but only when people allow multiple frameworks to be explored.

Dorst suggests using a 9-step process to address complex problems through frame creation (Dorst, 2005):

Archaeology: Analyzing the history of the problem owner & the initial problem formulation
Paradox: Analyzing the problem situation: what makes this hard?
Context: Analyzing the inner circle of stakeholders
Field: exploring the broader field
Themes: Investigating the themes that emerge in the broader field
Frames: Identifying patterns between themes to create frames
Futures: Exploring the possible outcomes and value propositions for the various stakeholders

Playing

Build-Your-Own-Idea

Celebrated graphic designer and typographer, Paula Scher thinks of creativity as a slot machine that will sometimes align the random stuff in our heads into a winning combination.

This notion, that random connections spur creativity, is not new. Some of the greatest philosophers, builders, creators and artists in history have articulated their thought process in a similar fashion. A classic example is Albert Einstein, who referred to his thinking process as "combinatory play". Einstein approached his work by constantly combining and recombining ideas, images, and other thoughts into millions of different combinations – eventually leading him to restructure the way he looked at the universe.

Similarly, Arthur Koestler's (1964) famous theory of "bisociation" explains creativity through the combination of elements that don't ordinarily belong together and writer, John Thackara (2005) talks about the need for "smart recombinations" in design, where designers think across boundaries and put old knowledge into a new account, rather than creating something from scratch. These ideas all boil down to making connections, and lots of them. If we can train our minds to test out seemingly random ideas, we can begin to think differently when confronted with wicked problems.

So how do we train ourselves to think like Einstein? We practice through play. John Bielenberg is a designer known for running an experimental problem solving workshop that teach people to "think wrong". His exercises require participants to make random connections between unrelated ideas or even just words.
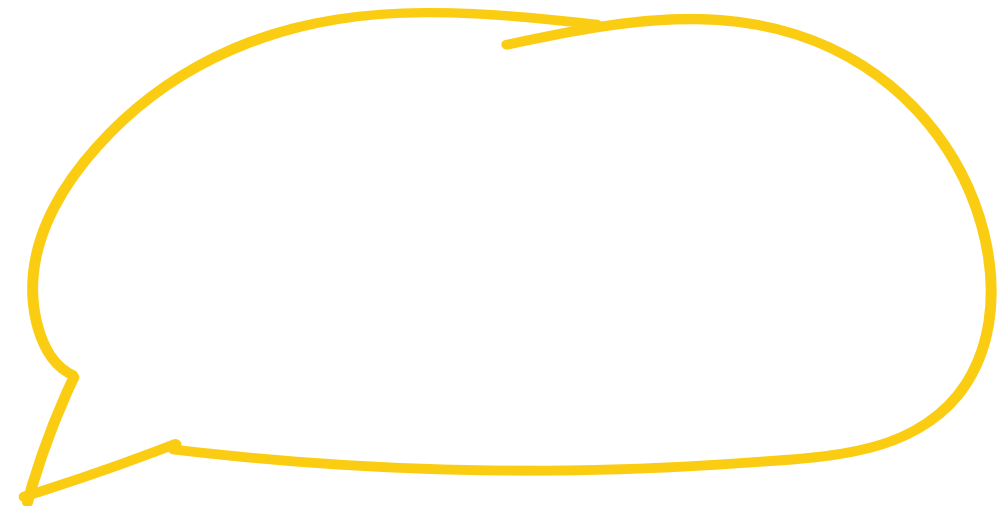
Let's try it.

Wicked Problems

The wicked problems approach to design thinking was introduced by Design Professor Horst Rittel in the 1960s. Rittel defines wicked problems as "a class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing." The phrase was originally used by philosopher Karl Popper but Rittel adapted it to explain design problems that are "indeterminate" – meaning each is unique, complex and expansive. In these cases, there are no right or wrong solutions, only good and bad (1992). In an early article published by Rittel and fellow city planning professor Melvin Webber (1973), they reveal that the most wicked of all problems is defining the problem itself.

Look around. In the left column, write down the name of first five objects that you see. Now in the right column, write down the last 5 things you used in the kitchen. Draw lines to connect words in column one and two. Think of ideas for new products or services for these new combinations. Write down three ideas for each combination then choose your favorite and develop a 30-second pitch around why someone might need to buy that product.

