



Good Designers do “X”: Embracing the breadth of design practices

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Abstract

Good Designers do “X” is a collection of responses from 35 scholars and educators from the design and engineering design education research communities about what “good” designers do. The collection features 180 shortened statements derived from full responses provided by each respondent. The collection was first developed in February 2022 by researchers at the Center for Engineering Learning & Teaching (CELT) in the University of Washington Department of Human Centered Design & Engineering (HCDE). As part of a seminar called *Dear Design* in HCDE, the teaching team crowdsourced responses to a query about Good Designers do “X” in order to provide a broad picture of what could be characterized as effective design practices. The collection can be found online in the teaching resources section of our website, designsignatures.org, and comes in multiple virtual or printable formats for engagement with the collection. The full list of responses can be found in *Appendices A* and *B*. This report provides several ways to understand the collection as a whole, a brief outline of three classroom activities that used the Good Designers do “X” collection, and an example of a longer engagement where students drew inspiration from the collection to create postcard visualizations. We believe Good Designers do “X” is a valuable resource to broaden students’ understanding of design.

Keywords: Design expertise, design education, design knowledge, design methods, engineering design, interdisciplinarity, design awareness, design process, human centered design

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1 - Introduction

What do “good” designers do? This is a question design scholars have been asking for many years. In this report we present Good Designers do “X”, a collection of responses from 35 scholars and educators from the design and engineering design education research communities about what “good” designers do. The collection features 180 shortened statements derived from full responses provided by each individual. We also include a list of 10 statements from 3 scholars on “good” practice in areas adjacent to design: math problem solving, physics problem solving, and innovation. We collected these responses from March 2022 through July 2023.

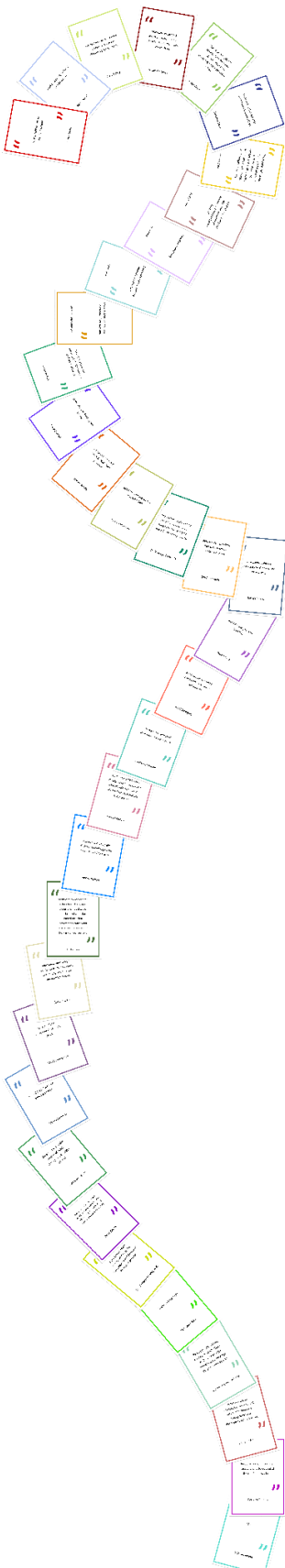
As a resource for design and engineering education, the Good Designers do “X” collection has the potential to broaden the ways students understand design practice. The resource has been used in multiple ways in a teaching environment, with students consistently reporting that they are inspired by both individual quotes and by the collection as a whole.

In the *Background and Methods* section, we cover how the Good Designers do “X” collection was inspired, collected, and developed, and we list the respondents and their affiliations. In the *Describing the Collection* section, we list a sample statement from each respondent and describe ways to understand and interpret the collection as a whole, including using [Claude.ai](#) as an example of a circa-2025 LLM interpretation of the collection. In the section *Accessing the Resource*, we explain the different formats through which the collection can be found in the teaching resources part of our website, Design Signatures ([designsignatures.org](#)). In the *Example Use Cases* section, we provide three classroom activities that use the Good Designers do “X” collection and an example of a longer assignment in two classes. Finally, the full list of responses and statements can be found in *Appendices A and B*.

Because we see these statements as the intellectual property of the people who authored them, if you use this resource, we ask that you keep the author name with each statement so that the work is attributed to the appropriate person.

2 - Background and Methods

In the Winter 2022 quarter (January to March 2022), Cindy Atman, Soraya Barar and Yuliana Flores delivered a 10-week seminar titled “Dear Design: Creating your ideal design signature” in the Human Centered Design & Engineering Department at the University of Washington in the U.S. This seminar was delivered online during the global COVID-19 pandemic. You can read more about the *Dear Design* seminar series [here](#) on our website, as well as below where we describe how Good Designers do “X” was used within the



seminar (see *Example Use Cases: As an assignment in a longer engagement and Appendix D*).

As part of the *Dear Design* seminar, we wanted to provide a broad picture of what could be characterized as *effective design practices*. Intending to cast a broad net, we decided to crowdsource various perspectives of what good designers might do. In February 2022, Atman sent an email to colleagues in the design research and engineering design education communities to generate a list that could serve as inspiration for the students in the seminar. The email included a description of the seminar to provide context for the query, followed by the specific ask:

“I am writing to ask you when you talk to someone and say “Good designers do ‘X’”, what are the top things you list?

This could be your top 4 to 5 things, or whatever comes to mind for you in the timeframe that you have to give to this question. In a nutshell, I would love to hear back from you about your items. My plan is to use responses to my query in an upcoming session in a seminar I am running.

I’m looking for “off the top of your head” answers - but if you have a pointer to a paper or evidence that this is what expert designers do that would be most welcome.”

Initially, 27 scholars responded to the query in February. Atman added her list to the mix, resulting in a rich set of responses from 28 individuals to use in the seminar in March 2022. Additional responses were added later in 2022 and 2023, resulting in a final set of responses from 35 scholars. These responses are in *Appendix A*.

The respondents were contacted based on Atman’s professional connections to the design research and engineering design education communities. Below, Table 1 lists the respondents and their organizational affiliations. Each individual’s organizational affiliations listed here represent their affiliations at the time of their response.

Inspired by variation theory^{1,2}, we also wanted to include examples that were close to design, but not exactly design. These examples may help readers of the list compare design processes to other processes. We are calling these processes that are close to design “adjacent to” design. To this end, we invited responses from scholars in physics problem solving (Michelene Chi) and math problem solving (Alan Schoenfeld). In addition, Ade Mabogunje changed the question from “Good Designers do ‘X’” to “Good Innovators do X” for seven of his eight responses. Therefore, the seven responses to his reframed question are included as adjacent responses, and his response to “Good Designers do ‘X’” is included in the main collection. This resulted in 3 sets of statements about problem solving and innovation processes that we have characterized as “adjacent to” design. These responses are in *Appendix B*.

Each individual provided their full response in a mixture of formats, from a list to full paragraphs. The intent was to use the resource in an educational setting. Therefore, we produced shortened statements from those respondents who wrote in paragraph form. In the summer of 2024, we gave each scholar the opportunity to edit their responses; in particular, we asked them to review the shortened statements to ensure we captured the essence of their points. Eight respondents made slight changes to their shortened statements.

Robin Adams, <i>Purdue University</i>	Peter Lloyd, <i>T U Delft</i>
Cynthia J. Atman, <i>University of Washington</i>	Ade Mabogunje, <i>Stanford University</i>
Reid Bailey, <i>University of Virginia</i>	Janet McDonnell, Emerita, <i>Central Saint Martins</i>
Adam Carberry, <i>Arizona State University</i>	Laura Murphy, <i>University of Michigan</i>
Nigel Cross, Emeritus, <i>The Open University UK</i>	Harold Nelson, <i>Advanced Design Institute</i>
Dharma Dailey, <i>University of Washington</i>	Eli Patten, <i>University of Washington</i>
Shanna Daly, <i>University of Michigan</i>	Şenay Purzer, <i>Purdue University</i>
Andy Dong, <i>Oregon State University</i>	Ben Shneiderman, <i>University of Maryland</i>
Liz Gerber, <i>Northwestern University</i>	Sheri Sheppard, <i>Stanford University</i>
John Gero, <i>University of North Carolina at Charlotte</i>	Kathleen Sienko, <i>University of Michigan</i>
Gabriela Goldschmidt, Emerita, <i>Technion - Israel Institute of Technology</i>	David Socha, <i>University of Washington</i>
Colin M. Gray, <i>Indiana University Bloomington</i>	Erik Stolterman Bergqvist, <i>Indiana University Bloomington</i>
Mark Guzdial, <i>University of Michigan</i>	Vanessa Svihla, <i>University of New Mexico</i>
David Hendry, <i>University of Washington</i>	Lauren Thomas Quigley, <i>IBM Research</i>
Susannah Howe, <i>Smith College</i>	Jennifer Turns, <i>University of Washington</i>
Daria Kotys-Schwartz, <i>University of Colorado Boulder</i>	Barbara Tversky, Emerita, <i>Stanford University; Columbia University</i>
Gordon Krauss, <i>Harvey Mudd College</i>	Linda Vanasupa, <i>Olin College of Engineering; Emeritus, California Polytechnic University</i>
Micah Lande, <i>South Dakota School of Mines & Technology</i>	

Table 1. *Good Designers do “X” Respondents and Affiliations*. This table lists the 35 respondents and their affiliations. Respondents’ titles can be found in *Appendix A*.

3 - Describing the collection

To provide a glimpse into the richness of this resource, the two lists below include one sample shortened statement from each individual's full response. Design-focused responses are in the first list, and adjacent responses are in the second list. The full list of responses and shortened statements on design can be found in *Appendix A*. Adjacent responses and shortened statements can be found in *Appendix B*.

Design responses

- "Good design is gracefully unachievable." (Robin Adams)
- "Scope, gather, model, iterate, cascade" (Cynthia J. Atman)
- "Always keep an eye on the system even when designing components" (Reid Bailey)
- "Modeling of all kinds (physical, mathematical, process, theoretical, and conceptual)" (Adam Carberry)
- "Take a broad systems approach to the given problem, rather than accepting narrow problem criteria" (Nigel Cross)
- "Understand they are NOT designing for themselves" (Dharma Dailey)
- "Recognize that "going back" to prior decisions and revising is not evidence of a mistake, but rather part of a thorough and thoughtful journey" (Shanna Daly)
- "Look at everything and say, 'This is beautifully designed. What can I learn from it?'" (Andy Dong)
- "Question everything" (Liz Gerber)
- "Frame the task to include multiple stakeholders" (John Gero)
- "Sketch ideas throughout the process, from day one" (Gabriela Goldschmidt)
- "Recognize they are building potential futures and ways of being" (Colin M. Gray)
- "Know thy user for they are not you" (Mark Guzdial)
- "Account for indirect impacts and value tensions" (David Hendry)
- "Balance planning, action, and reflection" (Susannah Howe)
- "Know when to pause and reflect on the problem they are really trying to solve. Even during a crisis!" (Daria Kotys-Schwartz)
- "Find the real problem rather than accept the stated problem" (Gordon Krauss)
- "Are comfortable in ambiguity (while reducing uncertainty)" (Micah Lande)
- "Balance analysis with creativity" (Peter Lloyd)
- "Are themselves! which makes the word "good" disappear!" (Ade Mabogunje)
- "Attend to the ethics of their professional actions" (Janet McDonnell)
- "Understand that every design decision impacts a person's life, even if they can't witness the impact themselves" (Laura Murphy)
- "Manage and integrate mindsets, knowledge sets, skill sets, and tool sets" (Harold Nelson)

- “Intentionally decide how to decide - what design decisions need to be made, in what order, based on what information, with what level of confidence, and how much consensus” (Eli Patten)
- “Anticipate how design would perform in 10 years from today and foresee unintentional uses” (Şenay Purzer)
- “Do something unexpected, new, and fresh” (Ben Shneiderman)
- “Do not fall in love with their own ideas” (Sheri Sheppard)
- “Consider the broader context of design throughout a design process” (Kathleen Sienko)
- “Privilege observing over asking, showing over telling, prototyping over guessing, and acting over delaying” (David Socha)
- “Have a developed understanding of the complexity and richness of the design process” (Erik Stolterman Bergqvist)
- “Think synthetically” (Vanessa Svihla)
- “Reflect deeply on their own positionality, that of their users, and the industry or technology they are working with” (Lauren Thomas Quigley)
- “Have a learning orientation—they collect lots of information by asking questions, deploying prototypes, etc.” (Jennifer Turns)
- “Reduce fixation... form new associations, to get out of the rut, find new stimuli” (Barbara Tversky)
- “Listen” (Linda Vanasupa)

Adjacent responses

- “Good [physics] problem solvers try to understand the situation presented in the problem.” (Micheline Chi)
- “Good innovators Day dream, ask generative questions – what if? why not?” (Ade Mabogunje)
- “Good [mathematical] problem solvers reflect periodically on the state of their work and adjust accordingly.” (Alan Schoenfeld)

Reminder: We request that if you use this resource, we ask that you keep the author name with each statement so that the work is attributed to the appropriate person.

3.1 - Understanding the collection as a whole

One way of understanding the Good Designers do “X” collection as a whole is through a word cloud. In Figure 1 we present a wordcloud created from the collection of shortened statements. We removed the words “design” and “good” to highlight the concepts that the contributors were bringing in their responses

<i>Affinity Grouping Themes by Flores</i>	<i>Affinity Grouping Themes by Atman</i>
Good designers analyze problems	Are intentional about process - general
Good designers are change agents	Are intentional about process - specific
Good designers are curious learners	Ask questions / take a learning perspective
Good designers are responsible	Attend to problem framing
Good designers find inspiration	Have a systems approach / deal with complexity
Good designers have a design process	Have developed a personal design mindset/stance
Good designers have design awareness	Include many perspectives
Good designers test their self-bias	Incorporate ethics/values
Good designers think about users	Make the world a better place
Good designers understand their relationship with stakeholders	Think about consequences of design
Good designers do prototypes	Understand attributes of their solutions
Good designers do research	Understand the broad context of situation
Good designers question	Understand users and stakeholders
Good designers scope	Work with others

Table 2. *Affinity Grouping Themes for Good Designers do “X” Shortened Statements.* This table lists the themes found by Yuliana Flores and Cindy Atman during their individual affinity grouping of the shortened responses.

The collection demonstrates that design is a beautifully multifaceted concept that is so hard to describe. So many words, themes, and ideas could be used to describe design and still not cover every possible way that design can be interpreted and acted upon. Because of this, the Good Designers do “X” collection demonstrates that design is not a monolith, but a mosaic.

3.2 - An LLM interpretation of the collection

When we first began soliciting responses to Good Designers do “X” in 2022, large language models (LLMs) were not readily available, but as this paper is being published in 2025, LLMs have become much more common for public use. We would like to provide insights into how one LLM tool, [Claude.ai](https://claude.ai), describes the collection as a whole. Our assumption is that users of the collection will be thinking about using AI to help describe the collection themselves. We wanted to provide a model for how to ask LLM models to engage with the collection, while still connecting ideas to their authors. We also wanted to provide an AI summary that is citable at the time that the collection was released. Finally, we were curious to see whether an LLM would encounter any inconsistencies between the shortened statements and the full response for each contributor.

We used the LLM tool [Claude Opus 4](https://claude.ai) to provide insights about the Good Designers do “X” collection. On June 13th, 2025, we uploaded *Appendix A* into the model and asked it a series of questions. Claude found an error in one of the shortened statements. We fixed that error and reran the questions on June 19,

2025. The tasks that we gave Claude included: 1) finding themes (both 5 and 10 themes), 2) writing a summary of the collection (both one and two paragraph versions), 3) creating affinity group mapping, 4) asking for suggestions about how to use the collection, 5) asking for suggestions about how to teach design with this resource, 6) assessing how effectively the shortened statements capture the key points of the full responses and finding any gaps, and 7) any final thoughts. At the end of each query, we included the following sentence in order to maintain appropriate citations to ideas: “If you use an idea or example quote be sure to connect the author’s name to the idea or quote.”

The following section is a summary of the collection in Claude’s own words. The full Claude transcript can be found in *Appendix C*.

3.2.1 - Claude’s summary of the Good Designers do “X” collection

[NOTE: Direct quotes from Claude’s text are in courier font]

Question: Please describe the collection as a whole in two paragraphs. If you use an idea or example quote be sure to connect the author’s name to the idea or quote.

The Good Designers do 'X'" collection represents a remarkable convergence of wisdom from 39 design and engineering educators and researchers, each offering their perspective on what distinguishes good design practice. The collection emerged from Cindy Atman's query asking experts to share their "off the top of the head" responses about what good designers do, resulting in a rich tapestry of insights that spans disciplines from engineering and computer science to architecture and psychology. The diversity of contributors—from established scholars like Nigel Cross and Barbara Tversky to emerging voices like Laura Murphy—creates a multifaceted view of design excellence. What's particularly striking is how the informal nature of the request ("off the top of my head") produced deeply thoughtful responses that reveal both individual expertise and shared values across the design community.

The collection paints a portrait of good design as fundamentally human-centered, ethically grounded, and cognitively complex work. Rather than focusing solely on technical skills or methodologies, the responses overwhelmingly emphasize relational and reflective capabilities. As Mark Guzdial succinctly puts it, "Know thy user for they are not you," while David Socha describes designers as "servants for greater good." The collection reveals that good designers operate in a constant state of learning and iteration, with Robin Adams noting that good design is "gracefully unachievable" because "every cycle you learn something that needs to be improved." Perhaps most importantly, the collection shows that good design requires a delicate balance—between optimism and pessimism (Eli Patten), between analysis and creativity (Peter Lloyd), between confidence and humility (multiple authors). This collective wisdom suggests that good design is not just about creating solutions, but about navigating complexity with empathy, ethical awareness, and a commitment to making the world better for all stakeholders, including, as

Cynthia Atman notes, "future generations, other species, ecosystems and the globe."

Question: Please find 5 themes from this collection. If you use an idea or example quote be sure to connect the author's name to the idea or quote.

1. Frame Problems Through Deep Understanding and Learning
2. Engage Meaningfully with People and Context
3. Make Ideas Tangible Through Iterative Prototyping
4. Navigate Complexity While Considering Values and Impact
5. Balance Multiple Ways of Thinking and Doing

Question: Using just the shortened statements from each contributor, please do an affinity grouping for the full set of shortened statements with a total number of affinity groups between 12 and 15. If you use an idea or example quote be sure to connect the author's name to the idea or quote.

- | | |
|--|---------------------------------------|
| 1. Problem Framing and Redefinition | 8. Iterative Evolution |
| 2. User-Centered Empathy and Understanding | 9. Dynamic Balance and Flexibility |
| 3. Rapid Prototyping and Experimentation | 10. Collaborative Engagement |
| 4. Continuous Learning Mindset | 11. Divergent and Convergent Thinking |
| 5. Ethical Responsibility and Values | 12. Contextual Sensitivity |
| 6. Systems and Complexity Thinking | 13. Action Orientation and Momentum |
| 7. Metacognitive Reflection | 14. Designer Character and Humility |

Question: How might you use these resources to teach about design? If you use an idea or example quote be sure to connect the author's name to the idea or quote.

Note: The responses here were long, so for brevity, we have included the headings only. Please see Appendix D for full responses.

Here's how I would use "The Good Designers do 'X'" collection to teach about design:

- Building Design Mindsets Through Reflection Journals
- Case Study Analysis Through Multiple Lenses
- Progressive Skill-Building Workshops
- Collaborative Design Challenges
- Metacognitive Exit Tickets

Question: Any final thoughts? If you use an idea or example quote be sure to connect the author's name to the idea or quote.

Looking at this collection as a whole, several striking insights emerge:

The Paradox of Simplicity and Complexity: Perhaps the most profound insight comes from Robin Adams' "gracefully unachievable" and Andy Dong's expansion that design is "simple, but not straightforward." This captures how good design appears effortless while requiring tremendous depth. The collection repeatedly emphasizes embracing complexity while seeking clarity—a fundamental tension that defines expert practice.

Design as Fundamentally Human: What's remarkable is how little these experts focus on technical skills or tools. Instead, the overwhelming emphasis is on relationships, empathy, and understanding others. Mark Guzdiak's "Know thy user for they are not you" could serve as the collection's thesis. Even when discussing prototypes or sketches, the focus is on using them to understand "through other people's perspectives" (Robin Adams).

The Humble Expert: There's a beautiful contradiction in how these accomplished designers emphasize humility, listening, and not knowing. Linda Vanasupa's simple "Listen" and Ade Mabogunje's "Are themselves! which makes the word 'good' disappear!" suggest that expertise in design might mean letting go of the need to be seen as an expert. This humility enables the continuous learning that so many contributors emphasize.

Design as Ethical Practice: The collection reveals design as inherently value-laden work. Multiple contributors stress that designers are "building potential futures" (Colin Gray) and must consider impacts on "future generations, other species, ecosystems and the globe" (Cynthia Atman). This positions design not just as problem-solving but as a form of cultural and environmental stewardship.

The Value of Informal Wisdom: Finally, Daria Kotys-Schwartz's comment—"I love these times to reflect on these questions! It fills my heart"—reminds us that sometimes the most valuable insights come not from formal research but from creating space for experts to share what they truly believe matters. This collection demonstrates that "off the top of my head" responses can reveal deep, practiced wisdom that might be filtered out in more formal contexts.

This collection offers a masterclass in what it means to practice design with both competence and conscience.

4 - Accessing the Resource



The [Good Designers do “X” collection](#) can be found online in the teaching resources section of our website, Design Signatures (designsignatures.org). The collection comes in the form of a database for the statements (a Google Sheet), printable versions of the statements for in-class activities (a playing card deck and a business card deck), and virtual versions for remote activities (a Miro board and Figma file). In this report itself, the list of full responses and shortened statements can be found in *Appendix A* and *B*.

It is very important to us that the intellectual property of the responses in this resource are attributed to the respondents themselves, not to the collectors of the list. Our request to users of the list: **When using or quoting the statements in the Good Designers do “X” collection, we ask that you keep the author name with each of their statements so that the work is attributed to the appropriate person.**

If you are referring to the collection as a whole, please refer to the technical report:

APA format | Atman, C. J., Zhang, E., Barar, S., Flores, Y., & Turns, J. (2025). *Good Designers do “X”: Embracing the breadth of design practices* (Publication No. HCDETRS_2025_01). UW Department of Human Centered Design & Engineering. <https://hdl.handle.net/1773/53109>

A brief description of the resources available on the [website page](#) includes:

- **Spreadsheet** — a Google Spreadsheet containing the individuals’ names, affiliations, and their shortened statements and full responses.
- **Miro Board** — an online board containing virtual sticky notes of the shortened statements. This works well for affinity grouping activities for virtual or in-person classrooms. To copy and use this file, you will need a free Miro account.
- **Figma File** — an online design file containing virtual cards of the shortened statements. This works well for affinity grouping activities for virtual or in-person classrooms. To copy and use this file, you will need a free Figma account.
- **Technical Report** — the archival document that describes the resource, containing the individuals’ names, titles, their institutions, and all original and shortened statements.
- **Playing Card Deck** — a PDF of a printable card deck of the individuals’ names and shortened statements. This can be printed on 8.5” x 11” paper and cut out.
- **Business Card Deck** — a PDF of printable business card sized deck of the individuals’ names and shortened statements. This can be printed on perforated Avery business card paper or on 8.5” x 11” paper and cut out.

5 - Example Use Cases

The Good Designers do “X” collection has been used in the *Dear Design* seminar described earlier, in an undergraduate teamwork course, in a MS class about organizational design, in three workshops, and in a MS class called *Design Process Resilience*. These uses are described in more detail in the “Teaching Resources” section of the Design Signatures website, designsignatures.org. See *Appendix D* for more information on the *Dear Design* and *Design Process Resilience* courses.

Below, we give a brief outline of three classroom activities that we’ve created using Good Designers do “X”, and provide an example of a longer engagement where students create postcard visualizations inspired by Good Designers do “X”.

5.1 - In the moment in the classroom

- **Example Activity: Affinity Grouping**
Students analyze the Good Designers do “X” collection by performing an inductive affinity analysis on the shortened statements and naming themes for the categories they produce. Instances of this activity are detailed in *Use Case: “Dear Design”* and in *Use Case: “Design Process Resilience”* in *Appendix D*.
- **Example Activity: Pick a card**
Students explore the Good Designers do “X” collection by selecting shortened statements that personally resonated with them, discussing their choices in groups, and reflecting on how they might apply these statements to their own approaches to doing design. This was used in an undergraduate course on teamwork and in *Design Process Resilience*, detailed in *Appendix D: Use Case: “Design Process Resilience”*.
- **Example Activity: Mapping Design to Conceptual Frameworks**
Students connect the Good Designers do “X” collection to teamwork principles, leadership principles, and/or user centered design frameworks. Students sort the shortened statements into these frameworks and discuss their insights. This was used in a MS course on organizational teamwork.

5.2 - As an assignment in a longer engagement

In two seminars taught at the University of Washington, the Good Designers do “X” collection also served as inspiration for students to reflect on themselves and their design process. “Dear Design: Creating Your Ideal Design Signature”, mentioned above in the *Background* section, was taught in Winter Quarter 2022 as a directed research group³ for undergraduate, MS, and PhD students from HCDE and other disciplines who were seeking to develop design process awareness. The second course, *Design Process Resilience*, was taught in Autumn Quarter 2024 as a special topics course for HCDE MS students seeking to develop resilience in doing design. See *Appendix D* for more information on these two courses.

Both *Dear Design* and *Design Process Resilience* featured weekly assignments where students created postcard representations of their design process or what inspires them in their design work. These weekly postcards help students reflect on the class session and practice conveying their design process visually.

For one week in both courses, the students interacted with the collection in the classroom and then reflected on the collection for their out-of-class assignment. The postcard prompt is quoted below, and students were free to draw ideas from the Good Designers do “X” statements or look for outside inspiration.

“Based on the responses to the prompt “Good Designers do X” and what we covered in lecture, what resonated with you or inspired you? How might you imagine your own design process using these (new?) insights as a lens or guide/inspiration?”

A student postcard from *Dear Design* and a student postcard from *Design Process Resilience* are shown in Figures 2 and 3, respectively. (These postcards are attributed to the students with their permission). More example student postcards from both courses can be found in *Appendix D*. These postcards demonstrate the reflection and insight that students can gain from interacting with Good Designers do “X”. The front of the postcard is the student’s postcard visualization, and the back of the postcard explains their inspirations and how to read their visualization.

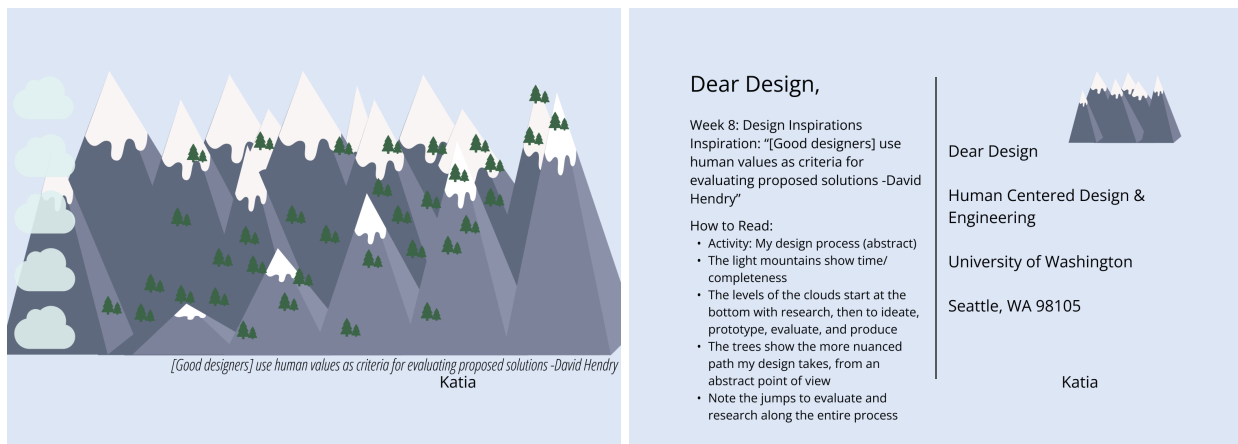


Figure 2. Katia’s postcard from *Dear Design*. Katia was inspired by David Hendry’s statement, “Use human values as criteria for evaluating proposed solutions”.



Figure 3. Rupal Patel’s postcard from *Design Process Resilience*. Rupal was inspired to think about the impact of design, especially impacts one may not realize.

6 - Summary

In classrooms and other spaces where we interact with students, the Good Designers do “X” collection shows promise as a tool for opening up conversations around “good” design and design inspirations. Activities and discussions prompted from Good Designers do “X” responses show promise in broadening students’ understanding of design as behavior, process, and outcome. Students in our classes who have interacted with the collection consistently report deep insights about design in general and about themselves as designers. Because of this, we believe Good Designers do “X” is a valuable resource to enhance design teaching. We encourage you to use and adapt the activities we’ve created on the Design Signatures website.

7 - Acknowledgements

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We would like to express our gratitude to the design researchers, engineering design educators, and math and physics educators who provided their inspirational thoughts about design practices, and to the students whose experiences have helped us improve this resource.

8 - References

¹ Marton, F. (2015). *Necessary conditions of learning*. New York: Routledge.

² Runesson, U. (2006). What is it possible to learn? On variation as a necessary condition for learning. *Scandinavian journal of educational research*, 50(4), 397-410.

³ Turns, J., & Ramey, J. (2006). Active and collaborative learning in the practice of research: Credit-based directed research groups. *Technical communication*, 53(3), 296-307.

9 - List of Appendices

Appendix A: Responses to the query Good Designers do “X”

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Appendix A

Responses to the query Good Designers do “X”

When using or quoting the statements, we ask that you keep the author name with each statement so that their work is attributed to them. Organizational affiliations listed here represent respondents' affiliations at the time of their response.

Robin Adams

*Professor, School of Engineering Education
Purdue University*

Shortened statements for cards:

- Good design is gracefully unachievable.
- Good design is deeply contextualized.
- Good design starts off with good framing.
- Good design takes into account multiple perspectives.
- Good design recognizes and embraces complexity.
- Good design is being open to surprises and learning by design.
- Good design is simple, but not straightforward.
- Good designers make quick mockups of ideas to "see them" and "understand them through other people's perspectives".

Response to *Good Designers Do “X”* query:

The following are Robin’s “in the moment” responses¹. Her responses are also reframed from “Good designers do ‘X’” to “Good design is...”

- Gracefully unachievable – every cycle you learn something that needs to be improved, it’s a good thing – so good designers know there are more cycles coming (and make space for that). Another way of saying this... good design is iterative (should enable iterative improvements); good designers flexibly and purposefully iterate. This is a continual learning process – personally, professionally, and proactively for that particular project.
- Deeply contextualized – what is good in one context is not guaranteed to be good in another (it can be negative) – this may feel like it goes against the idea of “universal design” – but good designers know that context is a key part of what is making a problem...problematic.
- Starts off with good framing – good designers spend considerable time trying to figure out what needs to be achieved and for whom (and where), and they will take in quite a bit of input but with an eye towards knowing the goal isn’t to be reductive but generative and integrative (embracing the complexity). Good designers also know that the more they find out, the more they might need to evolve their initial frame – that the first one was a place holder to help them dig deeper without getting overwhelmed.

- Takes into account multiple perspectives – not just people (design as a social process of meaning making) but the planet (design as a contextualized endeavor). This allows seeing a larger system of complex inter-relationships, and coming to terms with how “healthy conflict” among different perspectives creates valuable opportunities to continually grow your own perspective.
- Recognizes and embraces complexity – rather than reducing down to goals that can be measured, good design leaves open the possibility of finding ways to check how a solution meets a complex set of needs.
- Being open to surprises and learning by design – happy accidents become places for revising ideas about good practice. For example, curb cuts were designed for physically disabled people in wheelchairs so they could have more freedom of movement. These days, everyone uses them for everything (baby carriages, dog carriages, skateboards and roller skates, a shorter step off a curb to reduce likelihood of falls, etc.). Without learning by doing, we lose the opportunity to think deeply about the biggest bang for the buck in what we design and how these become values that shape a philosophy of good design.
- Simple, but not straightforward – simple in knowing how to start, move forward, and know if you hit an end point. Not straightforward in that it involves considerable effort to build knowledge and put that to effective use. This is an idea I picked up from David Radcliffe – and it stuck with me. It reminds us that design is not a method or a technique – but a way of thinking, doing, and being. It can be summarized into a short bullet list, but behind the curtain of that bullet list is deep and embodied connected knowing – some which serves as common ground across a community of practitioners and some of which is agentive, providing freedom of voice and action in ways that continually refresh a “what is good design” conversation.
- Good designers make quick mock-ups of ideas to “see them” and “understand them through other people’s perspectives.” They don’t see this as a waste of time (like beginning designers) – but see it as jumping a process many steps forward (they find out stuff including things they may have taken for granted or unknowingly assumed). By making ideas “real” and “painting a picture” for others to engage with, they bring an idea out of the picture in their head (the unquestioned perspective that hides many blind spots) and into the social and material space of multi-perspective collaborative design.

¹From Robin Adams: “These were in the moment responses. I prefer to keep them authentic (it’s what I felt at the time) which means that they are likely to carry errors or promote misunderstandings...that I hope prompt interesting conversations, rather than judgment.”

Cynthia J. Atman (Cindy)

*Mitchell T. & Lella Blanche Bowie Endowed Chair
Professor, Human Centered Design & Education
Director, Center for Engineering Learning & Teaching
University of Washington*

Shortened statements for cards:

- Consider context and consequences
- Include many perspectives
- Scope, gather, model, iterate, cascade
- Ask questions
- Enact design awareness
- Understand that design embodies values

Response to the query *Good designers do “X”*:

Good designers...

- Consider context and consequences. Good designers cast a broad net when they are understanding the problems they are solving and the potential consequences of their final designs so that they are leaving the world in a better place than they found it.
- Include many perspectives. Good designers include many diverse perspectives at all parts of the process, understanding all the stakeholders affected (not just the users). In these considerations they think past current humans to include perspectives of future generations, other species, ecosystems and the globe. Good designers also include diverse perspectives in their design team.
- Scope, gather, model, iterate, cascade. Good designers understand the scope of a problem early in the process, gather information throughout their process, model their potential solutions, and frequently iterate across design activities. Their “design signature”, or a tracing of activities of their process displays a cascade from problem scoping through modeling to finishing the design.
- Ask questions. Good designers ask questions throughout their design process. They do this not only to understand the problem and decrease ambiguity (converge), but they also ask questions of the situation to increase ambiguity and explore possibilities (diverge).
- Enact design awareness. Good designers stay aware of their design process while they are in the midst of a design project. They 1) think deeply and plan how they want their design process to go before starting a design project, 2) monitor their design process while they are in it and make informed decisions about next steps, and 3) reflect on their process when they are done to inform how they will carry out their next design project.
- Understand that design embodies values. Good designers understand that the designs they put out into the world embody the set of values that they have enacted through the many choices they make along the way. This includes the choice of what projects to work on, the voices that are prioritized, the decision criteria that are used in decision making, the choice of how time is spent, ect.

Atman, C. J. (2019). Design timelines: Concrete and sticky representations of design process expertise. *Design Studies*, 65, 125-151.

Eris, O. (2004). *Effective inquiry for innovative engineering design* (Vol. 10). Springer Science & Business Media.

Scalone, G., Atman, C. J., Mejia, K., Twigg-Smith, H., Shroyer, K., & Joya, A. (2020). Dealing with ambiguity: Leveraging different types of expertise to guide design questioning. *International Journal of Engineering Education*, 36(2), 773-795.

Reid Bailey

Professor, Systems Engineering

University of Virginia

Shortened statements for cards:

- Stay optimistic
- Understand their work is as much about problem finding as it is about problem solving
- Are constantly learning – about problems, about possible solutions, new skills
- Know when good enough is good enough; they don't perseverate over perfection
- Can quickly switch between an open, creative mindset and a judging, evaluative mindset
- Are good makers who prototype to learn; they consider manufacturing during design
- Always keep an eye on the system even when designing components
- Richly engage with users' perspectives and use those to drive ideation and decision-making
- Know how to apply their deep engineering theoretical knowledge in design – and when such knowledge is not helpful or sufficient
- Hit deadlines
- Don't just adopt these mindsets/behaviors/practices, but VALUE doing so

Response to the query *Good designers do "X"*:

Here is my answer: Good (engineering?!) designers (sources when possible in this font)

- Stay optimistic (no citations; in IDEOs Little Red Book; general experience)
 - When the conflicting needs of users seems to leave little space for innovation
 - When a “favorite” idea has to be abandoned – which is a courageous act!
 - When an idea that they have invested a lot of time in simply does not function or does not work
- Blend phases of activity (your work!)
 - They move quickly but don't rush (stole this from UCLA coach Wooden)
 - Good designers don't perseverate over getting it perfect ... they get something and then learn from it
 - For example, don't wait to understand the users and context “perfectly”
 - They can quickly switch between an open, creative mindset and a judging evaluative mindset... and know when each mindset is helpful in advancing a design.
- Are constantly learning – about problems, about possible solutions, new skills
 - They understand their work is as much about problem finding as it is about problem solving... and that their understanding of the problem and of the solution will co-evolve throughout a project (Nigel Cross Engineering Design Thinking)
- They make stuff with purpose.
 - In many spaces (but not in all of engr design), they are good makers/prototypers in addition to being good “on-paper” designers.
 - Just being good at “design process” is not sufficient.
 - Just making stuff wily-nilly isn't good – prototype with purpose. Prototype to learn.
- Always keep an eye on the system even when designing components (seems like lots of sources for this! – but I don't have citations from studies at the ready – one I recall is a study from Mudd 2005 published in IJEE 22(3), author is Durward Sobek. Link [here](#).)
- Richly engage with users' perspectives and use those to drive ideation and decision-making (seems like lots of sources for this one, too! – but I don't have citations from studies at the ready)
- Know how to apply their deep engineering theoretical knowledge to create “things” – and when such knowledge is not helpful (no sources... seems self-evident?)

