

CATAPULT DESIGN WORKSHOP SERIES

WORKSHOP

THE TECHNOLOGICAL ENVIRONMENT

A great deal about the technical sophistication of a region can be deduced by observing the environment of the people living locally. Understanding the products, materials, and technologies that people are already accustomed to living with can deliver insight as to what they would be comfortable using in the future. Additionally, observing what artifacts and activities exist in people's homes, work places, shops, and public spaces can indicate what materials, skills, and manufacturing and maintenance capabilities are available regionally. Knowing what to look for, being able to identify technological indicators, and keeping records of technical observations will produce information that the team will use throughout the design process.



AUTHOR Tyler is the COO and co-founder of Catapult Design. Before launching Catapult, he worked as a project manager for Plant Construction building multi-million dollar commercial buildings in downtown San Francisco and as a mechanical engineer for Chevron. In 2007, after two years spent working and exploring in Latin America, he began volunteering with Engineers Without Borders as part of a team focused on designing technologies for impoverished communities. That work became all-consuming and in late 2008 Catapult Design was born.

The majority of our world's population lacks access to life's basic needs. We develop and implement human-centered products to help them thrive.

www.catapultdesign.org



THE TECHNOLOGICAL ENVIRONMENT

INTRODUCTION

- What's the purpose?
- What are we hoping to learn?
- How will this information be used?
- What if I don't know what a lathe is?

APPROACH

- Discussion of technique
 - Photos (close-up for detail)
 - Observation
 - Locations to visit?
- Questions to ask/ observations to make
- Keep your eyes open and take note of anything interesting/different

DISCUSSION: COMPONENTS OF PRODUCTS

TECHNOLOGY - What is it?

- What constitutes technology?
- What are different types of technology?
- Levels of sophistication
 - Homemade (by owner)
 - Cobbled together locally (by local shop)
 - Local artisan (skilled workmanship, various degrees of sophistication)
 - Centrally manufactured regionally (factory or assembly line)
 - Centrally manufactured globally (factory, probably China)
 - Branded (clearly branded product - d.light)
- Degree of user training/ understanding required
 - Zero (shovel)
 - Low (mosquito net)
 - Medium (LED light)
 - High (improved cook stove)
- What does this tell us?

MANUFACTURING - How are things made?

- How are things made?
- How do you deduce manufacturing processes by observing products?
- Can it be made using hand tools?
 - Does it require power tools?
 - Is it mass manufactured (factory)?
 - How is it held together? (wire, fasteners, interlocking pieces, etc.)
- Manufacturing processes of note

Ceramics
 Wood working
 Smithing
 Casting
 Machining
 Welding
 Plastics

- Assembly methods
 - Cobbled together (wire, string, tape, etc.)
 - Fasteners (nuts, bolts, screws, rivets, etc.)
 - Interlocking pieces
 - Adhesives
- What does this tell us?

MATERIALS - What are things made of?

- Different kinds of materials
 - Organic [wood, fabric, leather, etc.]
 - Ceramics
 - Glass
 - Metal [ferrous (steel), non-ferrous]
 - Plastic
 - Synthetics [nylon, foam, etc.]
- What does material use and selection tell us?

DISCUSSION: GENERAL TECHNIQUE

To better understand what products, materials, and behaviors to which your end-user is accustomed, try the following questions and observations.

Methods:

- Take pictures of everything!
- Find out where they got it and how much it cost.
- Observe everything man-made, how it is used, and by whom.
- Go to a local hardware store.

Questions:

- What products/devices/tools do you see in homes, work places, and shops? (take pictures)
- Are there any devices/tools/products that stand out or seem out of place?
- What are they made of? (material)
- How are they made? (fabrication methods)
- Where are they made? (region/country)
- Where do they come from? (where were they purchased by the current owner)
- How did they get here? (transportation)
- Who uses them?
- How frequently are they used?
- What else is used for the same purpose? (before they

- had the tool or if the tool is broken)
- How much do they cost? (wholesale and retail)
- Can they be locally repaired/serviced?
- What do people want/think they need?
- What possessions are people most proud of? Value the most? Why?
- Does anyone have anything they got from an AID agency?

Tips:

- How can you tell if a metal is made of steel?
- Others?

REFERENCE: QUESTIONNAIRES BY TOPIC

TECHNOLOGY

Transportation

- What are the roads like?
- How do people travel (walk, bus, rail, boat, donkey, etc.)?
- How do goods get from place to place?
- Do people use bikes?
- How are goods transported?

Communication

- What is the telephone/cell phone infrastructure/penetration like?
- How do people get their news?
- Do they use radios/TVs?
- What do people want/say they need?
- How close is the nearest land line?
- Are there computers/internet anywhere?
- How close is the nearest cell phone reception?

Agriculture

- How do people farm? What do they grow?
- How do they irrigate their fields?
- How do they plant?
- How do they till?
- How do they harvest?
- How do they process their crop?
- Is any machinery used (tractor, thresher, etc.)?

Water

- How do people get their water?
- What is the infrastructure like?
- Do they treat their water? How?
- Are there water treatment products available?
- Do people know they should treat their water?
- How do they transport/store their water?

Food

- How do they store their food?
- Where does their food come from?