"It's not what you don't know that gets you in trouble, it's about what you know for sure that aint so."

-Mark Twain

Play Date

As a seven year old girl, my favorite thing to do with friends was "play school". If I got my way, I would be the teacher and my friends Julie and Melissa would be the students. We would all sit cross-legged on the ground in front of my white wicker desk, making suggestions about the kind of made-up school we were in. As the teacher, I would pass out Lisa Frank stickers, along with white papers and pens, and we would all come up with assignments together based on those materials. We brainstormed dozens of activities, such as spelling bees, drawing competitions, sticker exchanges, personal story writing and so much more. After we talked about all our ideas, I would pick my favorite activity to teach that day.

Not a bad model, right? It might be interesting to explore what a school like this would look like.

Design thinkers are tasked with being connectors, facilitators, creators, but most of all, expert collaborators. Creative collaboration, like that practiced by Julie, Melissa and I, is what brings the design thinking process to life. Because good design is centered around people and problem solving, it does not happen in solitude. For example, authors Richard Florida and Jonah Lehrer, describe the unique capacity for cities to be innovation hubs. They suggest that because they have a higher degree of "human friction," they are better positioned to solve their own problems. It's when you have a high concentration of diversity that innovation happens. That is the heart of collaboration.

To successfully navigate the design thinking process, collaboration should happen at different

times and places throughout.

For example, let's say my "play school" teaching style was adopted by an elementary school in Pittsburgh. The teacher might decide what subject to prompt the class with, based on their existing curriculum and also make the final decision about which activity to teach. Concurrently, the teacher might work with groups of students to brainstorm their own assignment ideas before she makes that final decision. These are examples of the two different styles to facilitate

learning. In design, we call these modes: convergent and divergent thinking. Divergent thinking is a way to ensure that many possible solutions are explored early on, by opening the floor to ideas. In contrast, convergent thinking is a way to narrow down those ideas to a final solution.

Design thinkers should move in and out of convergent and divergent thinking, until they land on a final solution.

It looks a little like this:
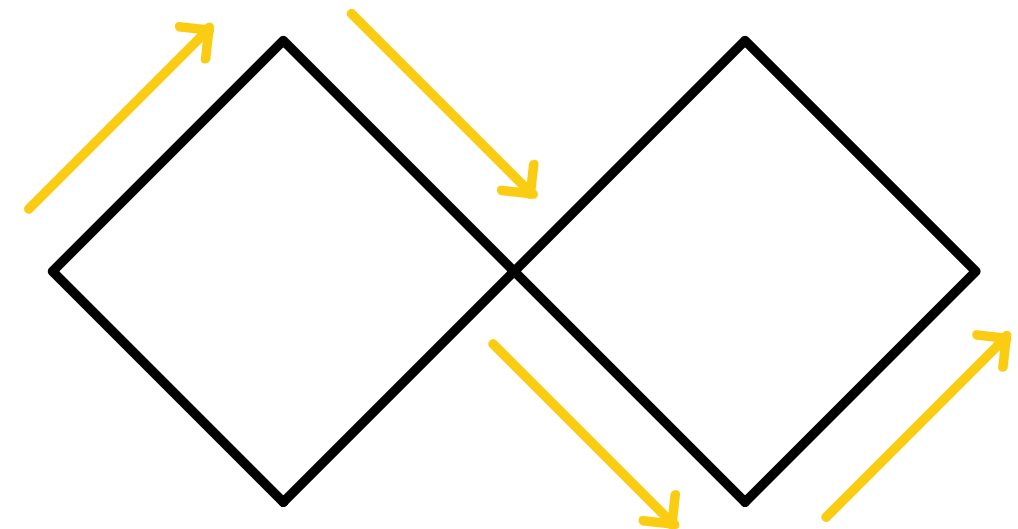
Can you think of a time when collaboration didn't work for you? Why?
Can you think of a time when collaboration helped you? Why?
Can you think of a leader, social movement or product that uses collaboration for good?

Jumping

Just Go For It

When I was in college, the only way I could learn new vocabulary words was to write down each word and its definition on a flash card, use it in a sentence, draw pictures that reminded me of the word and then discuss it outloud to a partner. I remember practicing this cycle for more than five hundred words my first semester. It wasn't the most time-efficient process, but it was the only thing that really worked for me. I can see now that I was testing out different methodologies for learning. The "action pieces", such as writing, drawing and discussing, were ultimately how I made the knowledge stick.

