User Experience In the Age of Sustainability

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Philosophy 110: Science, Technology, and Human Values
May 10th, 2017
About the Author

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- UX designer for over 13 years
- Worked on mobile apps, web design, logistics, assembly, energy, and automation
- Created the first usability lab for Blackberry
- Was the first user experience researcher hired by Siemens

This is Kem-Laurin Kramer giving a presentation about this book
Chapter 1: Sustainability, User Experience, & Design

**User experience design** focuses on users and their interactions with products and systems.

**Sustainability** is meeting both the needs of present and future generation without compromising the ability of future generations to meet their own needs (Brundtland Report of 1987).

Why should we care about user experience (UX) and sustainability? And how do they relate to each other?
Issues of sustainability to address

- Growing awareness of environmental issues
- High rates of consumption
- Avoid infractions and PR disasters

The author refers to this as the sustainability landscape that designers have to worry about
Designers need to understand several things

The what: the sustainability landscape

The context: What does it means to be sustainable

The theory and accuracy: how to embrace and advocate for good design

The practice: How to begin a practice of sustainable design

The strategy for sustaining practice: How to maintain traction and momentum to continue to drive change through design
Waste Hierarchy

- Prevention
- Minimisation
- Reuse
- Recycling
- Energy recovery
- Disposal

Most favoured option is prevention, followed by minimisation, reuse, recycling, energy recovery, and disposal as the least favoured option.
Baggu case study

- Paper or plastic bags?
  - Paper is made from a renewable resource and plastic is not BUT
    - Paper bags use more water to produce
    - The process to make plastic bags generates 40-60% less greenhouse gases
    - Plastic bags consume 71% less energy during production
    - Paper creates 5x more solid waste than plastic bags

- Solution? Use reusable bags
Problems with reusable bags

1. We need to encourage the use of reusable bags for shopping
2. We need to have users remember to take them along on shopping trips
3. Make it easier to integrate in their travel for impromptu shopping

How many of us are guilty of owning several reusable bags only to not use them?

How can user experience design address these issues and change the behavior of consumers through product design?
Baggu’s design philosophy:

“Baggu makes simple high quality bags in many bright colors. They fill many uses so you can own less stuff.”

Baggu doubles as an accessory for fashion as well as a practical reusable bag.
Bad examples

**Greenwashing:** when corporations try to seem more environmentally conscientious than they actually are

**Planned Obsolescence:** a business strategy in which the obsolescence of a product is planned and built into its conception
Chapter 2: Approaches to a Sustainable User Experience

Chapter 2 talks about sustainability frameworks for user experience design

The main frameworks that were focused on were

1. Natural capitalism
2. Biomimicry
3. Total beauty
4. Life-cycle analysis (LCA)
5. Cradle -to cradle (C2C)
Other frameworks

- Social return on investment (SROI)
- Sustainability helix
- The natural step
- ISO 14000
- Global Reporting Initiative
- Leadership in Energy and Environmental Design (LEED)

These frameworks, while important, are considered sub-frameworks of the main five and are not as relevant to the top
Natural Capitalism

Natural capitalism: system of four principles, where business and environmental interests overlap and in which businesses can satisfy customers’ needs, increase profits, and help solve environmental issues.

- Four kinds of capital:
  - Human capital - in form of labour, intelligence, culture, organization
  - Financial capital - cash, investments, etc
  - Manufactured capital - infrastructure, machines, tools, factories
  - Natural capital - resources, living systems, and ecosystems services
Four central strategies of Natural Capitalism

- **Radical resource productivity:** using resources more effectively have significant benefits
- **Biomimicry:** optimizing design by studying nature
- **Service and flow economy:** encouraging a shift in the economy from goods and purchase to service and flow. Focuses on the relationship between customer and producer
- **Investing in natural capital:** reinvesting into natural capital so that the biosphere can produce more abundant ecosystem services
Biomimicry

**Biomimicry:** animals, plants, and microbes are perfect engineers. R&D focus is on nature

- **This framework looks at nature in three different ways**
  - **Model:** the emulation of nature’s forms, processes, systems, and strategies to solve human problems sustainability
  - **Measure:** The use of an ecological standard to judge the sustainability of innovations. After 3.8 billion years of evolution, nature has learned what works and what lasts
  - **Mentor:** The reviewing and valuing of nature to introduce an era based not on what we can extract from the environment but what we can learn from it
Biometric principles

- Nature runs on sunlight
- Nature uses only the energy it needs
- Nature fits form to function
- Nature recycles everything
- Nature rewards cooperation
- Nature banks on diversity
- Nature demands local expertise
- Nature curbs excess from within
- Nature taps the power of limits
Total Beauty

**Total Beauty**: describing the concept of “beauty” in quantifiable terms. Sustainable products are those best for society, business, and the planet.

With the assumption that beauty is an objective measure, that means that there can be **beauty IQ** that designers have.

There can be beautiful products that have hidden “ugliness” (made from harmful products, human labor violations in production, etc) and thus total beauty should be accounted for when designing products.
How do we calculate Total Beauty?

