

TWELVE DESIGN ATTITUDES FOR DESIGNER SUCCESS

THE NECESSARY COMPLEMENTS TO DESIGN METHODS AND DESIGN SKILLS

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PAPER ABSTRACT: It has long been demonstrated that teaching design methods and design skills is insufficient to ensure academic and professional success for industrial design students. These two legs should be balanced with the third leg of a design mindset. Students are often expected to learn the required mindset implicitly through their studio projects, internships, and other work. We assert that for students to grow properly into professional designers, a design mindset needs to be clearly defined, explicitly taught, and built into a real-world studio project to reinforce their learning through application and reflection. In this paper, we demonstrate our intro course takes students through twelve mindsets, what we call design attitudes: be playful, reignite curiosity, exercise child's eye, question assumptions, increase empathy, seek inspiration, creative confidence, cultivate collaboration, accept critique, embrace ambiguity, relish risk, and fail forward. We share teaching strategies for each design attitude and demonstrate how application and empiric experience of each attitude positively impacts their final design concepts. The studio project intentionally requires the students to leverage these design attitudes because the design space is completely foreign to the students. We collaborate with the Toyota Mobility Foundation as we design solutions for users with lower-limb differences to enable an active lifestyle.

Keywords: design attitude, mindset, soft-skills, hands-on learning, project learning

1. INTRODUCTION

There is discussion around design methods and which methods will result in the best outcomes to meet the users' needs, wants, and desires. While methods themselves are important, we've seen that the most effective is one that is pliable, and able to adapt and conform to the challenge, the design context, the client, the customer(s), the organizational culture, and the skills and abilities of the designers themselves. Similarly, there are a wide variety of design skills that can be useful in our goal of designing products that make life better. With the advent of digital tools, a whole new set of skills and abilities are becoming available to the designer that will be revolutionized with new AI-implemented rendering and visualization software.

What has not changed during our ever-evolving future is the fundamental mindset of the designer. Many of these design perspectives are taught implicitly by design faculty as they take students through foundational courses and into design studios. Fry and Scaggs (2013) first proposed that design programs

should be intentional about preparing students for career success by fostering an appreciation and application of six aptitudes which are “vital components of the designer’s strategic toolbox”. In this paper, we present an expanded set of aptitudes, which we call *attitudes*. These attitudes have been taught in various introductory design courses since 2011 and are now presented as necessary and foundational for design students to use intentionally and consciously in their design practice if they expect to pursue excellence in the practice of industrial design as measured by practical market penetration and use (innovation).

2. DESIGN PROJECT FOR CONTEXT

For the reader’s understanding, we share these twelve attitudes in the context of a semester-long design project in collaboration with Toyota Mobility Foundation (TMF). The challenge presented was to design a solution which *enables users with a lower-limb difference to pursue an active lifestyle*. We start with just an open challenge and no product direction. One of our design program’s fundamental values is that we are *outcome-agnostic*. Beyond some simple guiderails, we expect the design research to drive the project towards a viable solution influenced by student experience and perspectives of the world.

To create momentum and to reinforce the value of being playful, almost every class for the entire semester starts with a short but playful creative exercise from *Caffeine for the Creative Mind* by Mumwaw and Oldfield (2006) to get students out of their current mindset and reignite creativity.

3. BE PLAYFUL

Playfulness is the first attitude for a reason. If a designer starts from too serious of a posture, their creativity can be significantly limited, and their ability to take an unencumbered outside view and explore the adjacent possible is limited (Steven Johnson, 2010). Based on Tim Brown’s TEDTalk on Creativity of Play (2008) we define this as **taking your task seriously but losing your self-consciousness**. The key is to shock yourself out of the normal way of doing things, to think with your hands, and to build empathy by immersing yourself in role playing. In addition to Tim Brown’s 30 circles exercise, we take students through a crafty-prototyping challenge of building an apple-picking machine. They are given just a few structured minutes to draw five quick concepts (not enough time to have any reasonable detail). They then pick one of these to pursue and have 45 minutes to build a communication prototype using typical craft materials. This forces the students to ignite their inner child and leverage their imagination of what could be represented versus expected realism.

4. REIGNITE CURIOSITY

Once playfulness is established, curiosity should be a natural result. Cassini Nazir’s TEDX talk (2021) provides an important baseline for the value of curiosity in the success of designers. We define curiosity as **allowing yourself to be in wonder and awe of what is around you**. The awe and wonder, while critical to the design process, is just as valuable for the success of our designs within the overall

organizations in which we function. Gino (2018) details how both teams and projects are positively impacted by curiosity. She also warns that two common business cultural values, efficiency and status quo, are the largest impediments and discusses the benefits for an organization that embraces exploration. This attitude is immediately put into practice in the next attitude, child's eye.