- Hit deadlines
 - They can work under time pressure and deliver

Key is that they don't just do/adopt these mindsets/behaviors/practices, but that they VALUE doing so. They see them as important.

¹ Because the response was to Cindy Atman, the reference here is to her scholarship on design.

Adam Carberry

*Associate Professor, The Polytechnic School
Fulton Schools of Engineering
Arizona State University*

Shortened statements for cards:

- Research on the potential societal, economic, cultural, and environmental impacts of their solutions
- Use-inspired projects informed by insights from real people
- Modeling of all kinds (physical, mathematical, process, theoretical, and conceptual)
- Testing before distribution
- Iteration and redesign

Response to the query *Good designers do "X"*:

Here is my immediate list without doing too much in depth thinking:

1. Research on the potential societal, economic, cultural, and environmental impacts of their solutions
2. Use-inspired projects informed by insights from real people
3. Modeling of all kinds (physical, mathematical, process, theoretical, and conceptual)
4. Testing before distribution
5. Iteration and redesign

Nigel Cross

*Emeritus Professor of Design Studies
The Open University UK*

Shortened statements for cards:

- Take a broad systems approach to the given problem, rather than accepting narrow problem criteria
- Frame the problem in a distinctive and sometimes rather personal way
- Use the framing to identify relevant first principles to guide solutions
- Work with a breadth of attention to different facets of the problem and solution
- Work with a depth of attention from broad goals to details of implementation

- Exhibit more frequent shifts of attention between activity modes within the overall process

Response to the query *Good designers do “X”*:

Here’s my response to your question:

- Three key strategic aspects of design thinking appear to be common across expert, innovative designers: 1. taking a broad systems approach to the given problem, rather than accepting narrow problem criteria (going beyond the brief); 2. framing the problem in a distinctive and sometimes rather personal way (focusing on critical or promising aspects); and 3. designing from first principles (using the framing to identify and employ relevant fundamental knowledge).

These statements are evidence-based from my studies of outstanding innovative engineering and product designers and recorded in my book *Design Thinking: Understanding how designers think and work*.¹

- Better designers exhibit richer design process behaviours: they work in breadth across a wide span of attention to different facets of the problem and solution, and in depth from broad goals to details of implementation, and they exhibit more frequent shifts of attention between activity modes within the overall process.

These statements are from other studies of experienced and student designers (e.g. 'Design Expertise Amongst Student Designers', Cross, N., H. Christiaans and K. Dorst, *Journal of Art and Design Education*, Vol. 13, No. 1, pp. 39-56, 1994.), but more especially your own work².

¹(Cross, N. (2023) Bloomsbury Publishing.)

²Because the response was to Cindy Atman, the reference here is to her scholarship on design.

Dharma Dailey

*Research Associate, Human-Centered Data Science
Part-time Faculty Bothell Computing & Software Systems
University of Washington*

Shortened statements for cards:

- Integrate multiple perspectives into their design
- Understand they are NOT designing for themselves
- Understand the nature of the problem-solution by tactically taking actions that enable others to respond to the design in progress and help shape it

Response to the query *Good designers do “X”*:

Good Designers integrate multiple perspectives into their design.

They understand they are NOT designing for themselves and I would say, almost everything or maybe everything they do is to better understand the nature of the problem-solution by tactically taking actions that enable others to respond to the design in progress and help shape it directly or indirectly.

Of course, my idea of “good design” is shaped by the thinking of designing information systems. Maybe this applies less in fashion or other less service-oriented design spaces.

Shanna Daly

Associate Professor, Mechanical Engineering

Miller Faculty Scholar

Arthur F. Thurnau Professor, Mechanical Engineering

University of Michigan

Shortened statements for cards:

- Recognize the power they have in naming problems and ideating solutions
- Recognize, research, and account for both social and technical aspects of problems and solutions
- Recognize that deep exploration of a real problem is just as much a part of design work as developing and evaluating solutions
- Engage in collaborative, reciprocal relationships with diverse stakeholders, both internal and external to their organization
- Explore divergently in problem and solution spaces
- Engage in deep analyses to make decisions that consider design context, design and stakeholder positionalities, and technical knowledge
- Create visual representations to examine their understandings of problems, contexts, stakeholders, and solutions throughout their design work
- Reflect intentionally throughout their work to shape iteration to their understandings and ideas and prompt shifts in their design approaches
- Recognize that “going back” to prior decisions and revising is not evidence of a mistake, but rather part of a thorough and thoughtful journey

Response to the query *Good designers do “X”*:

Good designers recognize the power they have in naming problems and ideating solutions and reflect and respond to that power with an equity- and justice-focused lens throughout their design work.

Good designers recognize, research, and account for both social and technical aspects of problems and solutions and acknowledge these aspects as inextricable from one another.

Good designers recognize that deep exploration of a real problem is just as much a part of design work as developing and evaluating solutions.

Good designers engage in collaborative, reciprocal relationships with diverse stakeholders, both internal and external to their organization.

Good designers explore divergently in problem and solution spaces as well as engage in deep analyses to make decisions that consider design context, design and stakeholder positionalities, and technical knowledge.

Good designers create visual representations (sketches, prototypes, storyboards, maps, models, diagrams, etc.) to examine their understandings of problems, contexts, stakeholders, and solutions throughout their design work, including at the earliest stages of work.

Good designers reflect intentionally throughout their work to shape iteration to their understandings and ideas and prompt shifts in their design approaches, and recognize that “going back” to prior decisions and revising is not evidence of a mistake, but rather part of a thorough and thoughtful journey.

Andy Dong

*Professor & Head Of School for the School of Mechanical, Industrial, and Manufacturing Engineering
Oregon State University*

Shortened statements for cards:

- Look at everything and say, "How could this be better (designed)?"
- Look at everything and say, "This is beautifully designed. What can I learn from it?"
- Think of (better) design as about good service to others (inspired by Ray and Charles Eames)
- Pay attention to how others see & (inter)act in the world (especially while using things) so that they can learn to see the world through other people's POV
- Obsess over details (to our detriment)

Response to the query *Good designers do “X”*:

A terrific question and since you wanted things off the top of my head, I thought I should respond immediately so that I don't think too hard. Here they are (excuse bad grammar):

1. Look at everything and say, "How could this be better (designed)?"
2. or Look at everything and say, "This is beautifully designed. What can I learn from it?" (Do you follow this instagram feed? One of my favorites: @iconicdiary)
3. Think of (better) design as about good service to others - OK this is a bit of a riff from a quote by Ray and Charles Eames, which I cannot now find
4. Pay attention to how others see & (inter)act in the world (especially while using things) so that they can learn to see the world through other people's POV (point of view)
5. Obsess over details (to our detriment)

Liz Gerber

*Professor, Mechanical Engineering
Co-Founder and Director of the Center for Human Computer Interaction + Design
Northwestern University*

Shortened statements for cards:

- Question everything
- Are great learners
- Imagine the future

- Are generative
- Are ethical
- Are systems thinkers

Response to the query *Good designers do “X”*:

Good designers question everything. Does what that person say they do align with what that person actually does and how they feel? If not, why not? Do products, policies, services, etc have to work this way? Why? What if they worked in this other way? For example, in healthcare, what if doctors paid people to be their patients?

Good designers are great learners. Good designers know how to learn and how to learn quickly and efficiently. They know how to identify what they don’t know and to figure out how to close the knowledge gap. They know what environments support their learning and they are willing to learn from anything from a book to getting arrested at a protest. They are learning machines – learning about everything from people and places to technology and meaning making.

Good designers imagine the future. Good designers use the present and past to inform new visions of the future. Good designers are futurists, imagining ideal ways of being. In these futures, they work with stakeholders to prioritize what’s best for the community over their own egos.

Good designers are generative. They are never worried about not having a new idea. Like being learning machines, they are also idea machines. They produce thousands of new ideas a day. They are domain and material agnostic. They can generate an idea in any domain or in any medium.

Good designers are ethical. When they know something can be designed, they always ask “should” it be designed. They don't just ask if their design work is legal, efficient, or cost-effective, they ask how the design will affect others. They consider the unintended consequences and take responsibility.

Good designers are systems thinkers. They recognize that no design exists in isolation – it’s part of a complex and dynamic ecosystem.

John Gero

Research Professor in Computer Science and Architecture

UNC Charlotte

Co-Editor in Chief, Design Science

Shortened statements for cards:

- Give the client more than they specified in the Requirements
- Frame the task to include multiple stakeholders
- Explore more than one alternative
- Interact regularly with their client

Response to the query *Good designers do “X”*:

Here are my “off the top of my head” responses, based on the assumption that we are talking about designers who are big D designers.

Good designers:

1. Give the client more than they specified in the Requirements
2. Frame the task to include multiple stakeholders
3. Explore more than one alternative
4. Interact regularly with their client

Gabriela Goldschmidt

*Professor Emerita, Industrial Design Track
Technion - Israel Institute of Technology*

Shortened statements for cards:

- Dig up any available background information that could be relevant
- Break problem down into sub-problems
- Think of users
- Determine what is most important and create a list of priorities
- Look at precedents
- Sketch ideas throughout the process, from day one
- Build prototypes

Response to the query *Good designers do “X”*:

Here are a few things I jotted down in response to “Good designers do X” (no particular order):

- Dig up any available background information that could be relevant.
- Break problem down into sub-problems.
- Think of users.
- Determine what is most important and create a list of priorities.
- Look at precedents.
- Sketch ideas throughout the process, from day one.
- Build prototypes.

Colin M. Gray (they/them)

*Associate Professor, Informatics
Director, Human-Computer Interaction Design (HCI/d)
Indiana University Bloomington*

Shortened statements for cards:

- Recognize they are building potential futures and ways of being
- Mediate complex ethical relationships with stakeholders
- Continuously engage in judgements that shape their understanding of the design context
- Actively resist the "matrix of domination" and seek to create more equitable futures

Response to the query *Good designers do “X”*:

Some quick responses to your query which you are welcome to share and use as you'd like:

- Good designers recognize they are building potential futures and ways of being (Gray, 2022)
- Good designers mediate complex ethical relationships with stakeholders (Gray & Chivukula, 2019)
- Good designers continuously engage in judgments that shape their understanding of the design context (Gray et al., 2015)
- Good designers actively resist the “matrix of domination” and seek to create more equitable futures (Costanza-Chock, 2020)

Costanza-Chock, S. (2020). *Design Justice: Community-Led Practices to Build the Worlds We Need*. MIT Press.

Gray, C. M. (2022). *Languaging design methods*. *Design Studies*, 78, 101076.

<https://doi.org/10.1016/j.destud.2021.101076>

Gray, C. M., & Chivukula, S. S. (2019, May). *Ethical Mediation in UX Practice*. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems - CHI '19*. <https://doi.org/10.1145/3290605.3300408>

Gray, C. M., Dagi, C., Demiral-Uzan, M., Ergulec, F., Tan, V., Altuwajjri, A. A., Gyabak, K., Hilligoss, M., Kizilboga, R., Tomita, K., & Boling, E. (2015). *Judgment and Instructional Design: How ID Practitioners Work In Practice*. *Performance Improvement Quarterly*, 28(3), 25–49. <https://doi.org/10.1002/piq.21198>

Mark Guzdial

*Professor, Electrical Engineering and Computer Science
University of Michigan*

Shortened statements for cards:

- Design for their users
- Know thy user for they are not you

Response to the query *Good designers do “X”*:

As you know, I don't study expert designers. But I can give you my favorite X for “Good designers do ‘X’”, because it's **consistently** hard for students, and I've found it very hard for faculty too in doing design for learning: Good designers **design for their users**. The way I put it when I teach HCI design is: "Know thy user for they are not you." It's **so** hard to imagine a user that isn't like you, who has different knowledge, experiences, goals, and even epistemologies!

- When I do design galleries in my classes, my students describe their users often by saying, "Well, when I'm doing this..." It's so hard for them to go interview someone, survey them, or just watch real users.

- When I was working with Betsy DiSalvo at Georgia Tech, she taught me how she does participatory design, and that describes everything I do to design now. I realize that I don't know how social studies, mathematics, and language arts teachers think and work, so I work with them as designers of the tools we build for their classrooms.
- Here in [my field] all faculty simply know that all students want to go work for a Silicon Valley tech firm, so that determines the course content, structure, and pedagogy. But nobody ever asks the students.
- The Tech industry has this saying "Eat your own dog food." Build your software for you and people like you, and use it while you develop it. I can't imagine a worse idea if you're trying to design for users not like you.

David Hendry

Associate Professor, The Information School

University of Washington

Shortened statements for cards:

- "Find" and "frame" new problems in response to a given problem
- Serve stakeholders and clients - which means they sometimes say "no"
- Use human values as criteria for evaluating proposed solutions
- Account for indirect impacts and value tensions
- Consider planetary limits in their work

Response to the query *Good designers do "X"*:

Here's my "off the top of my head" – very biased – list. Good designers:

1. "Find" and "frame" new problems in response to a given problem
2. Serve stakeholders and clients – which means they sometimes say "no"
3. Use human values as criteria for evaluating proposed solutions
4. Account for indirect impacts and value tensions
5. Consider planetary limits in their work

Susannah Howe

Design Clinic Director and Senior Lecturer

Smith College

Shortened statements for cards:

- Balance planning, action, and reflection
- Plan (ensuring direction and intentionality)
- Take Action (facilitating movement and outcomes)
- Reflect (enabling refinement and learning)

Response to the query *Good designers do "X"*:

Good designers balance planning, action, and reflection

Planning ensures direction and intentionality

Action facilitates movement and outcomes

Reflection enables refinement and learning

Daria Kotys-Schwartz

Director, Idea Forge

Co-Director, Mechanical Engineering Design Center

Teaching Professor, Mechanical Engineering

University of Colorado Boulder

Shortened statements for cards:

- Understand that design is a social process and know how to leverage their relationships and resources (with all stakeholders) throughout the process
- Know when and how to use design tools effectively to augment each step of the design process
- Know when to pause and reflect on the problem they are really trying to solve. Even during a crisis!
- Know that design is a difficult and emotional process!

Response to the query *Good designers do “X”*:

Good designers understand that design is a social process and know how to leverage their relationships and resources (with all stakeholders) throughout the process.

Good designers know when and how to use design tools effectively to augment each step of the design process.

Good designers know when to pause and reflect on the problem they are really trying to solve. Even during a crisis!

Good designers know that design is a difficult and emotional process!

By the way – I love these times to reflect on these questions! It fills my heart.

Gordon Krauss

Fletcher Jones Professor of Engineering Design

Harvey Mudd College

Shortened statements for cards:

- Find the real problem rather than accept the stated problem
- Develop empathy for users and all other stakeholders
- Functionally decompose problems thoroughly

- Understand the impact of their design decisions on society
- Generate a wide set of potential solutions prior to selecting the best one
- Build and test their ideas to confirm and refute their beliefs and assumptions (including those about user needs) and improve their understanding
- Iterate their solutions to improve the degree to which their designs meet user and stakeholder needs

Response to the query *Good designers do “X”*:

(From first email)

Off the top of my head, good designers:

1. find the real problem rather than accept the stated problem.
2. develop empathy for users and all other stakeholders.
3. functionally decompose problems thoroughly.
4. understand the impact of their design decisions on society.
5. generate a wide set of potential solutions prior to selecting the best one.

If you have extra room, I'd add "iterate" and "validate."

(From follow-up email)

Validation is an interesting area to explore, in part because it includes invalidation as a silent partner. In a sense I think of it as: good designers:

1. build and test* their ideas to confirm and refute their beliefs and assumptions (including those about user needs) and improve their understanding.
2. iterate their solutions to improve the degree to which their designs meet user and stakeholder needs.

* This has the implications for physical testing for validation but could broadly mean building mathematical or other models as well.

Micah Lande

Assistant Professor, Mechanical Engineering

E.R. Stensaas Chair

South Dakota School of Mines & Technology

Shortened statements for cards:

- Radically reframe or reset the problem at hand
- Are problem-finders not just problem-solvers
- Get started even before they know that they are certain in what they are doing
- Are comfortable in ambiguity (while reducing uncertainty)
- Draw on a wealth of experience to (knowledge) broker possible ideas/prototypes/solutions/directions
- Are humble in sharing their relevant experiences working collaboratively

Response to the query *Good designers do “X”*:

Off the top of the head -- what a freeing framing...

Good designers:

- radically reframe or reset the problem at hand
- are problem-finders not just problem-solvers
- get started even before they know that they are certain in what they are doing
- are comfortable in ambiguity (while reducing uncertainty)
- draw on a wealth of experience to (knowledge) broker possible ideas/prototypes/solutions/directions
- are humble in sharing their relevant experiences working collaboratively

Peter Lloyd

Professor of Design Methodology

Faculty of Industrial Design Engineering

TU Delft

Shortened statements for cards:

- Balance analysis with creativity
- Are interested in everything about the world around them
- Feel that things should be better somehow
- Can communicate the importance of design (and design thinking)
- Know when to lead, facilitate, listen, collaborate and act

Response to the query *Good designers do “X”*:

To answer your question off the top of my head:

Good designers:

- Balance analysis with creativity
- Are interested in everything about the world around them
- Feel that things should be better somehow
- Can communicate the importance of design (and design thinking)
- Know when to lead, facilitate, listen, collaborate, and act

Ade Mabogunje

Sr Research Engineer, Mechanical Engineering

Stanford University

Ade changed the question to: “Good innovators do X” instead of “Good designers do X”. His responses to his reframed question on innovation are in Section B. Ade also sent a second email that included a response specifically to the “Good Designers Do ‘X’” query, and that response is included in this section.

Shortened statements for cards:

- Are themselves! which makes the word “good” disappear!

Response to the query *Good designers do “X”*:

Good designers are themselves! which makes the word “good” disappear!