- **Cyclic**: refers to the manufacturing process
- **Solar**: Does the design use reusable sources/energy
- **Safe**: Does the design use non-toxic materials
- **Efficiency**: Using 1990 as a benchmark, does the product use 90% less resources
- **Social**: Labor conditions, supports human rights
Cradle-to-Cradle (C2C)

**Cradle to cradle:** refocuses product development from a process aimed at limiting end-of-pipe liabilities to one geared to creating safe, healthful, high-quality products right from the start.

Views waste as “food” for future products. No product has a “death”.

Unlike other frameworks who are concerned about reducing future damage to the environment, C2C goes further and looks to reduce damage already done.
C2C example

The Herman Miller Mirra Chair

- Made using 96% of recyclable material
- Packaging used is recycled
- Production line uses renewable resources
  - Wind from turbines
  - Gas from landfills
- $400 price tag
Life Cycle Analysis (LCA)

**Life-cycle analysis:** examining the life cycle of the product and issues of waste

This framework is done by:

1. Compiling a list of inventory of relevant energy and materials inputs and environmental releases
2. Evaluating the potential environmental impacts associated with identified inputs and releases
3. Interpreting the results to help in making a more informed decisions
This is the most used frameworks in the industry but is more of a subjective measure than the rest of the frameworks.

This framework embraces all activities in the lifecycle of a product from manufacturing, transportation, or disposal.
Chapter 3: Product Life Cycle & Sustainable User Experience

Understand how a product life cycle lends itself to collecting user and product data From Start to Finish

- Phase 1: Manufacturing
- Phase 2: Transportation
- Phase 3: Usage & Energy Consumption
- Phase 4: Recyclability
Phase 1: Manufacturing

Reports take a high-level view of the act of the production, including the use of machines, tools, materials, and labor to produce the product

- What materials are the products made?
- How were the materials extracted?
- Does the product contain hazardous materials?
- Was the product manufactured under ethical conditions in the extraction manufacturing process?
Phase 2: Transportation

3 key factors

- Emissions associated with products being transported from one place to another
- Type of transportation used
- Role of packaging in transportation
Phase 3: Usage and Energy Consumption

Using methodology such as ethnography and the data generated helps improve design and user experience based on actual user data

- How much energy is consumed in the production and use of the produce
- If the produce has a user interface, is it efficiently designed from a sustainability perspective
- Does the produce engage users in allowing some active management of energy preservation
Phase 4: Recyclability

This looks at the product’s end life and how the end user and product relationship can help create new opportunities for reuse, serviceability and other ideas that can help close the waste loop into reduction of complete elimination. User experience methodologies can be used to collect significant data at this phase.

- How long does the product last?
- Do end users think that the product is durable?
- If broken, can the user repair the product easily, is it serviceable?
Chapter 4: Pulling it All Together

- This chapter pulls together everything discussed so far and gives us guidance and direction on how we can set sustainability goals to measure performance.

- **User Experience:** customers' total experience of the product
  - Its image, use, and effectiveness
  - Good design results = positive user experience (ultimate goal for all products)

- **Products having a good design is subjective**
  - Varies on product, target market, and landscape
  - This requires prioritizing resources and precision planning
Why do Products Exist?

- The need of people in order to achieve a specific goal
  - Ex. chair = sitting, phone = connecting with others, refrigerator = keep things cold
- In order to be aware of a product in all its stages, we must understand
  - How users perceive a product
  - How they would use the product
  - How can the product be optimized to meet users needs
  - How to meet environmental needs and business needs simultaneously
Users perception

- In order to have a well fit product for consumers, many designs and iterations must happen in order to fix the “unreliability” of the product.
  - Ex. = a phone is not durable or loses battery fast
- Users today look beyond aesthetic beauty of product they face in stores or on commercials
  - Users now rely on product value, durability, manufacturing, and company practices
  - They ask: “What is the battery life?” “Are the materials used in the product ethically sourced?”
- Companies use a scoring basis in order to improve the product and make it more efficient
- Users today are more “eco-aware”
  - Avoid pollution, conserve natural resources, eliminating wasteful products, energy efficient
Perceived Product Value

- **Perceived value:** values consumers assign to product
  - Based on its looks, how it is made, and how it is priced
  - Ex. shoes that are made to last 10-15 years → used hefty, durable materials = less waste in landfill, less money spent over longer period of time

- **When faced with two products**
  - One that is cheaper and inferior vs. one that is more expensive and superior
    - Always will choose more expensive, because reduces waste, feels valuable, and used for longer periods of time

- **When perceived value of product is set against the price = unhappy buyers**
  - Ex. When told a tool is solid, durable, and reliable, but it was so poorly designed it broke apart easily
    - Will rely on media for reviews and research for future products bought
Go Green Foundation

- Organization that reminds people to make “green-aware” purchases
- Became an online tool in order to provide access to thousands of environmental scorecards and ratings of recognizable consumer brands
- A simple text message can inform users instantly about a company's ratings based on the brands they purchase as well as what they contribute to product data.
- Companies have made a sustainability department in order to view consumers feedback and other companies same issues.
- