THE DESIGNER TOOLKIT IS NOT ABOUT SKILLS
PREPARING DESIGN STUDENTS FOR LONG-TERM SUCCESS

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1. INTRODUCTION

At the beginning of a recent semester, we asked a group of 2nd year students the question "what did you learn last term?" The learning outcomes that they described showed a surprising level of insight. Their responses did not focus on skill-based topics such as aesthetics, visualization, brainstorming, and the application of manufacturing constraints (key components of our 2nd year curriculum), but instead listed the more abstract skills of:

- Seeing things as they really are [truth].
- Asking the right questions and the need to dig for answers.
- The power of working as a group, and that different opinions are valuable.
- Taking critique and deciding what is actually important in that critique.
- Being bold and confident in judgments and decisions.
- Being creative within constraints.
- Working through invisible obstacles.

This discussion was followed up by an ad hoc experience with a group of 4th year students who were preparing to graduate and were feeling a bit nervous. They cornered some of the ID faculty and asked, "you have talked a lot over the years about the 'Designer Toolkit' but what is it exactly?" Instead of being centered on tactical skills, the subsequent discussion in the studio focused on a broader tool-set that would prepare students for success in many fields, and jump-start their desire to make significant contributions in all areas that they touch.

This paper focuses on the outcome of that discussion, describing several vital components of the designer's strategic "toolbox" – Aptitudes, Methods, and Techniques. It will describe the differences between each of the categories and the ways that they compliment and interact with each other. This paper is not meant to be an exhaustive listing, but is meant to promote a discussion about how this toolbox could be broadened, expanded, or re-defined to help us (as educators) understand and communicate to our students the potential that they have to make impactful contributions in the world they will live and work in.

2. APTITUDES

Many design programs have the luxury of separating and filtering out more successful students from less successful students through a series experiences and tollgates. However, whether or not your program allows for such winnowing, there are certain attributes successful students bring with them that seem to naturally pre-dispose them to be a "designer", regardless of their backgrounds. For this discussion, "aptitudes" will be the term applied to those personal characteristics that the student seems to bring with them, or that they seem to naturally posess.

The word “talent” may be thought of as a synonym, but that often implies that you either have it or you do not. Even though this is often the case, we also believe that some of these aptitudes can be nurtured and developed in people that don’t seem to come with it up front. In general, the term aptitude refers to an overall frame of mind that drives a unique outlook and approach to things.

The APTITUDES that we talked about with the students are (in no particular order):

- Curiosity/Playfulness
- Tolerance for Ambiguity (adaptability to change, willingness to take risks)
- Courage/Confidence/Initiative
- Observant with a unique point of view
- Resistance to closure
- Judgment

2.1. CURIOSITY – A person’s overall ability to be “Creative” is partially related to their ability to be interested in things inside and outside of their immediate discipline in a way that is deeper than simple interest. Although a career in design demands an immense level of commitment and dedication *within* the field to be considered as having a certain amount of expertise, a broad range of interests outside of design is seen as a positive. Curiosity provides a broad base of knowledge that allows a designer to compare, combine, engage, and communicate effectively ideas with a wide range of process partners across their career.

Although most of us started life with a healthy curiosity, through various environmental influences we learned that *answers* were more important than *questions*. In most cases, our environments did not develop or reinforce our curiosity, nor increase our question-asking skills. Those who are resilient enough to make it through life with their curiosity intact have an edge over their peers who have not been prepared for the “new Renaissance” (Gelb 1998).

2.2. TOLERANCE FOR AMBIGUITY – This is the ability to hold two seemingly conflicting ideas up at the same time, and not be bothered by the conflict. It can even go as far as being "the tendency to perceive ambiguous situations as desirable" (Budner 1962). Conversely, *intolerance* for ambiguity is "the tendency to perceive…ambiguous situations as sources of threat" (Budner 1962).

The ability to leverage this aptitude allows a designer to operate and thrive in at least three contexts: (a) "a completely new situation in which there are no familiar cues," (b) "a complex situation in which there are a great number of cues to be taken into account," and (c) "and a contradictory situation in which different elements or cues suggest different structures--in short, situations characterized by novelty, complexity, or insolubility" (Budner 1962).