Janet McDonnell

Visiting Professor, Innovation School, The Glasgow School of Art

Professor Emerita, Central Saint Martins, University of the Arts London

Editor-in-Chief, CoDesign International Journal of Co-Creation in Design and the Arts

Shortened statements for cards:

- Attend to the ethics of their professional actions
- Interrogate the brief, i.e. the characterisation of the 'task' or the construct of the 'problem'
- Move fluidly between generating and critically evaluating proposals as design progresses
- Seek and engage in authentic collaboration

Response to the query *Good designers do “X”*:

Good designers do –

1 attend to the ethics of their professional actions

they take responsibility for considering the political, social and environmental consequences of what they do

2 interrogate the brief, i.e. the characterisation of the ‘task’ or the construct of the ‘problem’

to surface and question implicit assumptions and clarify what constitute the constraints

3 move fluidly between generating and critically evaluating proposals as design progresses

maintaining openness and responsiveness to insights that emerge, including backtracking when appropriate

4 seek and engage in authentic collaboration

to effect mutual learning among collaborators and to advance understanding

I'd recommend as reading

J.McDonnell Gifts to the Future: Design reasoning, design research and critical design practitioners

She-ji: The Journal of Design, Economics and Innovation 1(2) (Winter 2015)

<http://dx.doi.org/10.1016/j.sheji.2016.01.007> pp107-117

Laura Murphy

PhD student, Design Science

Shortened statements for cards:

- Understand that every design decision impacts a person's life, even if they can't witness the impact themselves
- Lead with humility, curiosity, and empathy that each human life is worth understanding and accounting for
- Push for radical change while also recognizing that our lives are the culmination of small moments
- Seek to build a more inclusive, joyful, and equitable future

Response to the query *Good designers do "X"*:

Kathleen Sienko from the University of Michigan sent the following:

One of Shanna Daly's PhD students (Laura Murphy), who is studying inclusive design, shared the following:

"Good designers understand that every design decision impacts a person's life, even if they can't witness that impact themselves."

"Good designers seek to build a more inclusive, joyful, and equitable future."

"Good designers push for radical change while also recognizing that our lives are the culmination of small moments."

"Good designers lead with humility, curiosity, and empathy that each human life is worth understanding and accounting for."

Harold Nelson

Director and President of the Advanced Design Institute (ADi)

Shortened statements for cards:

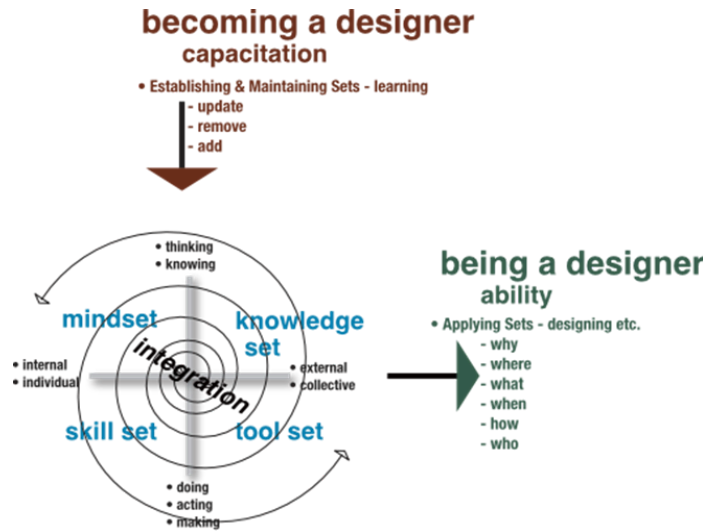
- Manage and integrate mindsets, knowledge sets, skill sets, and tool sets

Response to the query *Good designers do "X"*:

Sorry I don't have such a list. I have written a bit about what good design education and praxis consists of. I have listed a few on my web site:

www.haroldgnelson.com

I don't have 4 or 5 things as such. My approach to design education in general is systemic. For example I use a schema of 'sets' to help me organize pedagogy and content:



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I would not venture to define the contents of any of the sets for engineering design given it has been so long since I worked with engineers. For me ‘good’ designers manage and integrate all four sets in this schema.

Eli Patten

*Assistant Teaching Professor
Mechanical Engineering
University of Washington*

Shortened statements for cards:

- Know how to intentionally balance optimism and pessimism in the design process to get a better design than just realism itself
- Break apart a problem to figure out what is at the very core
- Intentionally decide how to decide - what design decisions need to be made, in what order, based on what information, with what level of confidence, and how much consensus
- Work to empathize with the many different customers/stakeholders involved and understand all use cases, not just the core functions
- Try to understand their assumptions and explicitly test them

Response to the query *Good designers do “X”*:

this is a list of design aphorisms I've come across: <https://www.mechdesignprocess.com/aphorisms>
some I find insightful but some less so.

One thing about design that I've come to realize in my own journey is the importance of balancing optimism with pessimism. This is different than just being realistic, but intentionally having an optimistic outlook at certain stages of the project and intentionally being pessimistic in other parts. You have to be optimistic to get started and stay motivated and think there is even a solution out there for this

problem, and that the crazy ideas you're thinking of might work. But you also need to balance that with pessimism when evaluating ideas or accounting for risk - what are all the ways this idea can go wrong? Can I make it more simple? I realized a while ago that often I have that balance reversed in my head, being optimistic about "I'm sure there's someone out there working on this problem", "This was probably designed this way for a good reason", "This design will work great, let's just do it" while pessimistic about "it's unlikely this is that great of an idea" or "someone has probably already tried this and couldn't get it to work", and this approach is not very helpful for a) seeing needs and problems around you that could be address, b) having the confidence/motivation to try to look into something further, and c) interrogating your biases and ensuring you're not deluding yourself about the risks. No data or studies to back it up, but it is something that I try to keep in mind when designing. To put it more succinctly for your prompt:

- Good designers know how to intentionally balance optimism and pessimism in the design process to get to a better design than just realism itself.

Other things that come to mind

- Good designers break apart a problem to figure out what is at the very core.
- Good designers intentionally decide how to decide - what design decisions need to be made in what order and based on what information and what level of confidence and buy-in.
- Good designers work to empathize with the many different customers/stakeholders involved and understand all use cases, not just the core function.
- Good designers try to understand their assumptions and explicitly test them.

Senay Purzer

*Professor, School of Engineering Education
Purdue University*

Shortened statements for cards:

- Center conscientious negotiation at the center of design
- Fluently reason across experiential observations, trade-offs, first-principles, and futures thinking
- Anticipate how design would perform in 10 years from today and foresee unintentional uses

Response to the query *Good designers do "X"*:

Good designers ...

1. Center conscientious negotiation of risks and benefits at the center of design
2. Fluently reason across experiential observations, trade-offs, first-principles thinking, and futures thinking
3. Anticipate how design would perform in 10 years from today and foresee unintentional uses and consequences

Ben Shneiderman

*Professor, Computer Science
University of Maryland*

Shortened statements for cards:

- Do something unexpected, new, and fresh
- Have a portfolio of accomplishments that are united by a personal style
- Deliver on their commitments

Response to the query *Good designers do “X”*:

My instant reaction was to shift to "Great designers do something unexpected, new, and fresh." They question the premise (as I just did) and offer alternatives that were not assumed by the stated requirement. As I was planning to send you this message we were watching some of the Olympic figure skating. The commentary was about how the dancing pairs took figure skating to the proverbial next level of grace, beauty, timing, coordination, etc. Each Olympic raises the expectations with triple spins and now quadruple turns... quite amazing to see. Similarly, the snowboarding showed incomprehensible and seemingly impossible flips. Athletes and their coaches are designers as well.

Also, "Great designers have a portfolio of accomplishments that are united by a personal style" - they have track records and a personal style that makes their work distinctive.

A final point might be that "Great designers deliver on their commitments" - they have the maturity and clarity to complete projects, often on time and in budget in ways that genuinely serve client needs.

I've lately been thrilled with the work of Neri Oxman, Bjarke Ingels, and Thomas Heatherwick. Their books show amazing portfolios of clever thinking in ambitious ways. The first two are featured in 45 minute segments about their work as part of the Netflix series called Abstract. I'm enjoying watching these diverse designers speak about their work.

Sheri Sheppard

*Richard W. Weiland Professor, Mechanical Engineering
Stanford University*

Shortened statements for cards:

- Ask a lot of questions of people obviously and not obviously "stakeholder" and/or knowledgeable about the situation (and the questions get beyond the surface)
- Connect ideas and concepts not obviously connected
- Do not fall in love with their own ideas
- Use a variety of approaches for feedback and engagement
- Are continuous and curious learners about the world
- Question how/where/if design is the appropriate tool for the situation at hand

Response to the query *Good designers do “X”*:

Good designers...

- Ask a lot of questions of people obviously and not obviously “stakeholder” and/or knowledgeable about the situation. (and the questions get beyond the surface)
- Connect ideas and concepts not obviously connected
- Do not fall in love with their own ideas.
- Use a variety of approaches for feedback and engagement
- Are continuous and curious learners about the world
- Question how/where/if design is the appropriate tool for the situation at hand

Kathleen Sienko

*Arthur F. Thurnau Professor, Mechanical Engineering
University of Michigan*

Shortened statements for cards:

- Engage stakeholders with prototypes during front-end design work
- Are intentional about their use of prototypes; they consider the design question(s) that they are asking, the stakeholders, and the setting prior to developing their prototype(s)
- Consider the broader context of design throughout a design process
- Base design decisions on quantitative and/or qualitative data rather than anecdotal evidence
- Use multiple, diverse sources of information to develop requirements and specifications
- Consider their positionality when engaging in design work

Response to the query *Good designers do “X”*:

Good designers engage stakeholders with prototypes during front-end design work ¹

Good designers are intentional about their use of prototypes; they consider the design question(s) that they are asking, the stakeholders, and the setting prior to developing their prototype(s) (worksheet that we use with our students [here](#)).²

Good designers consider the broader context of design throughout a design process (conference paper below, manuscript in review).³

Good designers base design decisions on quantitative and/or qualitative data rather than anecdotal evidence.

Good designers use multiple, diverse sources of information to develop requirements and specifications. ⁴

Good designers consider their positionality when engaging in design work.

¹Rodriguez-Calero, Ilka B., Marianna J. Coulentianos, Shanna R. Daly, Jocelyn Burrige, and Kathleen H. Sienko. "Prototyping strategies for stakeholder engagement during front-end design: Design practitioners' approaches in the

medical device industry." *Design Studies* 71 (2020): 100977.; Coulentianos, Marianna J., Ilka Rodriguez-Calero, Shanna R. Daly, and Kathleen H. Sienko. "Global health front-end medical device design: The use of prototypes to engage stakeholders." *Development Engineering* 5 (2020): 100055.; Rodríguez-Calero, I., Daly, S. R., Burleson, G., & Sienko, K. H. (2023). Prototyping Strategies to Engage Stakeholders During Early Stages of Design: A Study Across Three Design Domains. *Journal of Mechanical Design*, 145(4), 041413.

²Deiningner, Michael, Shanna R. Daly, Kathleen H. Sienko, and Jennifer C. Lee. "Novice designers' use of prototypes in engineering design." *Design studies* 51 (2017): 25-65.; Deiningner, Michael, Shanna R. Daly, Jennifer C. Lee, Colleen M. Seifert, and Kathleen H. Sienko. "Prototyping for context: exploring stakeholder feedback based on prototype type, stakeholder group and question type." *Research in engineering design* 30, no. 4 (2019): 453-471.; Coulentianos, Marianna J., Ilka Rodriguez-Calero, Shanna R. Daly, and Kathleen H. Sienko. "Stakeholder Engagement With Prototypes During Front-End Medical Device Design: Who Is Engaged With What Prototype?." In *Frontiers in Biomedical Devices*, vol. 83549, p. V001T08A001. American Society of Mechanical Engineers, 2020.

³Burleson, Grace, Kathleen H. Sienko, and Kentaro Toyama. "Incorporating Contextual Factors Into a Design Process: An Analysis of Engineering for Global Development Literature." In *International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, vol. 84010, p. V11BT11A009. American Society of Mechanical Engineers, 2020.; Burleson, G., Herrera, S. V., Toyama, K., & Sienko, K. H. (2023). Incorporating Contextual Factors Into Engineering Design Processes: An Analysis of Novice Practice. *Journal of Mechanical Design*, 145(2), 021401.

⁴Mohedas, Ibrahim, Shanna R. Daly, and Kathleen H. Sienko. "Requirements development: Approaches and behaviors of novice designers." *Journal of Mechanical Design* 137, no. 7 (2015): 071407.; Mohedas, Ibrahim, Shanna R. Daly, and Kathleen H. Sienko. "Gathering and synthesizing information during the development of user requirements and engineering specifications." In *2014 ASEE Annual Conference & Exposition*, pp. 24-639. 2014.

David Socha

*Associate Professor, Computing & Software Systems
University of Washington, Bothell*

Shortened statements for cards:

- Are servants for greater good
- Understand the responsibility of being a designer, and thus are humble and curious about what they don't know and seek out diverse and contradictory perspectives in order to avoid confirmation bias
- Deeply engage with the communities of use in order to best understand not only what might be useful for the producers of X but more importantly what might be beneficial to the people of the community for which the product/service is being designed
- Use iterative and adaptive processes to collaboratively explore and make sense of complex adaptive systems in order to reveal new patterns and insights (a.k.a. new knowledge) that can help the community answer questions about the desirability, feasibility, and viability of an existing or proposed system
- Privilege observing over asking, showing over telling, prototyping over guessing, and acting over delaying

- Focus on satisficing and abduction, rather than optimizing and proving/induction, since most of design is about complex systems where there is not sufficient stability of causal relationships to merit the effort to optimize or prove
- Take advantage of sense-making systems like the Cynefin framework to take different types of actions in different contexts
- For software-enabled systems, consciously attend to the three interacting complex adaptive systems (CAS) that comprise a software-enabled system: 1) the CAS of the people in an organization that is creating/evolving the system of use, 2) the CAS of the people who use the resulting system being created, and 3) the CAS of the system being created

Response to the query *Good designers do “X”*:

Using Heskett’s framing that “Design is to design a design to produce a design” I’d first notice that there are many, many different types of both Designers and designers. Given this, I’d want my answers to address the core fundamentals of what distinguishes designing (the verb) from other types of making.

Given that framing, I think that good designers:

- Are servants for greater good.
- Understand the responsibility of being a designer, and thus are humble and curious about what they don’t know and seek out diverse and contradictory perspectives in order to avoid confirmation bias. This is increasingly important as oligopolies are increasingly centralizing control over pervasive and invasive aspects of our work and personal lives.
- Deeply engage with the communities of use in order to best understand not only what might be useful for the producers of X but more importantly what might be beneficial to the people of the community for which the product/service is being designed. Designers have enormous power to bring into sight things that were not visible before, and their choices about what to show (and therefore what to hide) may have huge implications. See the prior two bullets.
- Use iterative and adaptive processes to collaboratively explore and make sense of complex adaptive systems in order to reveal new patterns and insights (aka new knowledge) that can help the community answer questions about the desirability, feasibility, and viability of an existing or proposed system. In particular, designers should focus on the whole gamut of outcomes and impacts, not just the positive ones.
- Privilege observing over asking, showing over telling, prototyping over guessing, and acting over delaying. See the six blog entries Skip Walter wrote on this topic based upon the discussions that he and I have been having about it:
<https://skipwalter.net/2020/09/19/observe-dont-ask-show-dont-tell/>
- Focus on satisficing and abduction, rather than optimizing and proving/induction, since most of design is about complex systems where there is not sufficient stability of causal relationships to merit the effort to optimize or prove. Of course, where appropriate good designers should also work with good engineers and scientists for areas where expert knowledge is critical (the Complicated Cynefin domain). See
https://cynefin.io/wiki/Cynefin:_weaving_sense-making_into_the_fabric_of_our_world.

- Take advantage of sense-making systems like the Cynefin framework to take different types of actions in different contexts.
- For software-enabled systems, which encompass more and more systems, consciously attend to the three interacting complex adaptive systems (CAS) that comprise a software-enabled system: the CAS of the people in an organization that is creating/evolving the system of use; the CAS of the people who use the resulting system being created; and the CAS of the system being created.

Lauren Thomas Quigley

Research Scientist

IBM Research

Shortened statements for cards:

- Reflect deeply on their own positionality, that of their users, and the industry or technology they are working with
- Explore the social implications of their products and designs and ensure that those implications align with their own value system
- Take time to understand and engage with the culture, needs, and wants of their user groups and related constituents
- Read history, fiction, social science, poetry from many disciplines and genres. Inspiration, understanding, and care come from engaging with others, the way they think, how they see the world and how they wish to see it
- Realize that the existence of any artifact affects everything around it

Response to the query *Good designers do “X”*:

Good designers do:

- Reflect deeply on their own positionality, that of their users, and the industry or technology they are working with and leverage those findings to inform their work.
- Explore the social implications of their products and designs and ensure that those implications align with their own value system
- Take time to understand and engage with the culture, needs, and wants of their user groups and related constituents. Even those who will not use a product are impacted by the product’s existence and use by others.
- Read history, fiction, social science, poetry from many disciplines and genres. Inspiration, understanding, and care come from engaging with others, the way they think, how they see the world and how they wish to see it.
- Realize that the existence of any artifact affects everything around it

Erik Stolterman Bergqvist

Senior Executive Associate Dean

Professor in Informatics

Shortened statements for cards:

- Always try to be aware of their own existing design thinking/philosophy
- Intentionally and reflectively develop their ability to make design judgements
- Are humble but strong when it comes to design ideas
- Have a developed understanding of the complexity and richness of the design process
- Have a deep sense of quality, without a preset notion of what is good or bad design

Response to the query *Good designers do “X”*:

Your question “Good designers do x” is fun but difficult. For me to answer something like that it has to be on a very abstract level, since there are no activities that are always good. It all depends on the design situation. But I can try...I realize that I did not list “what designers do” instead it became a list of what designers have or are....

They always try to be aware of their own existing design thinking/philosophy

They intentionally and reflectively develop their ability to make design judgments.

They are humble but strong when it comes to design ideas.

They have a developed understanding of the complexity and richness of the design process.

They have a deep sense of quality, without a preset notion of what is good or bad design.

Well, this was fun, I could probably come up with 50 more. The problem is of course to know which 5 are more important than others, it is all contextually dependent.