Within the context of the design project, the students use this attitude to initiate their design research process. Starting from a foundation of design research practices learned in a prior class, they strategize their goals and collect information from secondary sources.

5. EXERCISE CHILD'S EYE

The concept of child's eye was popularized by IDEO and Tom Kelley (2000) in *The Art of Innovation*. It is all too often that we become blind to everyday tasks and expect to adapt ourselves to poorly design products and systems. Leveraging child's eye is to purposefully reignite your curiosity to **look at situations and experiences as if you've never seen them before**. It takes practice, but a good designer knows how to step back and intentionally forget previous experiences with a product or an environment. The application of this means that we need to **become hyper-aware** of our surroundings and experiences. We provide an opportunity to practice being hyper-aware and exercise child's eye by walking through a common path across campus and returning the same way. In a simple 15-minute exercise, most students will find more than 10 observations to which they were previously blind. The application is that as the students go through the design process they are leveraging child's eye to see design potential where everyone else is acclimated to the status quo.

Child's eye becomes critical for fleshing out the details of the design research strategy. Being hyper-aware of the design context, what solutions currently exist, how people and systems operate, and who are the primary users and the various stakeholders. In our project with TMF the students determined effective research methods and practices for this project. This continued with secondary research which influenced primary research methods like surveys. The results of the surveys then influence research questions addressed through one-on-one and panel user and stakeholder interviews. -one or through panels.

6. QUESTION ASSUMPTIONS

With hyper-awareness comes a natural desire to question why situations and contexts exist as such. Good designers are aware that most things are based on assumptions. Questioning assumptions is **not to accept any non-fact or perceived or arbitrary constraints that drive a design solution**. This is where we prompt the students to make sure that facts are clear and that assumptions are equally stated. Then, regardless of the potential merit of the assumptions, they need to challenge them. We've found the best way to address this mindset is to first lay out all the possible constraints related to the project in a comprehensive constraint map (Aspelund, 2022). The introduction of divergent and convergent thinking

through brainstorming, ideation, and selection then provides the tools to reframe the stated constraints, many of which are simply assumptions. Brainstorming, when exercised according to the original intent (Rawlinson, 1981) is “*not to find a solution but to break up the established thought patterns that may be inhibiting creativity*”. Breaking up the traditional ways of thinking makes it easier for the designer to challenge both stated and unstated assumptions which opens the door to a larger potential design space.

The mindset of questioning assumptions gives the students confidence to drill deep in their design research and to ask the questions in interviews that expose more than the user’s surface reactions to their current experiences. Working with TMF, we introduced the students to the TMF tool which helps them to get to the root of the challenges and build a better understanding of the user which in turn creates empathy.

7. INCREASE EMPATHY

For many designers, empathy can be the most challenging mindset. And yet, it is the most critical. The previous design attitudes build upon one another and grow the designer’s capacity to stretch beyond themselves until they can begin to internalize the Oxford Dictionary definition of empathy as **the ability to understand and share the feelings of others**. Simply put, we need to be able to see the world from other points of view. This is especially true for designers whose craft is to create products and experiences for others who are often quite different from themselves. While this mindset sequentially builds from curiosity and child’s eye, it also requires the ability to make sense of the information gathered. We challenge our students by presenting an exercise to understand **abductive reasoning**. Abductive reasoning is the critical ability to take lots of seemingly disconnected information and synthesize a solution that fills in the gaps in a logical and rational way. Sir Arthur Conan Doyle’s Sherlock Holmes is often attributed with having great deductive reasoning. But, if you read the stories, you realize that he is leveraging abductive reasoning to synthesize a solution that “however improbable, must be the truth”. In the class, we study an approachable Sherlock Holmes case and discuss the possible solutions. Amazingly, there is always one team that nearly gets it, despite a significant lack of information, because they have embraced the design attitudes.

With a rich understanding of and a growing empathy for the user and the context of the design challenge, the students can now create an effective persona (Laurel 2003) that synthesizes the results of all their research into someone who can be a target for their design. In addition to more traditional personas, we incorporate marketing segmentation variables to create an “industry ready” persona that is easy to communicate to anyone in a corporate environment. Given the unintended individual influence on each team, they arrived at three very distinct personas: a veteran who lost a lower limb while in the service, a teenager born with a lower limb difference, and a middle-aged adult who lost a limb due to diabetes. As stated earlier, these all fall within the scope of the project but are a result of the research directions.