As design thinkers, it is critical to err on the side of action for that same reason. Action allows us to learn, create and solve problems at a much faster rate. According to Creative Confidence author David Kelley (2013), in order to make something great, you need to start making. You can't get stuck in the planning stage. As adults, we often think that if we plan things in our heads perfectly and wait for the right time, we might just succeed. This is not the case.

The myth of creativity is that fully-formed, brilliant ideas just pop into people's minds like ready-made products. People who practice design thinking will tell you this is far from the reality. In Tim Brown's (2008) design thinking model, he describes three distinct steps – or "systems of spaces". The model begins with human-centered discovery and is followed by cycles of prototyping, testing and refinement. The latter end of the process, which includes generating, developing and testing ideas, is called ideation.

Prototyping

A prototype is a simulation or sample version of a final product, which is used for testing your idea. Prototypes can be anything from a paper sketch to a web simulation. Whatever it may be, the point is to make it quickly and at a low expense. Prototyping is an abductive practice that aims to help a designer oscillate between creation and feedback throughout the design thinking process so that they can continue improve the product.

"Try early and often. Create an expectation of rapid experimentation and prototyping. Encourage teams to create a prototype in the first week of the project. Measure progress with a metric such as average time to first prototype or number of consumers exposed to prototypes during the life of a program (p. 90)."

In the technology industry, this is called the minimum viable product (MVP). As the name indicates, the MVP is an early version of a product made with minimum amount of effort and development time. Although incomplete and far from perfect, the MVP is tested with potential customers in order to get early feedback and reactions.

For young children, ideating is instinctual. With little to no pressure to produce something "perfect" or "innovative", kids will show off their scribble of a dog or miniature house made with Legos. They might even ask you for your help with the next step. Young children's fearlessness to get started and "just make things" gives them a quality that is uniquely creative.

By shedding our own fears of judgement and perfection, we can begin to innovate through creation too. Jump in! It's cold – but it's not warming up anytime soon!

Falling Down

All of us fear failure at one time or another. From tiny mess-ups to epic fails, we tend to play these events over and over in our minds like a broken record. We even use it as cognitive click-bait to remind ourselves that we aren't good enough or shouldn't try something new. Gone unaddressed, it is a cycle that can cripple creativity, confidence and the fulfillment of trying.

As you grow up, failure becomes scarier. You start thinking: What if I mess up? What will others think? In most middle and high schools, failure is not tolerated. You're taught that messing up means your not smart or quick enough. Then, when you finally finish school and get a job, failure often equates to the loss of your own money and time. So why should we stop fearing failure if it is so bad for us? Well, because that is not always the case. We can't be extraordinary without trying new things and failing often.

In his popular TED Talks on creativity, Sir Ken Robinson focuses on the importance of taking risks and messing up. "If you're not prepared to be wrong, you'll never come up with anything original," he says. "We're running education systems where mistakes are the worst thing you can make. We're educating people out of their creative capacities." In Mitchel Resnick's book Lifelong Kindergarten (2017), he explains that we can help kids become creative thinkers by creating environments where they feel comfortable making mistakes.

In Silicon Valley, failure has been dubbed one of the sexiest traits of an entrepreneur because it spurs innovation and teaches resilience. You can think about any great leader or maker, and identify a failure that has helped defined their path to success. Just think, Christopher Columbus sought a direct water route from Europe to Asia, but discovered America instead! If design thinkers can re-frame failure as an important part of their story, then they can begin to use it as an advantage.

That's exactly what they are attempting to do at Smith College. The competitive women's college has launched a formal program called Failing Well that aims to destigmatize failure and foster student resilience (Bennet, 2017). Upon entering the program, students are given a certificate of failure saying, "You are hereby authorized to screw up, bomb or fail at one or more relationships, hookups, friendships, texts, exams, extracurriculars or any other choices associated with college … and still be a totally worthy, utterly excellent human (Bennet)."

Design thinkers should embraced failure and recognize it is a sign of progress. So go ahead, take your certificate! Pin it up at your desk as a reminder.

You are free to fail!

"The trick is to go from one failure to another, with no loss of enthusiasm"

—Winston Churchill

Making Meaning

"Always the beautiful answer
Who asks a more beautiful question." - ee cummings

Asking Why

Siri, why is the moon orange?