Vanessa Svihla

Associate Professor

*Organization, Information & Learning Sciences / Chemical & Biological Engineering
University of New Mexico, Albuquerque*

Shortened statements for cards:

- Advocate
- Practice joyful tentativeness
- Critically evaluate their own preferences, especially in terms of its transferability
- Think synthetically
- Manage the impacts of power dynamics while taking up agentive roles

Response to the query *Good designers do “X”*:

As I think about what good designers do, here is my list:

1. They advocate. Designers advocate for time and resources to invest effort in understanding and framing the problem. They advocate for vulnerable and marginalized stakeholder needs, rather

than dismissing them (as marginal) and thus creating solutions that widen the gap, further marginalizing them.

2. They practice joyful tentativeness. This means they make decisions, yet are ready to pivot when needed. They treat early ideas as suspect and initial understandings of problems as insufficient/incomplete. They don't leap at solutions. I use the word "practice" very deliberately here, as it takes effort for most people to enact this - it takes practice to develop this as a way of responding. This is especially true for those who don't tolerate ambiguity/uncertainty well. Practiced tentativeness is joyful in that designers playfully dwell in ambiguity, wear it like a colorful, jaunty quilt, recognize it as an opportunity to explore the unknown.
3. They critically evaluate their own preferences, especially in terms of its transferability. Design problems differ from other problems in that solving them requires abductive reasoning (AKA, design thinking). Designers rely on precedent, preferences, experience, and instinct in filling in gaps. These kinds of information are also prone to bias, and can lead to worse designs if designers fail to recognize the limits of their experience. Sometimes this means deliberate reframing of a problem or using speculative techniques.
4. They think synthetically. They are not overly swayed by numbers, but seek complexity in data. This can mean numerator/denominator thinking (rates, frequencies, disaggregation), but also means attention to qualitative data. Not everything is easy to count, but the non-countable information can sometimes make or break a designed solution. Synthesizing across and valuing different forms of data—apples-AND-oranges thinking—is difficult.
5. They can manage the impacts of power dynamics while taking up agentive roles. Designers know it is their role to use their agency to direct the framing of the problem. But sometimes this means false displays of uncertainty or tentativeness to invite others as co-designers, sharing agency with the stakeholders, materials, and contexts. They can work in transdisciplinary, power-conscious ways that invite marginal points of view and forthright feedback. There is a lot of witness-thinking needed here - being with context, with stakeholders, etc. and in ways that are respectful to them.

Book: Svihla, V., & Reeve, R. (Eds.). (2016). *Design as scholarship: Case studies from the learning sciences*. Routledge.

Jennifer A. Turns

*Professor, Human Centered Design & Engineering
University of Washington*

Shortened statements for cards:

- Have a learning orientation—they collect lots of information by asking questions, deploying prototypes, etc.
- Ideate not just solutions but also ways of defining the problem, ways of configuring the design process, etc.
- Are oriented toward action, and seek to not get stuck; to keep the process moving along
- Find ways to try out (a.k.a. prototype) their ideas as soon as possible and continually with a goal of getting information that will make it possible to iterate

- Include as many people in the process as possible; they make design social
- Don't just "have" an idea; they also talk about and through their idea a lot

Response to the query *Good designers do "X"*:

1. Effective designers have a learning orientation—they collect lots of information by asking questions, learn from deploying prototypes and seeing what happens, etc.
2. Effective designers ideate not just solutions but also ways of defining the problem, ways of configuring the design process, etc.
3. Effective designers are oriented toward action, toward trying something, doing something, imagining something, deploying something. They seek to not get stuck; to keep the process moving along.
4. Effective designers find ways to try out (a.k.a. prototype) their ideas as soon as possible and continually with a goal of getting information that will make it possible to iterate.
5. Effective designers include as many people in the process as possible--stakeholders, co-designers, people who listen to the pitch and give feedback. In other words, they make design social.
6. Effective designers don't just "have" an idea; they also talk about and through their idea a lot. They spend time explaining it, narrating it, representing it, etc. They explain the goals, the proposed solution, the reason the proposed solution will work. This is hard work and clarity comes from working hard.

Barbara Tversky

Professor Emerita of Psychology, Stanford

Professor of Psychology and Education, Teachers College, Columbia University

Shortened statements for cards:

- Think broadly (divergent), think deeply (convergent)
- Reduce fixation... form new associations, to get out of the rut, find new stimuli
- Wandering with Other Minds
- Change Perspective
- Sketch, model, prototype, role play, user test
- For ideas: wander, play, focus, repeat.

Response to the query *Good designers do "X"*:

Barbara pointed us to text she had written as a section in a synthesis paper published in 2021. Barbara's section is titled "*How to get a good idea in science, art, design, and life.*" The article appeared in the International Journal of Design Creativity and Innovation. Her section is on pages 24-25 and is copied below.

"How to get a good idea in science, art, design,—and Life (Barbara Tversky)

The core challenges in creativity, innovation, and design never change: think broadly (divergent), think deeply (convergent). Reduce fixation. Then a big jump to: Think out of the box, Think different. But how? And how to explain in 500 words? Here, some organized rubrics, to be enlarged with real research and real examples. In the meantime, no stealing!

Fixation happens when the mind goes round and round in the same rut, another old problem, one at the foundation of memory as well as creativity: stimulus-response associations. Every upside has a downside. For learning, you want to strengthen associations. For innovation, you want to weaken them. The fix for fixation: to form new associations, to get out of the rut, find new stimuli.

Wander

Life is constant flux, just wait, new stimuli come by themselves

Wandering in time, Incubate. The brain prunes distractions and finds essences

Wandering in the World

Wandering in the Mind

Wandering with Other Minds

Wandering might free you from fixation, but it is haphazard, bringing in stimuli that may or may not be productive. Wandering with a plan, a mind-set, a purpose, is likely to be more productive than random wandering. That's called play.

Play

Wander in a relevant world

Play with other minds

Find similarities and analogies, of surface, of structure, of process, of action, of conception, of outcome

Start with an old idea, then: deconstruct & reconstruct

Change Perspective

Take another's

Go abstract

Examine negative space

Focus

Test your idea(s) (more than one is better than one)

Sketch, model, prototype, role play, user test: you think with all your senses and with your actions and with what they produce.

Repeat

Like the instructions on a shampoo bottle: apply, lather, rinse, repeat. For ideas: wander, play, focus, repeat.

Wait, when to stop? When you're done. You'll know. All the pieces will fit together"

Tversky, B. (2022). *How to get a good idea in science, art, design,- and life*. In [Perspectives on design creativity and innovation research: 10 years later](#). International Journal of Design Creativity and Innovation, Cascini, G., Nagai, Y., Georgiev, G. V., Zelaya, J., Becattini, N., Boujut, J. F., ... & Wodehouse, A. (Ed), pp 24-25.

Linda Vanasupa

Professor, Olin College of Engineering

Emeritus Professor of Materials Engineering

California Polytechnic University

Shortened statements for cards:

- Listen
- Decenter themselves
- Effortfully stand with others to view their world

- Wonder about what they don't know
- Are humble

Response to the query *Good designers do "X"*:

Here are my top 4-5 things: Listen, Decenter themselves, Effortfully stand with others to view their world, Wonder about what they don't know, are humble.

Appendix B

Responses to questions adjacent to to Good designers do “X”: Good problem solvers do “X” and Good innovators do “X”

When using or quoting the statements, we ask that you keep the author name with each statement so that their work is attributed to them.

Michlene Chi

*Regents Professor, Dorothy Bray Endowed Professor of Science and Teaching
Arizona State University*

Michlene was asked to respond to the prompt “Good physics problem solvers do X”

Shortened statements for cards:

- Good [physics] problem solvers think about constraints
- Good [physics] problem solvers try to understand the situation presented in the problem.

Response to the query *Good physics problem solvers do “X”*:

My top of the head response to your question is: Think about the constraints and try to understand the situation presented in the problem.

Alan Schoenfeld

*Elizabeth and Edward Conner Professor of Education
Affiliated Professor of Mathematics
University of California at Berkeley*

Alan was asked to respond to the prompt “Good mathematical problem solvers do X”

Shortened statements for cards:

- Good [mathematical] problem solvers reflect periodically on the state of their work and adjust accordingly.

Response to the query *Good mathematical problem solvers do “X”*:

If I had to pick one phrase, it would be “Good problem solvers reflect periodically on the state of their work and adjust accordingly.”

That’s the short version. The more thorough version is in a paper that just appeared. See: Schoenfeld, A. H. (2022). Why Are Learning and Teaching Mathematics So Difficult?. In Handbook of Cognitive Mathematics (pp. 1-35). Cham: Springer International Publishing.

Ade Mabogunje

*Sr Research Engineer, Mechanical Engineering
Stanford University*

Ade changed the question to: “Good innovators do X”. His statements on what good innovators do is included in this section of responses that are “adjacent” to the responses about design.

Shortened statements for cards:

- Good innovators Value teamwork.
- Good innovators Day dream, ask generative questions – what if? why not?
- Good innovators Are not afraid of making mistakes, looking foolish, and being vulnerable.
- Good innovators Are Compassionate, that is they combine empathy with personal sacrifice and persevering action to alleviate the suffering of others.
- Good innovators Are more visual and tactile than most people in their community.
- Good innovators Suffer mildly... they have to learn to accept themselves.
- Good innovators Have a desire to self-actualize.

Response to the reframed query *Good Innovators Do “X”*:

From first email [Note: response from his second email is included in Section A]:

My answer is biased ... very biased, because my research has been focused on innovators... Therefore before making my list, it may be helpful to describe how I view innovation, because it has now become a buzz word.

The best description in my opinion comes from Piero Scaruffi, the former head of the Artificial Intelligence Center at Olivetti, Cupertino, California. He writes:

“... I see two instincts at work in nature. On the one hand there is “imitation”: each living being tends to imitate what other living beings are doing. This is a widespread instinct, and I have come to believe that this is the fundamental “social instinct”. It is pervasive in nature. It is pervasive in human society. **People who imitate are considered “nice”**. They behave in a way that conforms to what society expects from its members. ... Innovation in human society is rarely welcomed. It is most often met with skepticism, hostility and plain accusations of heresy or madness. It is correctly perceived as a threat to the established order. In a sense, society is right to put innovators in madhouses: innovation is the social equivalent of a genetic mistake. It takes time for society to accept it for what it is: an innovation, that changed the established order and created a new order. Basically, people recognize it as “innovation” when they start imitating it. The paradox of innovation is that it is accepted as an innovation when it has become imitated.”

With the caveat that most good designers are not innovators (too expensive, and they may not get a job), I will rewrite your prompt as:

“Good Innovators do ‘X’”:

1. Value teamwork: Engineering today is very complex and knowledge intensive, and therefore difficult for one person to do alone.

2. Day dream, ask generative questions – what if? why not? – and take initiative to answer their questions. Innovation is oriented towards an unknown future, talk less a certain future. Innovators do not mind committing to and investing effort in the unknown, which reveals itself or emerges only in the doing.
3. Are not afraid of making mistakes, looking foolish, and being vulnerable. Doug Engelbart the inventor of the mouse, windows, internet links, and several other first in a 1994 interview said: "The rate at which a person can mature is directly proportional to the embarrassment he can tolerate, I've tolerated lots."
4. Are Compassionate, that is they combine empathy with personal sacrifice and persevering action to alleviate the suffering of others. While prepping for the movie, Just Mercy, Brie Larson the actress asked Eva Ansley, the person she was portraying in the movie how she keeps going in the face of so much working against her. Eva answered: 'If all I can do is bring a little hope to someone, that's enough. No one needs to feel alone.'
5. Are more visual and tactile than most people in their community. According to Ellen Langer, a Harvard psychologist, mindlessness, the human tendency to operate on autopilot, whether by stereotyping; performing mechanically, by rote; or simply not paying attention, and often results from categorical thinking. Our language is a list of categories, and very often verbal articulation is mistaken for concrete reality. Through drawing and building, innovators gain a more comprehensive access to phenomena beyond its immediate cultural use and understanding.
6. Suffer mildly from some culturally defined mental illness or handicap or stereotype. They have learnt to accept themselves, are open about it, and the good part is that they are able to do what they do despite the cultural tendency towards norming and homogenizing people. The following two research findings are still controversial, but they are listed as #6 and you asked for 5 :) 6.1. According to Simon Baron Cohen, a psychologist working on autism, "... Autism occurs more often in families of physicists, engineers, and mathematicians." Most high functioning autistic people and a few others like obsessive compulsives tend to be labelled as geeks. According to D.B Weiss's fictional character Adam Pennyman, "A geek is a person, male or female, with an abiding, obsessive, self-effacing, or even self-destructing love for something besides status." This of course allows such people to embark on a project that is not cool today, because they are not chasing status. 6.2. According to Allan Reiss, a neuroscientist studying cooperation, "... Previous behavioral studies have found that women cooperate more when they're being watched by other women; that men tend to cooperate better in large groups; and that while a pair of men might cooperate better than a pair of women, in a mixed-sex pair the woman tends to be more cooperative. ... Theories have circulated about why this is, but the brain science behind them has been scarce."
7. Have a desire to self-actualize. According to Abraham Maslow, very few people are able to self-actualize, and not everyone desires to self-actualize. However, those that self-actualize, appear to have the following characteristics. High creativity, autonomy, concern for humanity, acceptance of self and others, ability to achieve peak experiences more frequently than other people.

8. The last characteristic is an important one in my opinion. It says, good innovators enjoy what they do!

Appendix C

[NOTE: Direct quotes from Claude's text are in courier font]

User: Hi Claude! We're uploading The Good Designers do "X" collection to you, which is a group of statements written by design and engineering educators and researchers on what "good designers do".

This collection has these individuals' original full statements as well as a list of shortened statements that we have made from their original statements.

If you use ideas or example quotes in responding to the questions we ask, please be sure to connect the author's name to the idea or quote.

Synthesized expert insights on good design practices for attribution

Thank you for sharing "The Good Designers do 'X'" collection! I've successfully received and reviewed this comprehensive document containing insights from numerous design and engineering educators and researchers about what constitutes good design practice.

I understand that:

- The document contains both original full responses and shortened statement versions
- When referencing any ideas or quotes from this collection, I should properly attribute them to the specific author
- The collection includes contributions from experts like Robin Adams, Cynthia J. Atman, Reid Bailey, and many others

I'm ready to help answer any questions you have about this material, and I'll make sure to properly credit each author when discussing their specific insights about what good designers do. What would you like to explore from this collection?

User: Please find 10 themes from this collection. If you use ideas or example quotes be sure to connect the author's name to the idea or quote.

Distilled ten design themes from expert perspectives and insights.

Based on my analysis of the collection, here are 10 major themes about what good designers do:

- 1. Embrace and Navigate Complexity**

Good designers recognize and work with complexity rather than oversimplifying. As Robin Adams states, good design "recognizes and embraces complexity" rather than reducing down to easily measured goals. John Gero emphasizes that designers "Frame the task to include multiple stakeholders," while David Socha notes they work with "complex adaptive systems."

2. Engage Deeply with Users and Stakeholders

A dominant theme is meaningful engagement with people. Kathleen Sienko emphasizes designers "engage stakeholders with prototypes during front-end design work." Shanna Daly notes they "engage in collaborative, reciprocal relationships with diverse stakeholders, both internal and external to their organization." Mark Guzdial captures this with "Know thy user for they are not you."

3. Iterate, Prototype, and Learn Through Making

Good designers make ideas tangible quickly. Robin Adams describes how they "make quick mockups of ideas to 'see them' and 'understand them through other people's perspectives'." Gordon Krauss states they "Build and test their ideas to confirm and refute their beliefs and assumptions." Jennifer Turns emphasizes they "find ways to try out (a.k.a. prototype) their ideas as soon as possible."

4. Frame and Reframe Problems

Problem definition is as important as solving. Robin Adams notes good design "starts off with good framing." Nigel Cross emphasizes designers "Frame the problem in a distinctive and sometimes rather personal way." Micah Lande describes how they "radically reframe or reset the problem at hand."

5. Consider Multiple Perspectives

Good designers actively seek diverse viewpoints. Cynthia Atman states they "Include many perspectives" and consider "not just the users" but "future generations, other species, ecosystems and the globe." Robin Adams notes good design "takes into account multiple perspectives" for "seeing a larger system."

6. Maintain a Learning Orientation

Continuous learning characterizes good designers. Liz Gerber simply states they "Are great learners." Reid Bailey emphasizes they "Are constantly learning - about problems, about possible solutions, new skills." Jennifer Turns describes how they have a "learning orientation—they collect lots of information by asking questions, deploying prototypes, etc."

7. Consider Ethics, Values, and Impact

Good designers think about consequences. Cynthia Atman notes they "Understand that design embodies values." Colin Gray states they "Recognize they are building potential futures and ways of being." Janet McDonnell emphasizes they "Attend to the ethics of their professional actions."

8. Balance Different Modes of Thinking

Designers shift between different cognitive modes. Peter Lloyd mentions they "Balance analysis with creativity." Reid Bailey describes how they "Can quickly

switch between an open, creative mindset and a judging, evaluative mindset." Barbara Tversky captures this as "Think broadly (divergent), think deeply (convergent)."

9. Practice Reflection and Self-Awareness

Good designers are metacognitive. Susannah Howe emphasizes they "Balance planning, action, and reflection." Erik Stolterman notes they "Always try to be aware of their own existing design thinking/philosophy." Shanna Daly states they "Reflect intentionally throughout their work to shape iteration."

10. Understand Design as a Social Process

Design is collaborative and social. Daria Kotys-Schwartz emphasizes designers "understand that design is a social process and know how to leverage their relationships." Jennifer Turns notes they "make design social" and "include as many people in the process as possible." David Socha describes them as "servants for greater good."

These themes reveal that good design practice involves much more than technical problem-solving—it requires emotional intelligence, ethical consideration, systems thinking, and deep engagement with the human and environmental contexts in which designs will exist.

User: Please shorten this to a set of 5 themes. If you use an idea or example quote be sure to connect the author's name to the idea or quote.

Strategized condensing themes by identifying core design principles.

Based on the collection, here are 5 core themes about what good designers do:

1. Frame Problems Through Deep Understanding and Learning

Good designers spend significant time understanding before solving. Robin Adams emphasizes that good design "starts off with good framing" and that designers should spend "considerable time trying to figure out what needs to be achieved and for whom." Reid Bailey notes they "understand their work is as much about problem finding as it is about problem solving." This continuous learning mindset extends throughout the process, with Liz Gerber stating good designers "Are great learners" and Jennifer Turns describing their "learning orientation."

2. Engage Meaningfully with People and Context

Design is fundamentally social and contextual. Cynthia Atman states good designers "Include many perspectives" considering "all the stakeholders affected (not just the users)." Mark Guzdial captures this with "Know thy user for they are not you." Daria Kotys-Schwartz emphasizes designers "understand that design is a social process and know how to leverage their relationships." David Socha describes designers as "servants for greater good" who "deeply engage with the communities of use."