This aptitude is tested and evaluated the moment a student walks into their first design class and the instructor gives the assignment “Organize this space using line in some way that creates aesthetic-based emotional engagement”. A student with a limited (or undeveloped) tolerance for ambiguity immediately raises their hand and asks, “How do you want me to do that”? Or, “Can you show me some examples”. They want to know what the teacher wants and what the right answer is. Is it A, B, or C? Is it True or False?

Ambiguity tolerance is an essential aptitude for designers because of the complexity of our information rich, culturally diverse, dynamically changing world. People will continue to deal with an increasing amount of non-defined, less defined, and/or poorly defined problems. Those that have the ability to work well with ambiguous situations are primed to be strong contributors.

2.3. COURAGE – Being a designer is not for the faint of heart. From day one, you are asked to define and defend your point of view, often in the face of inexperience. How many of us have had to “fake it ‘til you make it”? Those who have the courage to make decisions and move forward have a key component for success.

A student who is intrinsically motivated (a sign of courage) is willing to go against previously learned habits that might lead to stereotypical ways of thought and action. They have a willingness to bend the rules, break traditions, and question authority and bureaucratic structures. Their courage to not worry about looking foolish, being criticized, or making a mistake allow them to fully utilize their potential to be creative. (Adams 1974) (Davis 1999)

2.4. OBSERVATION AND INTERPRETATION – This is the ability to see and give importance to problems, patterns, behavior, and important concepts beyond the obvious conclusions that others may not see. "Description" is the lowest form of observation, but designers are willing to go beyond that and "interpret" and attempt to ascribe some type of meaning. Designers look deeper beyond the "WHAT" and the "HOW" to the "WHY" and the "HOW COME"? They often ask, "What gives meaning to an object or a situation?"

2.5. RESISTANCE TO CLOSURE – In the case of most large-scale complex problems, the goal is not always about finding and developing an immediate workable conclusion. A designer is willing to ask, "How else can we look at this problem"? A designer is not only WILLING to ask this question, but often cannot proceed until that question has been asked.

This is the Aptitude that creates "joy in the journey". Because of this attitude, successful design students bring in lots of options and don't get discouraged by critique. They are obviously not satisfied with the FIRST good answer but attempt to continue to find multiple solutions to a given problem. They are happy to receive feedback and are able continue on in the exploration process. They realize that perfection lies beyond the low hanging fruit that makes up the obvious, immediate answers.

2.6. JUDGMENT – How many design students have you seen that seem to be able to generate lots of good ideas (whether visual or verbal) but always seem to gravitate towards the worst possible choice? They are good at executing when pushed and directed in a particular direction, but when left to their own devices, they default to the wrong thing?

Judgment is about pulling in and sorting through a wide range of variables, influences, and future possibilities and finding that thread that leads to original solutions well executed (Amabile, 1988).

Judgment is a form of educated Intuition and leads frequently to the sudden "a-ha feeling" (Bowers 1990). Formally, intuition has two stages. The first stage is on an unconscious level, where coherence, structure, and/or value is recognized; and the second stage is where that perceived value actually makes it way to the level of consciousness).

3. FROM APTITUDES TO METHODS & TECHNIQUES

If Aptitudes are PERSONAL characteristics, then Methods are PROCESS characteristics. TOOLS are then used to help the process along. Tools are less constant than aptitudes and methods and tend to change over time. This requires that a designer be a continuous learner, or at least be aware of the new techniques and be able to get things done in "New Ways".

The METHODS that we talked about fall under the following general categories:

- UNDERSTANDING/INSPIRATION
- SHAPING/SYNTHESIS
- EXPLORATION/CREATION
- SHARING/REFINEMENT

3.1. UNDERSTANDING – This method is defined by the need to "Seek to understand, then be understood" (Covey 1990). Understanding is a primary means for effective inspiration. It represents the designer's need to find inspiration (beyond the immediately obvious) and get to the essence of the problem. The principle of "Understanding" helps designers discover whether the problem, as stated, is actually the REAL problem. In

relating Methods to Aptitudes, Research (as a form of UNDERSTANDING) is “formalized curiosity. It is poking and prying with a purpose” (Hurston 1997).