Yes, that is the last question I asked my iPhone. With pocket-size technology at our fingertips, using Google or Siri for on-the-spot answers is easy. In fact, there has never been a better time to be a questioner than now, in the information age. Beyond Siri and search engines, there are vast social networks, free resources and databases where people are learning how to ask questions that engage vast numbers of friends and strangers alike.

Nonetheless, I have to wonder if we are asking the right questions to ourselves, technology and our networks. Often, people ask questions to reinforce existing beliefs or that fail to dig deep enough (and in the right direction) to understand the root of problems. For many, the culture of ready-made online inquiry has translated into a false sense of certainty offline.

In order to be a design thinker, you have to be willing to question yourself and the world around you, all the time. When TED founder Richard Saul Wurman approaches a new situation or subject, he likes to think of his mind as an "empty bucket" which can be filled by asking the most basic of questions. Asking why is often one of them.

For children, basic inquiry bridges awareness and learning. When cultivated, asking why-led questions can unlock greater understanding of connectivity and systems thinking. It can also nurture lifelong creativity and critical thinking. The challenge is, according to research from the Right Question Institute, the older kids get, the less questions they ask. In elementary and

IDEO

Design in management has its own set of discourse. In 2001, the IDEO way of working was introduced by Tom Kelley and Tim Brown. IDEO was their design and innovation firm and they leveraged their own practices, and those of their employees, to describe their work methods and secret formula for blending methodologies, work culture and infrastructure (Woodilla, 2013). The IDEO method offers a step-by-step process designed to help anyone and everyone become a design thinker. The three step process is inspiration, ideation and implementation. Business people and social innovators often use this process to conduct workshops or impliment creative problem solving processes on teams.

middle school, kids get stuck on this fear they might ask stupid questions, so they keep quiet. This rides out into adulthood, too.

Design thinkers have to learn to let go of those fears. IDEO's Chief Creative Officer, Paul Bennett points out that part of questioning is about exposing vulnerability (Berger, 2014). There is a suspicious level of certainty that many adults hold, leading us to overestimate our knowledge and tendency to have all the answers. The more comfortable people become questioning things, the more easily they will be able to articulate challenges and formulate new possibilities.

Eric Ries (2011), the widely recognized founder and author of the Lean Startup, recommends a child-like practice he calls The Five Whys. By asking why five times, designers can overcome the complacency of knowing.

Try asking the following questions next time you are tasked to solve a problem:

Why does a particular situation exist?
Why has the situation changed?
Why does it present a problem or opportunity?
Why has no one addressed this need already?
Why do you want to spend more time thinking about this?