3. Make Ideas Tangible Through Iterative Prototyping

Good designers quickly externalize and test ideas. Robin Adams describes how they "make quick mock-ups of ideas to 'see them' and 'understand them through other people's perspectives'." Gordon Krauss states they "Build and test their ideas to confirm and refute their beliefs and assumptions." This iterative approach is captured by Barbara Tversky's cycle: "wander, play, focus, repeat."

4. Navigate Complexity While Considering Values and Impact

Good designers embrace complexity and think systemically about consequences. Robin Adams notes good design "recognizes and embraces complexity." Cynthia Atman emphasizes designers "Understand that design embodies values" and "Consider context and consequences." Colin Gray states they "Recognize they are building potential futures and ways of being," while Janet McDonnell stresses they "Attend to the ethics of their professional actions."

5. Balance Multiple Ways of Thinking and Doing

Good designers fluidly shift between different modes. Peter Lloyd mentions they "Balance analysis with creativity." Reid Bailey describes how they "Can quickly switch between an open, creative mindset and a judging, evaluative mindset." Susannah Howe emphasizes they "Balance planning, action, and reflection." Eli Patten notes the importance of "intentionally balance optimism and pessimism in the design process."

These five themes capture the essence of good design practice as a thoughtful, human-centered, iterative process that requires both analytical and creative capabilities while maintaining ethical awareness.

User: Please describe the collection as a whole in two paragraphs . If you use an idea or example quote be sure to connect the author's name to the idea or quote.

Strategized comprehensive collection description with analytical approach

"The Good Designers do 'X'" collection represents a remarkable convergence of wisdom from 39 design and engineering educators and researchers, each offering their perspective on what distinguishes good design practice. The collection emerged from Cindy Atman's query asking experts to share their "off the top of the head" responses about what good designers do, resulting in a rich tapestry of insights that spans disciplines from engineering and computer science to architecture and psychology. The diversity of contributors—from established scholars like Nigel Cross and Barbara Tversky to emerging voices like Laura Murphy—creates a multifaceted view of design excellence. What's particularly striking is how the informal nature of the request ("off the top of my head") produced deeply thoughtful responses that reveal both individual expertise and shared values across the design community.

The collection paints a portrait of good design as fundamentally human-centered, ethically grounded, and cognitively complex work. Rather than focusing solely on technical skills or methodologies, the responses overwhelmingly emphasize relational and reflective capabilities. As Mark Guzdial succinctly puts it, "Know thy user for they are not you," while David Socha describes designers as "servants for greater good." The collection reveals that good designers operate in a constant state of learning and iteration, with Robin Adams noting that good design is "gracefully unachievable" because "every cycle you learn something that needs to be improved." Perhaps most importantly, the collection shows that good design requires a delicate balance—between optimism and pessimism (Eli Patten), between analysis and creativity (Peter Lloyd), between confidence and humility (multiple authors). This collective wisdom suggests that good design is not just about creating solutions, but about navigating complexity with empathy, ethical awareness, and a commitment to making the world better for all stakeholders, including, as Cynthia Atman notes, "future generations, other species, ecosystems and the globe."

User: Please shorten that to one paragraph. If you use an idea or example quote be sure to connect the author's name to the idea or quote

Strategized concise paragraph while preserving original attribution

"The Good Designers do 'X'" collection brings together perspectives from 39 design and engineering educators and researchers responding to Cindy Atman's request for their "off the top of the head" thoughts about what makes designers effective. This diverse group—spanning disciplines from engineering to psychology—creates a remarkably cohesive portrait of good design as fundamentally human-centered, ethically grounded, and cognitively complex work. The responses emphasize relational over technical capabilities, with Mark Guzdial capturing a central theme: "Know thy user for they are not you," while David Socha describes designers as "servants for greater good." The collection reveals good design as an iterative journey of continuous learning, with Robin Adams noting it is "gracefully unachievable" because "every cycle you learn something that needs to be improved." Throughout, contributors stress the importance of balance—between optimism and pessimism (Eli Patten), analysis and creativity (Peter Lloyd), and confidence and humility—while maintaining awareness of broader impacts. As Cynthia Atman emphasizes, good designers consider not just immediate users but "future generations, other species, ecosystems and the globe," suggesting that excellence in design requires navigating complexity with empathy, ethical awareness, and a commitment to creating positive change in the world.

User: What suggestions do you have for using this resource? If you use an idea or example quote be sure to connect the author's name to the idea or quote.

Pondered resource usage strategies for diverse audiences.

Here are suggestions for using "The Good Designers do 'X'" collection effectively:

For Design Education: This collection serves as an excellent teaching resource for helping students understand design as more than technical problem-solving. Instructors could use the shortened statements as discussion prompts or reflection exercises. For instance, students could explore Robin Adams' concept that good design is "gracefully unachievable" to understand iteration, or unpack Mark Guzdial's "Know thy user for they are not you" through empathy-building exercises. The diversity of perspectives makes it ideal for showing students that there's no single path to good design, while the recurring themes help identify core competencies to develop.

For Professional Development and Practice: Design practitioners and teams could use this collection for self-assessment and team building. The statements could serve as a reflective checklist—for example, asking "Are we truly engaging stakeholders as Kathleen Sienko suggests with 'prototypes during front-end design work'?" or "Are we balancing optimism and pessimism as Eli Patten recommends?" Teams could select different authors' perspectives to champion during projects, ensuring diverse approaches are considered. Janet McDonnell's emphasis on "attend to the ethics of their professional actions" could prompt regular ethical reviews of design decisions.

For Research and Scholarship: This collection provides a snapshot of expert knowledge in design thinking circa 2024, making it valuable for researchers studying design expertise, education, or practice. The format itself—requesting "off the top of the head" responses—reveals what experts consider most salient about good design when not overthinking. Researchers could analyze patterns across disciplines, track evolution of design thinking by comparing to historical texts, or use it as a foundation for developing assessment tools. The collection also demonstrates the value of informal knowledge gathering, as Daria Kotys-Schwartz noted: "I love these times to reflect on these questions! It fills my heart."

For Cross-Disciplinary Learning: Given contributors range from engineering to psychology, the collection offers an opportunity to bridge disciplinary boundaries. Practitioners in one field can gain insights from another—engineers might benefit from Barbara Tversky's cognitive science perspective on "wander, play, focus, repeat," while designers from artistic backgrounds might appreciate the systematic approaches described by engineering educators. This cross-pollination can enrich practice and encourage more holistic approaches to design challenges.

User: How might you use these resources to teach about design? If you use an idea or example quote be sure to connect the author's name to the idea or quote.

Strategized teaching methods for design resource integration

Here's how I would use "The Good Designers do 'X'" collection to teach about design:

Building Design Mindsets Through Reflection Journals: I would have students select 3-5 statements that challenge their current thinking about design and maintain a semester-long reflection journal. For instance, a student might grapple with Robin Adams' paradox that good design is "gracefully unachievable" or Linda Vanasupa's simple yet profound "Listen." Each week, students would document how they attempted to embody one principle in their project work, creating a personal growth narrative. This approach helps students internalize that becoming a designer is, as Harold Nelson suggests, about managing and integrating "mindsets, knowledge sets, skill sets, and tool sets."

Case Study Analysis Through Multiple Lenses: I would present real-world design cases and have student teams analyze them using different authors' perspectives. One team might evaluate a product through Mark Guzdial's "Know thy user for they are not you," while another applies Cynthia Atman's framework of considering "future generations, other species, ecosystems and the globe." This exercise demonstrates that good design can be viewed through multiple valid frameworks and helps students understand David Socha's point about "avoiding confirmation bias" by seeking "diverse and contradictory perspectives."

Progressive Skill-Building Workshops: I would structure a series of workshops around the journey from novice to expert designer. Early sessions would focus on observation and empathy, using Dharma Dailey's "Understand they are NOT designing for themselves." Middle sessions would emphasize making ideas tangible, following Robin Adams' advice to "make quick mockups of ideas to 'see them.'" Advanced sessions would tackle ethical complexity, exploring Colin Gray's concept of "building potential futures and ways of being." This progression helps students experience what Shanna Daly calls the "difficult and emotional process" of design.

Collaborative Design Challenges: I would create team challenges where each member must advocate for a different author's approach. For example, during a sustainability project, one student channels Reid Bailey's "Stay optimistic," another embodies Eli Patten's advice to "intentionally balance optimism and pessimism," while a third ensures the team follows Susannah Howe's "Balance planning, action, and reflection." This creates productive tension and demonstrates that good design emerges from negotiating different valid perspectives, reinforcing Jennifer Turns' observation that good designers "make design social."

Metacognitive Exit Tickets: At the end of each class or project phase, students would complete exit tickets connecting their experience to specific statements from the collection. They might recognize they just experienced what Barbara Tversky calls "wander, play, focus, repeat" or realize they need to work on Gordon Krauss's "Generate a wide set of potential solutions prior to selecting the best one." This practice develops what Cynthia Atman calls "design awareness"—the ability to monitor and reflect on one's own design process while engaged in it.

User: The list of shortened statements for each person were intended to convey the key points each person made in their full text. Please compare the shortened statements to each person's longer statement and let us know how well they match? Did we miss anything?

After comparing the shortened statements to the full responses, here's my analysis:

Overall Assessment:

The shortened statements generally capture the key ideas well, with most authors' main points accurately represented. However, there are some patterns of what gets lost in translation:

Notable Gaps or Reductions:

Reid Bailey: The shortened statements miss the nuance of "move quickly but don't rush" and the concept of "blending phases of activity." The full response's emphasis on prototyping "with purpose" and the distinction between just making stuff versus "prototype to learn" could be clearer.

Robin Adams: While comprehensive, the shortened version loses some of the explanatory depth, particularly around the "gracefully unachievable" concept—that this means embracing iterative improvement rather than seeking perfection.

Shanna Daly: The shortened statements capture the main points but lose the powerful framing about designers having "power" and the "equity- and justice-focused lens throughout their design work." This ethical dimension feels somewhat diluted.

David Socha: The complexity of his systems thinking approach is somewhat simplified. His emphasis on "observing over asking, showing over telling, prototyping over guessing, and acting over delaying" is compressed, and the specific discussion of software-enabled systems as three interacting complex adaptive systems is condensed.

Nigel Cross: His evidence-based framing is lost—the shortened statements don't indicate these insights come from formal studies of "outstanding innovative engineering and product designers."

Andy Dong: The philosophical depth of "Simple, but not straightforward" is reduced. His extended explanation that design "involves considerable effort to build knowledge" and is "a way of thinking, doing, and being" adds important context.

Harold Nelson: His response was already brief, but reducing his systemic approach to just "Manage and integrate mindsets, knowledge sets, skill sets, and tool sets" loses the visual diagram and systematic framework he provided.

Barbara Tversky: The shortened statements don't fully capture her structured approach of "Wander → Play → Change Perspective → Focus → Repeat" as a cyclical process.

What Works Well:

- **Mark Guzdial, Liz Gerber, Laura Murphy:** Their concise responses translated well to shortened statements
- **Simple, memorable phrases** like "Know thy user for they are not you" (Guzdial) retained their power
- **Action-oriented statements** generally survived the shortening process well

Recommendations:

1. Consider adding context markers for evidence-based statements (e.g., "Based on studies of expert designers" for Nigel Cross)
2. Preserve powerful metaphors and explanatory phrases that give depth to abstract concepts
3. Maintain ethical/justice dimensions when present in the original
4. Consider noting when someone provides a systematic framework versus individual points

The shortened statements serve their purpose as quick reference points, but users should be encouraged to read the full responses for nuanced understanding, especially for complex systems thinking approaches.

User: Using just the shortened statements from each contributor, please do an affinity grouping for the full set of shortened statements with a total number of affinity groups between 12 and 15. Please list the category headings with a brief description of the category. If you use an idea or example quote be sure to connect the author's name to the idea or quote.

Strategized thematic grouping for design expert statements

The user wants me to create affinity groups from the shortened statements, with 12-15 groups total. Each group should have a category heading and brief description. I need to cite specific authors when using their statements as examples.

Let me review the shortened statements and group them thematically. I'll aim for meaningful categories that capture the essence of what good designers do according to these experts.

Based on the shortened statements from all 39 contributors, here are 14 affinity groups:

1. Problem Framing and Redefinition

Moving beyond surface problems to uncover deeper needs and opportunities

- Includes statements about finding the real problem (Gordon Krauss), breaking apart problems to find the core (Eli Patten), and how good design "starts off with good framing" (Robin Adams)

2. User-Centered Empathy and Understanding

Recognizing that designers are not their users and must deeply understand those they design for

- Anchored by Mark Guzdial's "Know thy user for they are not you" and Dharma Dailey's "Understand they are NOT designing for themselves"

3. Rapid Prototyping and Experimentation

Making ideas tangible quickly to learn and communicate

- Captures Robin Adams' "make quick mockups of ideas to 'see them'" and multiple statements about sketching, modeling, and building prototypes

4. Continuous Learning Mindset

Maintaining curiosity and openness to new knowledge throughout the design process

- Encompasses Liz Gerber's "Are great learners" and Reid Bailey's "Are constantly learning - about problems, about possible solutions, new skills"

5. Ethical Responsibility and Values

Considering the broader impact and embedding values into design decisions

- Includes Cynthia Atman's "Understand that design embodies values" and Janet McDonnell's "Attend to the ethics of their professional actions"

6. Systems and Complexity Thinking

Seeing interconnections and embracing rather than simplifying complexity

- Features Robin Adams' "Good design recognizes and embraces complexity" and Reid Bailey's "Always keep an eye on the system even when designing components"

7. Metacognitive Reflection

Consciously examining and adjusting one's design process and thinking

- Includes Susannah Howe's "Reflect (enabling refinement and learning)" and Cynthia Atman's "Enact design awareness"

8. Iterative Evolution

Understanding design as a continuous cycle of improvement

- Anchored by Robin Adams' "Good design is gracefully unachievable" and Adam Carberry's "Iteration and redesign"

9. Dynamic Balance and Flexibility

Managing tensions between opposing forces in design

- Captures Peter Lloyd's "Balance analysis with creativity" and Eli Patten's "intentionally balance optimism and pessimism"

10. Collaborative Engagement

Design as a social process involving diverse voices

- Includes Jennifer Turns' "Make design social" and Shanna Daly's "Engage in collaborative, reciprocal relationships with diverse stakeholders"

11. Divergent and Convergent Thinking

Expanding possibilities before focusing on solutions

- Features Barbara Tversky's "Think broadly (divergent), think deeply (convergent)" and Gordon Krauss' "Generate a wide set of potential solutions prior to selecting the best one"

12. Contextual Sensitivity

Understanding and responding to the specific situation and environment

- Includes Robin Adams' "Good design is deeply contextualized" and multiple statements about understanding context and communities

13. Action Orientation and Momentum

Maintaining forward progress while avoiding analysis paralysis

- Encompasses Susannah Howe's "Take Action (facilitating movement and outcomes)" and Reid Bailey's "Know when good enough is good enough; they don't persevere over perfection"

14. Designer Character and Humility

Personal qualities that enable effective design practice

- Includes Linda Vanasupa's simple "Listen," Reid Bailey's "Stay optimistic," and Harold Nelson's recognition that good designers "Are themselves!"

User: Please make a version that includes the statements you chose under each heading. If you use an idea or example quote be sure to connect the author's name to the idea or quote.

Systematically organized statements into categories with attribution

The user wants me to create a version of the affinity grouping that includes the actual shortened statements under each heading, with proper attribution to authors. I need to go through the shortened statements from each contributor and group them into the 14 categories I identified, making sure to attribute each statement to the correct person.

Let me organize this systematically by going through each category and pulling in the relevant shortened statements with attribution.

Based on the shortened statements from all 39 contributors, here are 14 affinity groups with their associated statements:

1. Problem Framing and Redefinition

Moving beyond surface problems to uncover deeper needs and opportunities

- Good design starts off with good framing (Robin Adams)
- Find the real problem rather than accept the stated problem (Gordon Krauss)
- Break apart a problem to figure out what is at the very core (Eli Patten)
- "Find" and "frame" new problems in response to a given problem (David Hendry)
- Frame the problem in a distinctive and sometimes rather personal way (Nigel Cross)
- Interrogate the brief, i.e. the characterisation of the 'task' or the construct of the 'problem' (Janet McDonnell)
- Understand their work is as much about problem finding as it is about problem solving (Reid Bailey)
- Are problem-finders not just problem-solvers (Micah Lande)
- Radically reframe or reset the problem at hand (Micah Lande)
- Recognize that deep exploration of a real problem is just as much a part of design work as developing and evaluating solutions (Shanna Daly)

2. User-Centered Empathy and Understanding

Recognizing that designers are not their users and must deeply understand those they design for

- Know thy user for they are not you (Mark Guzdial)
- Design for their users (Mark Guzdial)
- Understand they are NOT designing for themselves (Dharma Dailey)
- Develop empathy for users and all other stakeholders (Gordon Krauss)
- Think of users (Gabriela Goldschmidt)
- Richly engage with users' perspectives and use those to drive ideation and decision-making (Reid Bailey)
- Work to empathize with the many different customers/stakeholders involved and understand all use cases, not just the core functions (Eli Patten)
- Use-inspired projects informed by insights from real people (Adam Carberry)
- Take time to understand and engage with the culture, needs, and wants of their user groups and related constituents (Lauren Thomas Quigley)

3. Rapid Prototyping and Experimentation

Making ideas tangible quickly to learn and communicate

- Good designers make quick mockups of ideas to "see them" and "understand them through other people's perspectives" (Robin Adams)

- Build and test their ideas to confirm and refute their beliefs and assumptions (including those about user needs) and improve their understanding (Gordon Krauss)
- Sketch ideas throughout the process, from day one (Gabriela Goldschmidt)
- Build prototypes (Gabriela Goldschmidt)
- Sketch, model, prototype, role play, user test (Barbara Tversky)
- Testing before distribution (Adam Carberry)
- Modeling of all kinds (physical, mathematical, process, theoretical, and conceptual) (Adam Carberry)
- Are good makers who prototype to learn; they consider manufacturing during design (Reid Bailey)
- They make stuff with purpose (Reid Bailey)
- Engage stakeholders with prototypes during front-end design work (Kathleen Sienko)
- Find ways to try out (a.k.a. prototype) their ideas as soon as possible and continually with a goal of getting information that will make it possible to iterate (Jennifer Turns)

4. Continuous Learning Mindset

Maintaining curiosity and openness to new knowledge throughout the design process