There are many tools in this group but the broad categories are essentially things that help us to LOOK, force us to DO, and encourage us ASK. This is often defined as “Design Research”. LOOK makes use of the designer’s aptitude to observe and interpret what he sees at a deeper level. DO is about empathy through participation and the willingness to look at a problem with a beginners mind. ASK is about working to uncover assumptions that need to be validated (or invalidated) or discovering additional questions that need to be asked.

These methods make use of the aptitudes of curiosity and tolerance for ambiguity, and the ability to suspend judgment.

Examples of “Understanding” Techniques:

- Shadowing, A Day in the life, Photo Studies
- Personal Inventories, Experience Simulation, Participatory Experiences, Competitive Testing
- Interviews, Surveys, and Questionnaires

3.2. SHAPING – This is the opportunity, need, and ability to summarize the divergent efforts of the UNDERSTANDING stage and create a picture of what might be happening. Shaping demands the ORGANIZATION, SIMPLIFICATION, and CLARIFICATION of information that is flowing through the process.

Since the outcome of the shaping process is not guaranteed (nor immediately validated), the attributes of tolerance for ambiguity, and the courage to move ahead without knowing either the outcome or the proper process necessary to proceed come into play. Understanding the value that various possible scenarios have is a reflection of the attributes of observation, interpretation, and judgment.

Examples of “Shaping” Techniques:

- Card Sorting, Summary Lists
- 2x2 Matrix, Mental Model Diagrams, Cognitive Mapping
- Affinity Mapping, Value Definitions
- Personas

3.3. EXPLORATION – This is a basic expression of creativity, which (for designers) is focused on problem solving over expression. To be creative, a designer needs to look for ways to be FLEXIBLE and FLUENT with the goal of achieving a measure of USEFUL ORIGINALITY. Flexibility is looking at a problem from multiple viewpoints. This is an aid to fluency, which is the ability to generate a large number of ideas. The aptitude of JUDGMENT allows a designer to understand which ideas are original or novel, but which also have enough definition and clarity needed to move ahead in a real way.

Examples of “Exploration” Techniques:

- Big Picture (Verb-a-lize) vs. Detail (Attribute Listing/Flipping)
- Five Whys, W5H
- Associations, metaphors, direct and indirect analogies,
- S.C.A.M.P.E.R. - Substitute, combine, adapt, minify/magnify, put to another use, eliminate, or reverse/rearrange.
- Natural and forced combinations or “combinatory play”.

3.4. SHARING AND REFINEMENT – Gaps and holes naturally emerge as ideas start to take shape and are expressed and shared. The designer works to VISUALIZE an idea, or make it concrete in an appropriate way so that others can VALIDATE, or digest, interpret, and give feedback. This drives the designer to ITERATE, or

revisit incomplete solutions and work to apply newly gained knowledge and insight into evolving and refined proposals.
The drive to VISUALIZE is important, and is expressed in different forms but many of the techniques that we are familiar with are molded around the activities of SHOW, ACT, and TELL. Designers work to visually and concretely engage people in interactive multi-dimensional/sensory experiences that help them understand on more than an abstract level.

Examples of "Sharing" techniques:

- 2D Visualizations (Sketching, Computer-Assisted definitions), 3D Visualizations (Low Fidelity Mock-ups, Appearance Models, Rapid Prototyping)
- Role Playing/Dramatization
- Narrative, the story, the "Elevator Pitch"

4. CONCLUSION

Without really recognizing it, the 2nd year students mentioned at the beginning of this paper were describing the REAL value of their education, focusing on value-based life-skills rather than mastery of a temporary time-sensitive design tool. The subsequent experience with the 4th year students was really driven by their emerging realization that they would need to function in a much more complex environment (i.e. the "working" world) and did not quite feel prepared.

It is important to occasionally pull students out of the tactical focus that they immerse themselves in as they struggle to learn the current techniques and methods that will make them successful in their immediate chosen field of study. By re-directing their vision and helping them see that the characteristics that were fostered in their school-based experiences provide them with a broad spectrum of opportunity. With practice students can explain this broader view of their value in interviews, and in interactions with process partners who make assumptions about their worth based on a narrow understanding of industrial design and the people who work in the field.

Without knowing it, students often sell themselves short by not capitalizing on this broader set of personal and process characteristics that allow them to make significant contributions that provide noticeable value.

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