Whether big or small, asking why generates a foundation for powerful inquiry. The value of asking a naive question is that it forces people to explain things simply, which can help bring clarity to an otherwise complex issue (Berger, 2014). In this fast moving world, it is important for adults to step back and ask why. Why did I react the way I did? Why aren't I happy? Why did we make that recommendation? By starting with oneself and then expanding outward to the environment, asking why can help uncover hidden assumptions and clarify purpose.
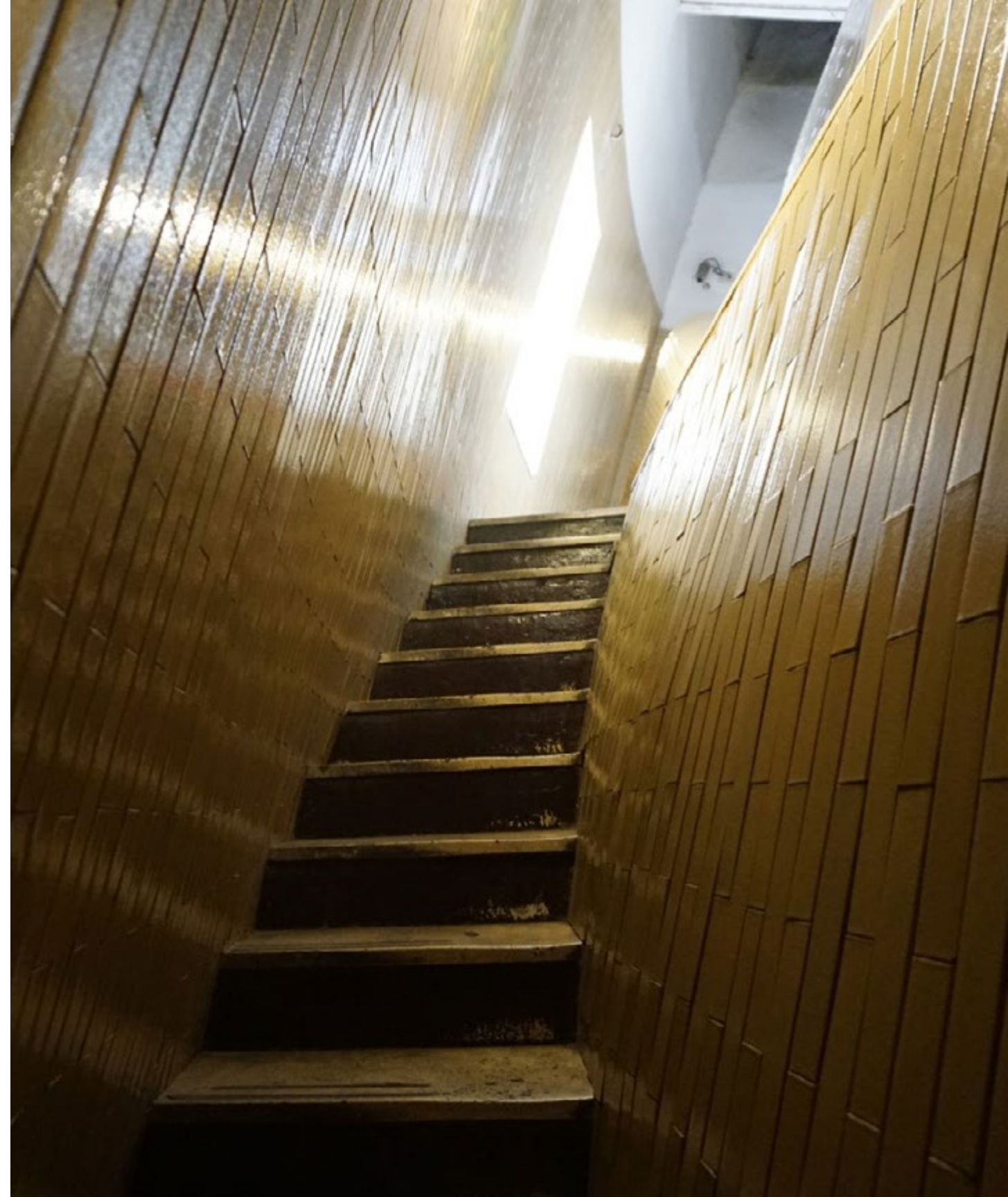
Reflecting

Reflection requires time. As we get older and life gets busier, most of us have been taught to work, think and learn linearly. Moving full-speed ahead squashes our chances of truly considering our ideas or experiences in a greater capacity. Although design thinkers are future-focused, they can only create a brighter future by constantly reflecting on the experiences of the past.

Nearly 100 years ago, philosopher and educational reformer John Dewey articulated several modes of human thought, including belief, imagination, and stream of consciousness, but the mode he was most interested in was reflection (Rodgers, 2002). One of his criterions of reflection that has been adopted and adapted by the design community is the idea that reflection is a meaning-making process. Dewey (1910, 1933) defined education as "that reconstruction or reorganization of experience which adds to the meaning of experience, and which increases [one's] ability to direct the course of subsequent experience (p.74)." In design, experiences can be created out of technology, artifacts, conversations and ultimately, any type of interaction between a person and the world. Yet, not all experiences are cognitive ones. To truly reflect, a person should be prompted to make connections between the experience and their own knowledge.

Nearly fifty years later, philosopher and urban planner Donald Schon (1983) introduced the concept of "reflection-in-action." In contrast to reflecting on past events to make changes in the future

(what Schon calls reflection-on-action), reflection-in-action requires one to reflect in the moment and make changes in real time. In design thinking, this type of reflexive process is a core tenant of creative problem solving in a meaningful and agile way. When a design thinker is able to ideate, test and reflect in continuous cycles, the result will measure much greater in value.

Trained architects and emerging design theorists, Bryan Lawson and Nigel Cross (2006) thought similarly about design thinking to Schon, but offered a more practice-based approach focused on reasoning. According to Jill Woodilla's (2013) analysis, "Both Lawson and Cross use abductive processes to make sense of and generalize from observations, and hence find patterns that are grounded in practical experience and can be described through practical examples (p.125)." Abduction, or logical inference, is a way for design thinkers to explain a situation without jumping to conclusions.