- Are great learners (Liz Gerber)
- Are constantly learning - about problems, about possible solutions, new skills (Reid Bailey)
- Have a learning orientation—they collect lots of information by asking questions, deploying prototypes, etc. (Jennifer Turns)
- Are continuous and curious learners about the world (Sheri Sheppard)
- Question everything (Liz Gerber)
- Ask questions (Cynthia Atman)
- Ask a lot of questions of people obviously and not obviously "stakeholder" and/or knowledgeable about the situation (and the questions get beyond the surface) (Sheri Sheppard)
- Good design is being open to surprises and learning by design (Robin Adams)
- Wonder about what they don't know (Linda Vanasupa)

5. Ethical Responsibility and Values

Considering the broader impact and embedding values into design decisions

- Consider context and consequences (Cynthia Atman)
- Understand that design embodies values (Cynthia Atman)
- Attend to the ethics of their professional actions (Janet McDonnell)
- Are ethical (Liz Gerber)
- Recognize they are building potential futures and ways of being (Colin Gray)
- Research on the potential societal, economic, cultural, and environmental impacts of their solutions (Adam Carberry)

- Understand the impact of their design decisions on society (Gordon Krauss)
- Use human values as criteria for evaluating proposed solutions (David Hendry)
- Account for indirect impacts and value tensions (David Hendry)
- Consider planetary limits in their work (David Hendry)
- Understand that every design decision impacts a person's life, even if they can't witness the impact themselves (Laura Murphy)
- Explore the social implications of their products and designs and ensure that those implications align with their own value system (Lauren Thomas Quigley)
- Realize that the existence of any artifact affects everything around it (Lauren Thomas Quigley)

6. Systems and Complexity Thinking

Seeing interconnections and embracing rather than simplifying complexity

- Good design recognizes and embraces complexity (Robin Adams)
- Are systems thinkers (Liz Gerber)
- Always keep an eye on the system even when designing components (Reid Bailey)
- Take a broad systems approach to the given problem, rather than accepting narrow problem criteria (Nigel Cross)
- Understand that design is a social process and know how to leverage their relationships and resources (with all stakeholders) throughout the process (Daria Kotys-Schwartz)
- Think synthetically (Vanessa Svihla)
- Consider the broader context of design throughout a design process (Kathleen Sienko)
- Use iterative and adaptive processes to collaboratively explore and make sense of complex adaptive systems (David Socha)
- Functionally decompose problems thoroughly (Gordon Krauss)

7. Metacognitive Reflection

Consciously examining and adjusting one's design process and thinking

- Reflect (enabling refinement and learning) (Susannah Howe)
- Reflect intentionally throughout their work to shape iteration to their understandings and ideas and prompt shifts in their design approaches (Shanna Daly)
- Enact design awareness (Cynthia Atman)
- Consider their positionality when engaging in design work (Kathleen Sienko)
- Reflect deeply on their own positionality, that of their users, and the industry or technology they are working with (Lauren Thomas Quigley)
- Always try to be aware of their own existing design thinking/philosophy (Erik Stolterman)
- Intentionally and reflectively develop their ability to make design judgements (Erik Stolterman)

- Understand the responsibility of being a designer, and thus are humble and curious about what they don't know and seek out diverse and contradictory perspectives in order to avoid confirmation bias (David Socha)
- Critically evaluate their own preferences, especially in terms of its transferability (Vanessa Svihla)

8. Iterative Evolution

Understanding design as a continuous cycle of improvement

- Good design is gracefully unachievable (Robin Adams)
- Good design is simple, but not straightforward (Robin Adams)
- Iterate their solutions to improve the degree to which their designs meet user and stakeholder needs (Gordon Krauss)
- Scope, gather, model, iterate, cascade (Cynthia Atman)
- Iteration and redesign (Adam Carberry)
- For ideas: wander, play, focus, repeat (Barbara Tversky)
- Move fluidly between generating and critically evaluating proposals as design progresses (Janet McDonnell)
- Recognize that "going back" to prior decisions and revising is not evidence of a mistake, but rather part of a thorough and thoughtful journey (Shanna Daly)

9. Dynamic Balance and Flexibility

Managing tensions between opposing forces in design

- Balance planning, action, and reflection (Susannah Howe)
- Balance analysis with creativity (Peter Lloyd)
- Can quickly switch between an open, creative mindset and a judging, evaluative mindset (Reid Bailey)
- Know how to intentionally balance optimism and pessimism in the design process to get a better design than just realism itself (Eli Patten)
- Manage the impacts of power dynamics while taking up agentive roles (Vanessa Svihla)
- Practice joyful tentativeness (Vanessa Svihla)
- Work with a breadth of attention to different facets of the problem and solution (Nigel Cross)
- Work with a depth of attention from broad goals to details of implementation (Nigel Cross)
- Know when to lead, facilitate, listen, collaborate and act (Peter Lloyd)

10. Collaborative Engagement

Design as a social process involving diverse voices

- Include many perspectives (Cynthia Atman)
- Seek and engage in authentic collaboration (Janet McDonnell)
- Include as many people in the process as possible; they make design social (Jennifer Turns)

- Engage in collaborative, reciprocal relationships with diverse stakeholders, both internal and external to their organization (Shanna Daly)
- Good design takes into account multiple perspectives (Robin Adams)
- Frame the task to include multiple stakeholders (John Gero)
- Interact regularly with their client (John Gero)
- Wandering with Other Minds (Barbara Tversky)
- Mediate complex ethical relationships with stakeholders (Colin Gray)
- Integrate multiple perspectives into their design (Dharma Dailey)

11. Divergent and Convergent Thinking

Expanding possibilities before focusing on solutions

- Think broadly (divergent), think deeply (convergent) (Barbara Tversky)
- Generate a wide set of potential solutions prior to selecting the best one (Gordon Krauss)
- Explore divergently in problem and solution spaces (Shanna Daly)
- Give the client more than they specified in the Requirements (John Gero)
- Explore more than one alternative (John Gero)
- Are generative (Liz Gerber)
- Imagine the future (Liz Gerber)
- Do something unexpected, new, and fresh (Ben Shneiderman)
- Reduce fixation... form new associations (Barbara Tversky)
- Connect ideas and concepts not obviously connected (Sheri Sheppard)
- Ideate not just solutions but also ways of defining the problem, ways of configuring the design process, etc. (Jennifer Turns)

12. Contextual Sensitivity

Understanding and responding to the specific situation and environment

- Good design is deeply contextualized (Robin Adams)
- Consider the broader context of design throughout a design process (Kathleen Sienko)
- Deeply engage with the communities of use in order to best understand not only what might be useful for the producers of X but more importantly what might be beneficial to the people of the community for which the product/service is being designed (David Socha)
- Take time to understand and engage with the culture, needs, and wants of their user groups and related constituents (Lauren Thomas Quigley)
- Listen (Linda Vanasupa)
- Effortfully stand with others to view their world (Linda Vanasupa)
- Determine what is most important and create a list of priorities (Gabriela Goldschmidt)
- Question how/where/if design is the appropriate tool for the situation at hand (Sheri Sheppard)
- Understand the nature of the problem-solution by tactically taking actions that enable others to respond to the design in progress and help shape it (Dharma Dailey)

13.Action Orientation and Momentum

Maintaining forward progress while avoiding analysis paralysis

- Take Action (facilitating movement and outcomes) (Susannah Howe)
- Are oriented toward action, and seek to not get stuck; to keep the process moving along (Jennifer Turns)
- Hit deadlines (Reid Bailey)
- Deliver on their commitments (Ben Shneiderman)
- Get started even before they know that they are certain in what they are doing (Micah Lande)
- Intentionally decide how to decide - what design decisions need to be made, in what order, based on what information, with what level of confidence, and how much consensus (Eli Patten)
- Know when good enough is good enough; they don't persevere over perfection (Reid Bailey)
- Know when to pause and reflect on the problem they are really trying to solve. Even during a crisis! (Daria Kotys-Schwartz)
- Plan (ensuring direction and intentionality) (Susannah Howe)
- Exhibit more frequent shifts of attention between activity modes within the overall process (Nigel Cross)

14.Designer Character and Humility

Personal qualities that enable effective design practice

- Are themselves! which makes the word "good" disappear! (Ade Mabogunje)
- Listen (Linda Vanasupa)
- Decenter themselves (Linda Vanasupa)
- Are humble (Linda Vanasupa)
- Stay optimistic (Reid Bailey)
- Don't fall in love with their own ideas (Sheri Sheppard)
- Don't just adopt these mindsets/behaviors/practices, but VALUE doing so (Reid Bailey)
- Advocate (Vanessa Svihla)
- Are humble but strong when it comes to design ideas (Erik Stolterman)
- Have a deep sense of quality, without a preset notion of what is good or bad design (Erik Stolterman)
- Are servants for greater good (David Socha)
- Have a portfolio of accomplishments that are united by a personal style (Ben Shneiderman)
- Are humble in sharing their relevant experiences working collaboratively (Micah Lande)
- Lead with humility, curiosity, and empathy that each human life is worth understanding and accounting for (Laura Murphy)
- Seek to build a more inclusive, joyful, and equitable future (Laura Murphy)

User: Any final thoughts?

Reflected on design insights and collective wisdom's depth.

The user is asking for any final thoughts on "The Good Designers do 'X'" collection. This is an open-ended question, so I should reflect on what strikes me most about this collection, perhaps highlighting key insights, patterns, or implications that emerge from analyzing all these perspectives together.

Some thoughts I could share:

1. The convergence despite diversity - how similar themes emerged from people in different fields
2. The emphasis on human-centered and ethical aspects over technical skills
3. The paradoxes and tensions inherent in good design
4. How this collection challenges simplistic views of design
5. The value of this kind of informal knowledge gathering
6. What this says about the evolution of design thinking

I should keep it thoughtful but concise, and make sure to cite specific authors when I reference their ideas.

Looking at this collection as a whole, several striking insights emerge:

The Paradox of Simplicity and Complexity: Perhaps the most profound insight comes from Robin Adams' "gracefully unachievable" and Andy Dong's expansion that design is "simple, but not straightforward." This captures how good design appears effortless while requiring tremendous depth. The collection repeatedly emphasizes embracing complexity while seeking clarity—a fundamental tension that defines expert practice.

Design as Fundamentally Human: What's remarkable is how little these experts focus on technical skills or tools. Instead, the overwhelming emphasis is on relationships, empathy, and understanding others. Mark Guzdial's "Know thy user for they are not you" could serve as the collection's thesis. Even when discussing prototypes or sketches, the focus is on using them to understand "through other people's perspectives" (Robin Adams).

The Humble Expert: There's a beautiful contradiction in how these accomplished designers emphasize humility, listening, and not knowing. Linda Vanasupa's simple "Listen" and Ade Mabogunje's "Are themselves! which makes the word 'good' disappear!" suggest that expertise in design might mean letting go of the need to be seen as an expert. This humility enables the continuous learning that so many contributors emphasize.

Design as Ethical Practice: The collection reveals design as inherently value-laden work. Multiple contributors stress that designers are "building potential futures" (Colin Gray) and must consider impacts on "future generations, other species, ecosystems and the globe" (Cynthia Atman). This positions design not just as problem-solving but as a form of cultural and environmental stewardship.

The Value of Informal Wisdom: Finally, Daria Kotys-Schwartz's comment—"I love these times to reflect on these questions! It fills my heart"—reminds us that sometimes the most valuable insights come not from formal research but from creating space for experts to share what they truly believe matters. This collection demonstrates that "off the top of my head" responses can reveal deep, practiced wisdom that might be filtered out in more formal contexts.

This collection offers a masterclass in what it means to practice design with both competence and conscience.

Appendix D

Use Case: “Dear Design: Creating your ideal design signature”

The *Dear Design* seminar was a directed research group³ for students interested in design process expertise and design awareness that was conducted online in the pandemic in early 2022. Good Designers do “X” was collected for the seminar session titled “Design Inspirations.” The goal of this session was to encourage students to reflect on themselves as designers and consider what inspires them. To this end, the collection of responses was intended to provide inspiration and insight. At the time this session was conducted, the list contained a total of 140 statements from 28 respondents.

During the seminar session, as an entire group, the students engaged in affinity grouping on a shared Miro board, where they grouped responses and named each grouping. Below, Table 3 shows the affinity group titles created by two sections of *Dear Design*, one held on Wednesday and one held on Thursday.

In small discussion groups of 3-4 students, students selected their top three shortened statements and/or affinity group categories and answered the following questions:

1. What do you notice across these themes? Do you see anything missing? What would you add?
2. How might you visually represent your selected top 3 responses on a postcard?

At the end of the class session, students completed a short reflection on “aha moments” and takeaways they had from the class. The following anonymized statements come from these end-of-class reflections:

“I really liked seeing the responses and perspectives from the different responses, especially across those in different disciplines. It really pushes the idea that design permeates throughout fields and categories.”

“Even more practiced/expert designers have different definitions of what a good designer is.”

Afterwards, as part of their weekly assignment and leading off from the second discussion question, students created postcard representations of what inspires them in their design work. These weekly postcards helped students reflect on the class session and practice conveying their design process visually. The full prompt is quoted below. Students were free to draw ideas from the Good Designers do “X” quotes or look for outside inspiration.

“Based on the responses to the prompt “Good Designers do X” and what we covered in lecture, what resonated with you or inspired you? How might you imagine your own design process using these (new?) insights as a lens or guide/inspiration?”

A student postcard is shown in Figure 2 of section 5.2 (*As an assignment in a longer engagement*) of the main report. Figures 4-9 below in *Dear Design Example Postcards* show six more student postcards. These postcards demonstrate the reflection and insight that students can gain from interacting with Good

Designers do “X”. The front of the postcard is the student’s postcard visualization, and the back of the postcard explains their inspirations and how to read their visualization.

Results of *Dear Design* students’ inductive affinity grouping of Good Designers do “X” statements

<i>Wednesday Section</i>	<i>Thursday Section</i>
Ask questions	Action-oriented
Attitude	Attitude
Awareness	Build relationships with stakeholders
Beyond design	Communication
Build prototypes	Constraint mindset
Consider stakeholders / Team dynamics	Creativity
Decision making	Critical
Design is personal	Design decision
Design thinking processes	Design process
Frameworks + constraints / Process driven	Design thinking
Future thinking	Designing with intention
Growth / learning	Empathy and compassion
Impact	Ethics
Inclusivity and diversity	Forward thinking
Iterations	Inter/multidisciplinary considerations and mindset
Less is more	Learning
Problem definition	Prioritize
Resourceful	Questioning
See design everywhere	Research / Scoping
Self-evaluation	Self-awareness / reflection
Understanding of complexity / systems approach	Simplifying
Values and ethics	Work broadly
Other	

Table 3. *Good Designers do “X” Affinity Grouping Categories from Dear Design*. This table lists the affinity grouping category names produced by an inductive affinity grouping activity done by a Wednesday section and Thursday section of the *Dear Design* seminar.

Dear Design Example Postcards

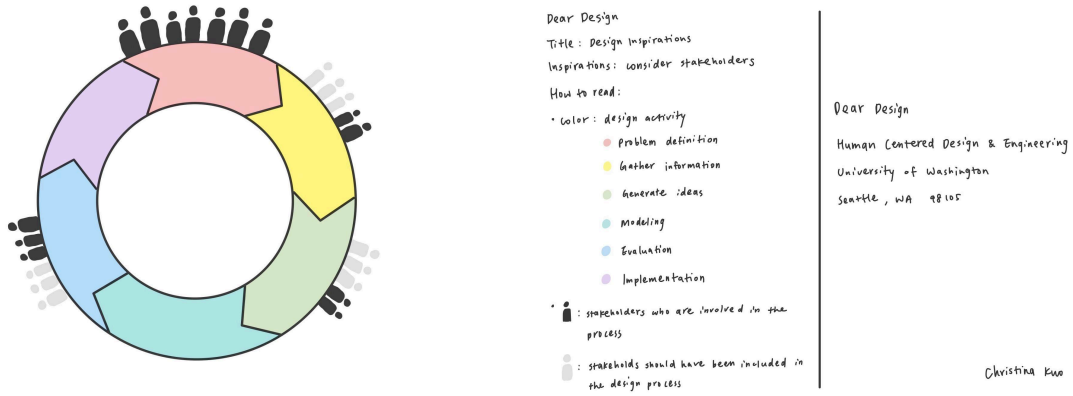


Figure 4. Christina Yu-Lin Kuo’s postcard from the *Dear Design* seminar. Christina was inspired by considering stakeholders, a theme that students in her section noticed across multiple statements (see Table 2, Wednesday Section list of themes).

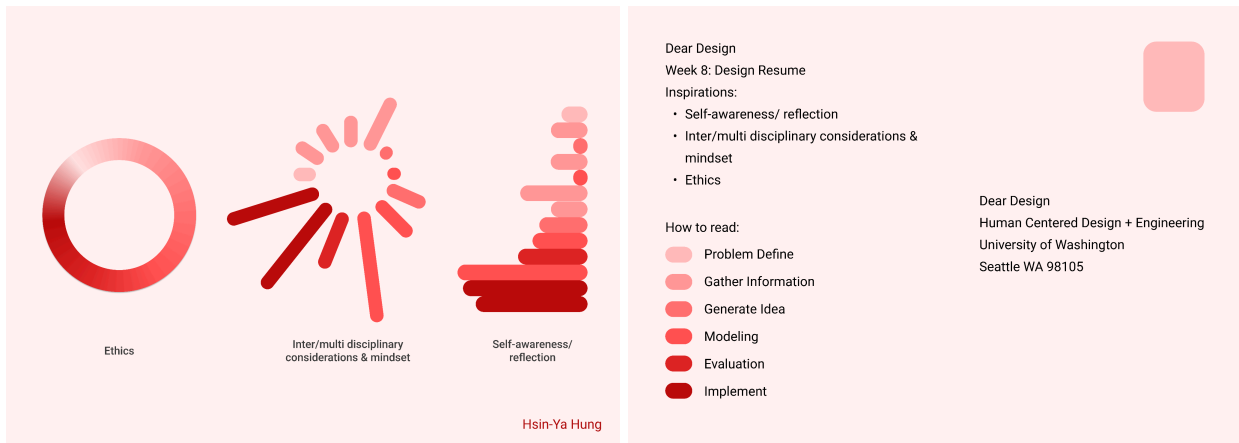
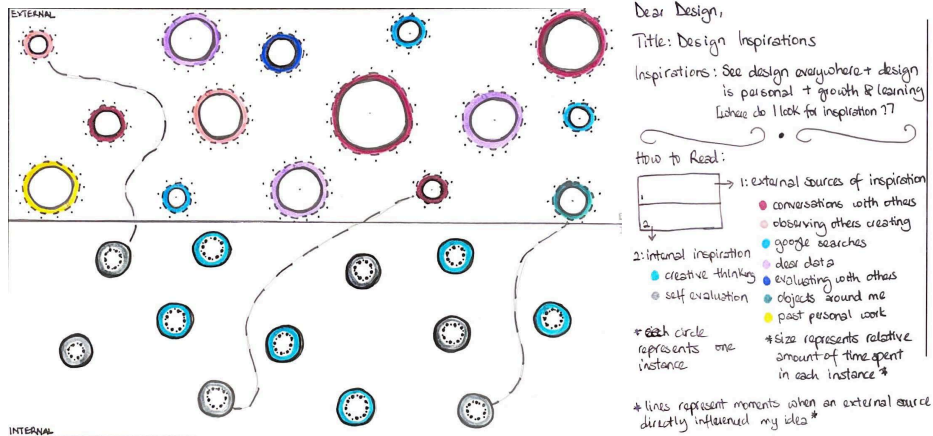


Figure 5. Hsin-Ya Hung’s postcard from the *Dear Design* seminar. Hsin-Ya was inspired by self-awareness and reflection, inter and multidisciplinary considerations and mindset, and ethics, themes that students in her section noticed across multiple statements (see Table 2, Thursday Section list of themes).