8. SEEK INSPIRATION

Designers need to pull from the many environments and experiences around them to find new directions and stretch boundaries in which to push their designs. If we're only exposed to the same experiences our creativity quickly becomes stagnant. Karl Asplund (2022) describes inspiration as **proactively tapping into your imagination**. Designers need to seek a wide variety of experiences, some not even related to the project they're working on and let them influence the possibilities of their imagination. This opportunity requires a designer to exercise child's eye to maximize the possibility of exploring new areas of imagination, which in turn opens more opportunities to the adjacent possible (Johnson, 2010). In practice, we challenge the students to participate in a safe activity outside their norms. Many of the students start simple by going to a locale that they've never visited. As we share each week, students are encouraged to steal each other's ideas and to stretch to find new experiences that might directly or indirectly influence their design.

Within the project, this is a week for the teams to start to transition from information gathering to creative output. They are challenged to seek inspiration related to the design project while also taking the time to incorporate feedback to conduct any final research and refine their personas. They are expected to continue to intentionally pursue inspiration each week.

9. CREATIVE CONFIDENCE

Sir Ken Robinson (2006) famously summarized that our education systems drive creativity out of us. From our early years, we function at a genius-level for lateral thinking (deBono 2015), but that ability is slowly eroded as we become 'educated'. Creativity is not optional for designers and designers need to be able to trust their own creative impulses while pushing the boundaries of what appears to be possible. Inspiration is the spark that starts the engine but creative confidence is the fuel that keeps it moving through all the resistance encountered during the design process. It is so critical that Tom and David Kelley (2013) devote an entire book to challenge and encourage designers to take this mindset seriously. To summarize their perspective: it's about **believing in your ability to create change in the world around you**. No discipline is more of a change-agent than industrial design, influencing thousands of products and experiences that everyone touches every day. Except for untouched people groups, industrial design influences every human life.

The introductory experience in class revolves around the differences between unconstrained creativity (art) and constrained creativity (design). Within class, we visit the school's makerspace and they are challenged to make "something" from available materials. Many are panicked by the freedom provided but quickly realize that self-imposed constraints create direction that enables action. As an assignment, they are challenged to create a tealight holder using nothing more than printer paper, clear tape, and glue. While also challenging due to materials, students find that their designs are much more effective when constrained but require multiple iterations to arrive at something desirable.

At halfway through the semester, this is a true pivot from building an understanding of the design context and the user to leveraging creativity toward a designed solution. The results of their deep research summarize in a persona then creates a picture for the designers which allows them to build a realistic representation of the persona using a mood board. After critique and several iterations, we begin to visually see the emotional representations of the user's challenges and day-to-day experiences.

10. CULTIVATE COLLABORATION

In academia, we push for an individual's design excellence, not for their status as a superstar but so that they are a significant contributor to their design teams. Good design is complex enough that it takes a team that can effectively integrate every critical aspect. We define collaboration as **the ability to effectively work with others, whether in pairs, small groups, or large teams**. We push our student to first understand the value and types of teams (Hackman & Wageman 2009) and to activate their leadership capabilities regardless of their role or title. Combining a leadership mentality with a competitive (Toulis 2011) but playful attitude pushes their team towards excellence while maximizing their potential to produce great designs. The ability to work with others, especially those that have complementary knowledge and skills, empowers us to unleash the creativity within and amplify the creativity between us. We are greater than our sum when it comes to design.

The classroom challenge is to push the students into an experience that forces them to rely upon each other and to recognize each other's strengths and weaknesses while being able to learn from their shortcomings and iterate towards success. We separate the class into groups of three: one building a simple Lego set blindfolded, one guiding using only verbal instructions, and one observing and taking notes. Not only does this teach collaboration, but it reinforces the importance of a child's eye, questioning assumptions, and empathy. After the first finished build, the teams are required to reflect on their experience and then switch roles. Regardless of prior experience, the second and third builds are significantly better and faster as they learn to work together.

The application within the design project with TMF starts with the student creating individual concept boards based on all prior work. The collaboration starts when they have to take three different boards and merge them into a single, unified concept. They have to ensure the concept's characteristics and attributes align with the constraints, research, persona, and established emotional impacts to start addressing the user's needs, wants, and desires .