When we think about the history of design thinking theory in itself, an ongoing problem is that the discussion between designers and members of the scientific community leave little room for reflection on the broader nature of design. Especially in relation to the arts and sciences, industry and manufacturing, marketing and distribution, and the general public that ultimately uses the results of design thinking (Buchanan, 1992). The point being, the design thinking narrative should be accessible to the people it will ultimately be used with, so that they too can reflect on it's meaning.

Whether you consider yourself a design thinker or not, reflection is a powerful creative tool. Reflection solidifies all of the design thinking practices discussed in this guide by giving them meaning. More so, reflecting actively, like writing in a journal or discussing your experience with a group, can uncover patterns and challenges that you hadn't considered before. At their best, designers help others make meaning of problems and experiences through creation. To do that well, we must first create meaning for ourselves.
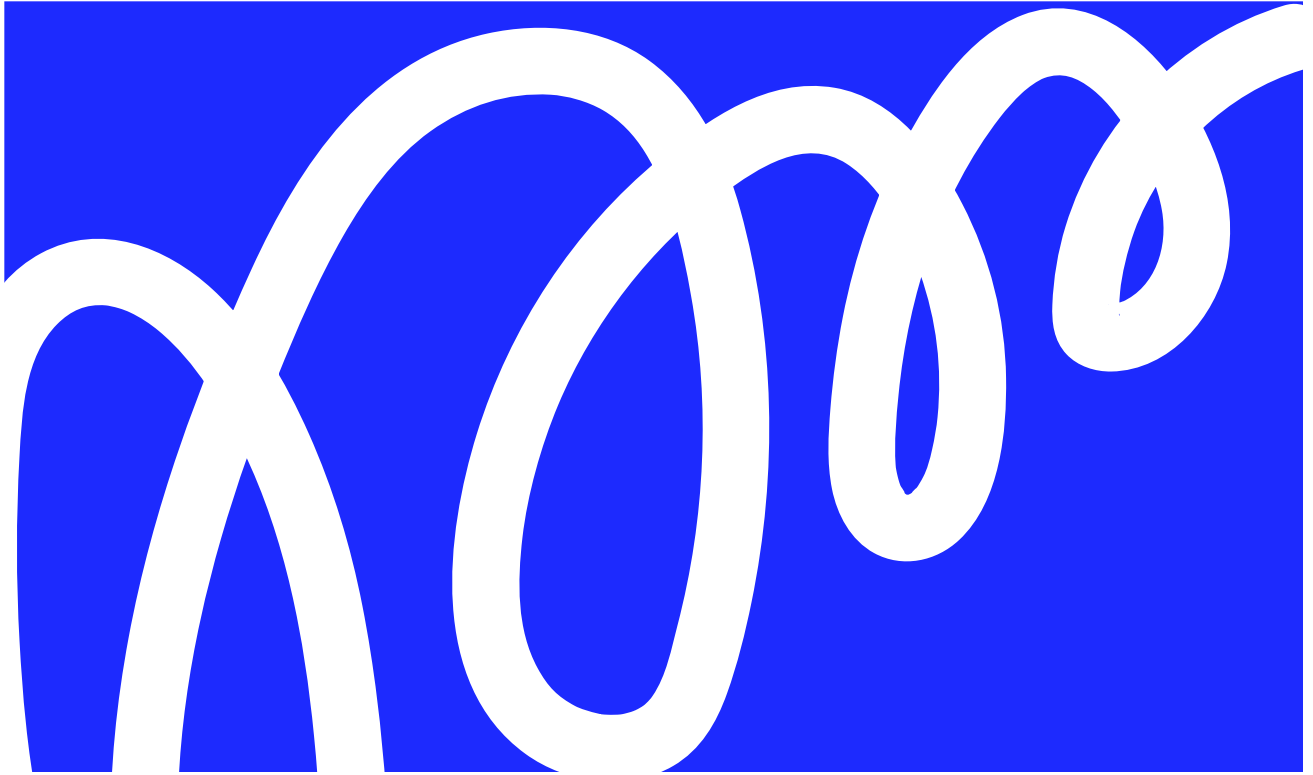
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