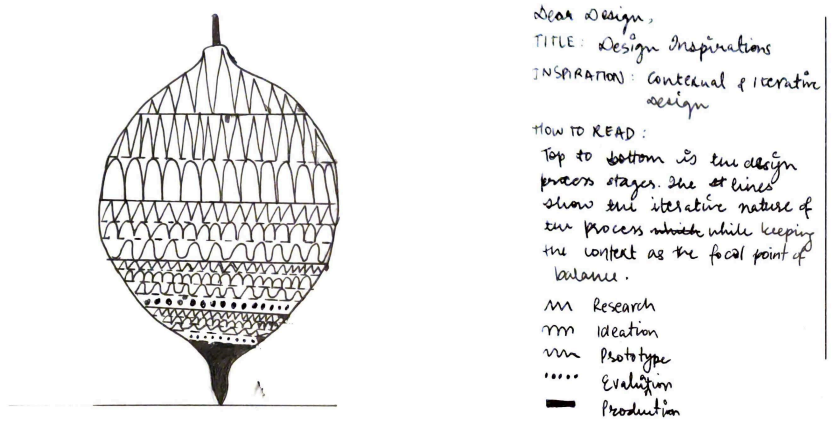


Place Stamp Here

Dear Design
 Human-Centered Design & Engineering
 University of Washington
 Seattle, WA 98105

IB

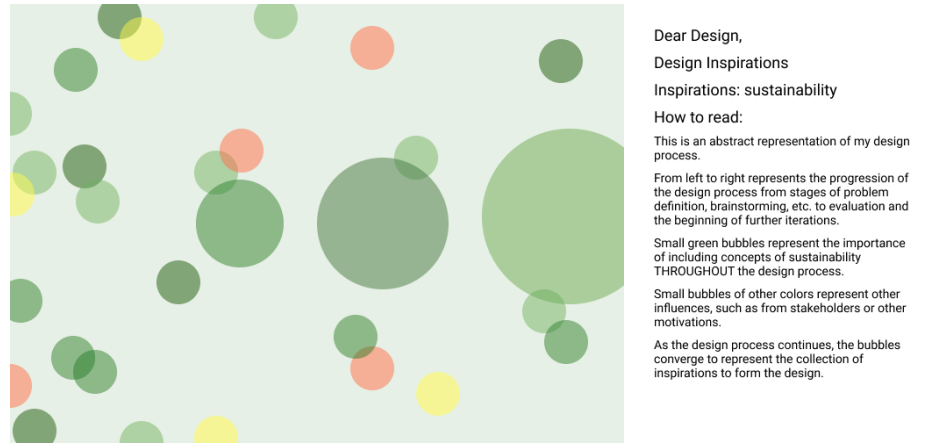
Figure 6. IB's postcard from the *Dear Design* seminar. IB was inspired by seeing design everywhere, the personal nature of design, and growth and learning, themes that students in her section noticed across multiple statement (see Table 2, Wednesday Section list of themes)



Place Stamp Here

Dear Design
 Human-Centered Design & Engng
 University of Washington
 Seattle WA 98105

Figure 7. Aishwarya's postcard from the *Dear Design* seminar. Aishwarya was inspired by contextual and iterative design.



Place Stamp Here

Dear Design
 Human Centered Design & Engineering
 University of Washington
 Seattle, WA 98105

Mileena

Figure 8. Mileena's postcard from the *Dear Design* seminar. Mileena was inspired by sustainability.



Figure 9. Eileen Zhang’s postcard from the *Dear Design* seminar. Eileen was inspired by designing for hope and meaning.

Use Case: “Design Process Resilience”

Design Process Resilience was a special topics course for MS students interested in developing self-awareness and resilience in doing design. The concept of resilience in design is important to help designers in fast-moving, contextually complex, and ambiguous environments, and this was the focus of the course. The course was structured in three sections, where each of the first two sections focused on design practice and resilience knowledge, and the third section focused on connecting this design experience to resilience. Good Designers do “X” was featured in the second section to present expert perspectives on design, and more broadly, to present the landscape of design as it could connect to the concept of design resilience.

During class, students engaged in two activities. They first explored the broader context of design through a “pick a card” activity (see the pick a card activity described in Section 5.1). In groups, students split the deck of statements so each student held a quarter of the deck. Students then looked through the selection they held to choose two cards that resonated with them. They would pass the cards they didn’t choose to the student on their left, so the group passed cards in a circle. Once each student found the two cards they resonated with, they had a conversation in their groups about the statements they chose.

In their second activity, each group engaged in affinity grouping of the full deck of cards, first putting the cards into similar groups and then naming the groups. Then, each group selected their top three responses and/or affinity group categories and engaged in a discussion, with the below prompts:

1. What do you notice across these themes? Do you see anything missing? What would you add?
2. How might you incorporate your top three statements / categories into your future design processes?
3. What are some insights or takeaways you have about what “good designers” do?

Each group then described their affinity grouping to the class.

After the class session, as part of their weekly assignment, students created postcard representations inspired by the Good Designers do “X” activity. Similar to postcards in *Dear Design*, these postcard

representations are intended to help students reflect on the class topic and practice conveying their learnings visually. The full prompt is quoted below.

“Based on the responses to the prompt “Good Designers do X” and what we covered in lecture, what resonated with you or inspired you? How might you imagine your own design process using these (new?) insights as a lens or guide/inspiration?”

A student postcard from this session is shown in Figure 3 of section 5.2 (*As an assignment in a longer engagement*) of the main report. Figures 10-15 found below in *Design Process Resilience Example Postcards* show six more student postcards. These postcards demonstrate the reflection and insight that students can gain from interacting with Good Designers do “X”. The front of the postcard is the student’s postcard visualization, and the back of the postcard explains their inspirations and how to read their visualization.

Design Process Resilience Example Postcards

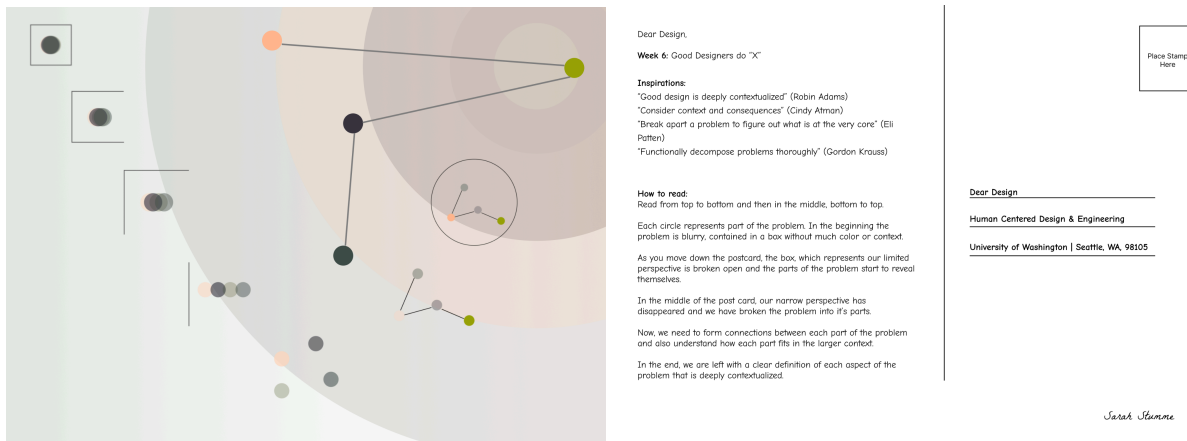


Figure 10. Sarah Stumme’s postcard from the *Design Process Resilience* course. Sarah was inspired by four statements: “Good design is deeply contextualized” (Robin Adams), “Consider context and consequences” (Cindy Atman), “Break apart a problem to figure out what is at the very core (Eli Patten), and “Functionally decompose problems thoroughly” (Gordon Krauss).

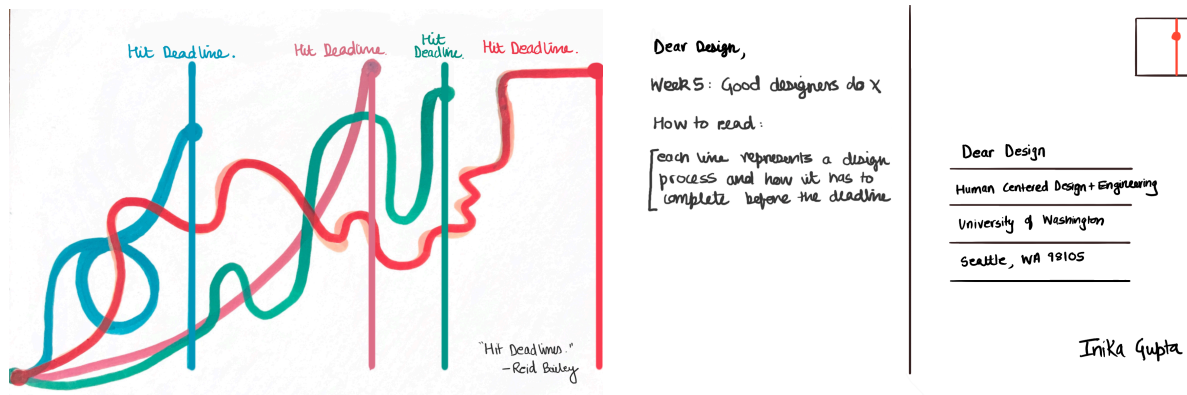


Figure 11. Inika Gupta’s postcard from the *Design Process Resilience* course. Inika was inspired by Reid Bailey’s statement, “Hit deadlines”.

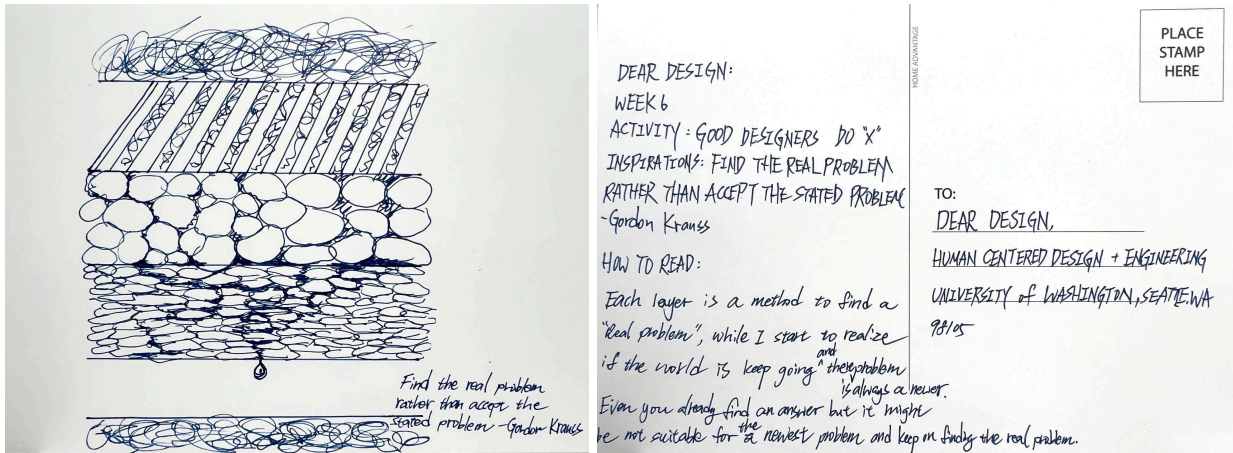


Figure 12. Yit Chung's postcard from the *Design Process Resilience* course. Yit was inspired by Gordon Krauss' statement, "Find the real problem rather than accept the stated problem".

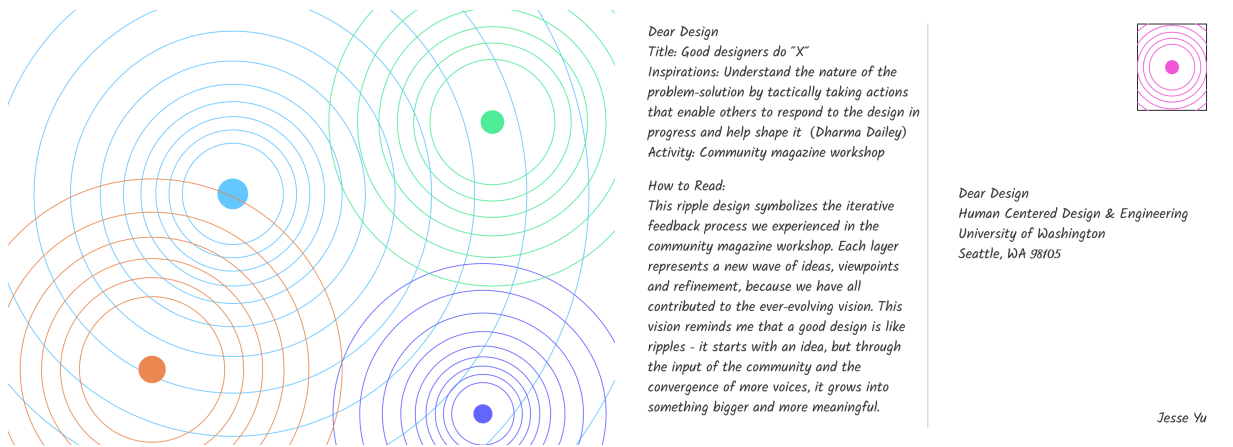


Figure 13. Zhe (Jesse) Yu's postcard from the *Design Process Resilience* course. Jesse was inspired by Dharma Dailey's statement, "Understand the nature of the problem-solution by tactically taking actions that enable others to respond to the design in progress and help shape it".

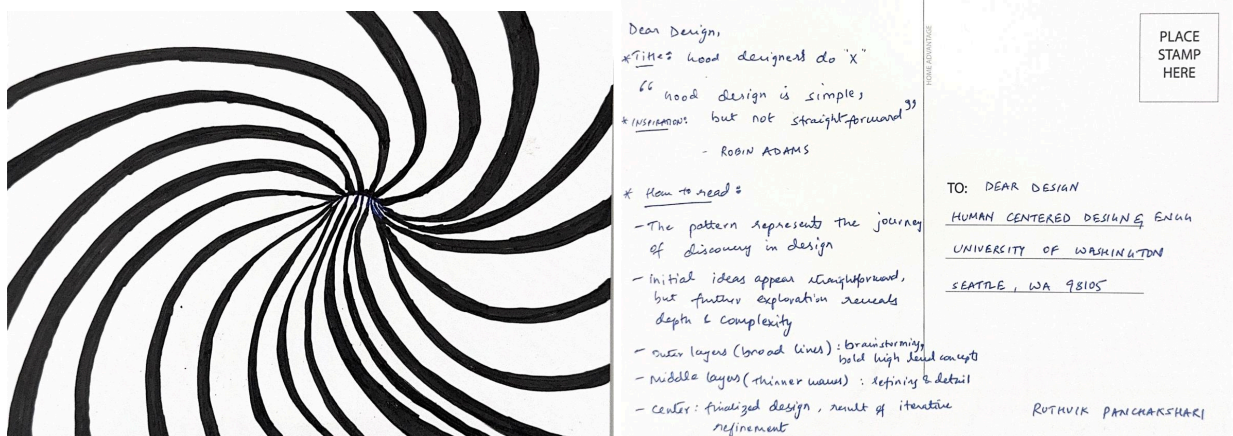


Figure 14. Ruthvik's postcard from the *Design Process Resilience* course. Ruthvik was inspired by Robin Adams' statement, "Good design is simple, but not straightforward."

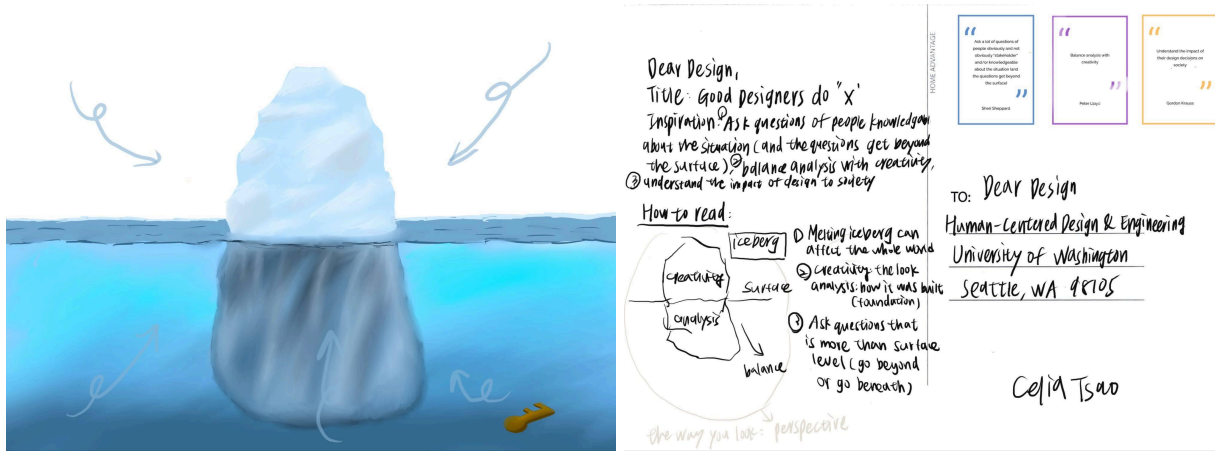


Figure 15. Celia Tsao's postcard from the *Design Process Resilience* course. Celia was inspired by three statements: "Ask a lot of questions of people obviously and not obviously 'stakeholder' and/or knowledgeable about the situation (and the questions get beyond the surface)" (Sheri Sheppard), "Balance analysis with creativity" (Peter Lloyd), and "Understand the impact of their design decisions on society" (Gordon Krauss).