11. ACCEPT CRITIQUE

Critique is **feedback that lets designers know how they are progressing in their application of creativity**. Healthy collaborators will provide both positive and negative critique which should enable substantial positive changes to designs. Not all criticism should be accepted. It takes experience and

wisdom, and intuition, to know what critique is valuable and should be considered and what critique needs to be ignored.

Since the students have matured their way through the semester and are embracing the unique structure of the course, this learning challenge is flipped. The students are required to find articles on effective critique and different methods of critique. This is discussed and reviewed as a class and the key characteristics of successful critique are built out as communal knowledge. Each team has brought a single concept board to present to the project team from TMF with all the supporting information to justify their design direction. While the moment can be full of expectation and anxiety, an application of productive feedback helps to refine their concepts and provides them with directional clarity as they move into the final stages of design and have the confidence to make good design decisions.

12. EMBRACE AMBIGUITY

Design is the act of creating something that previously did not exist. This explicitly requires a **willingness to tackle a challenge that is not clearly defined and does not have a predetermined solution**. Leonardo DaVinci called this space “sfumato” or “smokey”, recognizing that it is unclear, and we cannot expect it to become clear until we’ve moved through it (Gelb 1998). Unfortunately, our education system provides too much practice with clearly defined problems that have a single solution. While linear thinking is fine for learning fundamentals, it can be tragically misleading when tackling real-world design problems. That ambiguity can also create anxiety which can be alleviated with experience and a refusal to fear the unknown (Hodgson & White 2001).

The student experience is to continue to internalize these mindsets and to apply them directly to the project with TMF. The student teams are required to get user feedback on their final concept boards as they diverge again through brainstorming potential design solutions. They recognize that the final design is still ambiguous but is starting to take on a shape that aligns with the user persona. As they begin to sketch out forms and figures, there are still hundreds of possible solutions but the good designs are starting to take shape as the teams collaboratively leverage their creativity.

13. RELISH RISK

The real rubber-hits-the-road application is when designers are willing to take risks. Relishing risk is the mindset of **being willing to take on big or uncomfortable challenges**. This is not pursuing things that are dangerous, but being calculated with risk and willing to try something that has never been done before (Gelb 1998). The challenge with design is that low-risk, low-impact challenges aren’t likely to make a positive change in the world. Designers need to be willing to personally absorb some of the risk so that the positive impact can result from the design. To create great designs, designers need to be willing to fail.

Within the class experience, we teach risk by sending the student teams on a location-based, photo-verified scavenger hunt. It's impossible to reach all the locations within the 45 allotted minutes, but the further they travel from the classroom the more value each location is worth. This requires a negotiation of trade-offs, collaboration with their team, and an internal drive for the prize of bragging rights. In the project application, the teams are narrowing down to actual designs. No longer staying abstract, we're accelerating toward the end of the project by creating sketches of potential designs with an extra focus on design constraints, existing technologies, and materials, all to ensure that the final design is useful, usable, and desirable.

14. FAIL FORWARD

Designers willing to take risks have a reasonable probability they will fail. The response to failure determines whether it can be defined as a true failure or as an opportunity to learn and try again. Failing forward is seeing failure as **an opportunity to learn from experience and to keep moving forward with more information** (Maxwell 2000). The only true failure is not taking a risk or just giving up.

Within the classroom, we take this time to be introspective. After the reading, the students listen to a set of *Freakonomics* podcasts on failure and then take their standard resume and turn it into a failure resume. This, combined with a 1-page reflection paper, challenges them to think differently about past failures and to see the benefits of learning and continuing to move forward. We finish the class with a cathartic time where each person shares one failure and what they learned from it, starting with the professor. It is often emotional but also boldens each student to realize that failure is common and we can change our perspective in how we deal with failure.

For the project with TMF, each team converges on its final design and presents it to a full critique one week before it is presented to the TMF team and all the project participants. A culmination of every one of the 12 design attitudes, they all experience significant critical feedback and have to dedicate the final week to clarifying and iterating to ensure the best possible, user-focused design.

15. CONCLUSION

As design educators, we prepare our students for success with the processes and skills that designers need. But, we cannot expect them to rely only on methods or skills to create great design. We need to ensure they have the right mindset, or attitude, which enables them to create designs that will have a positive impact on the world. Some students will acquire these incidentally throughout the design curriculum but their success depends on learning by doing by teaching them intentionally and experientially so they can apply them effectively as professional designers.

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