- How do they cook their food?
- What is their stove like?
- What fuel do they use for cooking?
- What tools do they use for food preparation?
- What do they eat with?

Sanitation

- Where do people go to the bathroom?
- How do they clean themselves? Clothes? Dishes?
- Do they use soap?
- Do they wash their hands?

Clothing/soft goods

- What are people's clothes made of?
- Where do the clothes come from?
- Where are they made?
- Are they hand made or machine made?
- What about footwear?
- What bags or other soft goods do they use?
- What fabrics do you see around?

Health

- Do people have any health products?
- Do people take any medications?
- Do people use mosquito nets?
- How far is the nearest health clinic/hospital?
- Where to do people go when sick?

Lighting

- What do they use for lighting?
- What fuels/power do they use?
- What do people want/say they need?

Energy/electricity

- What fuel types are available locally (e.g. kerosene, gasoline, deisel)?

Electricity

- Do people use electricity for anything? What?
- What do people want/say they need?
- Do they have any appliances that use electricity? What?
- How do they get the power they use (batteries, cell phone charging stations)?
- Are shops, homes, school, etc. electrified?
- Are batteries available locally? Do people use them for anything?
- How close is the nearest grid connection?
- Do they charge anything? How?

Alternative Energy

- Do you observe alternative energy sources (solar panels/wind turbines/human power/etc.)?

d.world products

- Do you observe any d.world products (e.g. LED lights, improved cook stoves)?

Infrastructure

- What infrastructure is in place?
- What is notably missing?
- What are people waiting for?

MANUFACTURING

Evaluating the local and regional manufacturing capabilities is important. When you observe manufacturing or construction, take note of materials and processes used.

Manufacturing (local/around town)

- What types of trade shops do you see (machine shop, sewing shop, wood shop, automotive shop, etc)?
- What manufacturing do you see taking place?
- What tools and machines are being used (welding; machine shop: mill, lathe; wood working: planes, tables saw; automotive, etc.)
- Welding [Oxy/acetylene, tig, stick]
- Machining [Mill, lathe, drill press]
- Wood working [Planes, table saw, chisel]
- Automotive Mechanic
- What local skills do you observe (farming, construction, sewing, cobbling, smithing, etc.)?

Manufacturing (regional)

- What are the major national/regional industries?
- Are there any factories in the country? What do they make? (this is admittedly really general, but ask questions and do online research)

Manufacturing (experience)

- What products/devices/tools do you see in people's kitchens? Homes? Workplace? Shops?
- What are they made of (materials)?
- How are they constructed?
- What are they used for?
- How sophisticated are the tools (homemade, steel hand tools, power tools)?
- Do they appear to be locally made or centrally manufactured?
- What manufacturing processes were used to make them?
- What kinds of fasteners are used (nails, screws, bolts, rivets, welding, etc.)?
- What kinds of shops are around? What are they selling? (visit a hardware store and get photos)
- Are there any interesting/complex plastic shapes?
- Notice anything locally made or cobbled together.

Construction

- What types of trades do you see (concrete, masonry, wood construction, electrician)?
- What construction do you see taking place (homes,

- buildings, roads, infrastructure)?
- What tools and machines are being used?
- How are the buildings built?
- What are the buildings made of?
- What materials are used (milled lumber, local wood, concrete, pvc pipe, brass pipe, electrical conduit, rebar, tile, brick, etc.)?

Manufacturing Processes of Note

- Smithing (pounding metal)
- Casting (pouring metal into a mould)
- Galvanizing (making metal rust resistant)
- Sheet metal (bending shapes out of thin metal)
- Machining (using large machines to cut & shape metal)
- Extrusion (think play dough)
- Plastic injection molding
- Firing (pottery/brick)
- Weaving or Sewing
- Wood working
- Glass blowing
- Leather working

MATERIALS

- What are products/devices/tools made of?
- What are homes/buildings made of?
- Do these materials seem to be locally made or worked with? Are they simply shipped in from abroad?

Materials of note:

- Plastics
- PVC pipe
- Steel
- Aluminium
- Brass/bronze
- Cast iron
- Concrete
- Tile
- Brick
- Glass
- Pottery
- Fabric
- Leather
- Rubber
- Synthetic materials
- Corrugated tin
- Galvanized sheet metal
- Metal in general (what kinds & how used)

ACTIVITY: IDENTIFYING & ASSESSING TECHNOLOGY

As a group:

1. Identify artifacts you observe during your homestay for each technology category discussed.
2. Identify materials and manufacturing processes of note for artifacts in homestay.
3. Identify construction methods and materials from our homestay.

Individually:

4. Choose a product of interest and document it.
 - Photos
 - Observations
 - Use
 - Manufacturing techniques
 - Materials
 - Location of manufacture
 - Location of purchase
5. What conclusions can you draw from these observations about the technical sophistication of your end-users and about local/regional manufacturing capabilities?
6. Discussion

ACTIVITY NOTES:

RESOURCES

Good Books

Guns, Germs, and Steel. Jared Diamond.
Technology, Aid, and Poverty. Ian Similie.
The Way Things Work. David Macaulay.

Weblinks

<http://www.afrigadget.com>
<http://science.discovery.com/tv/how-its-made/>

TYLER VALIQUETTE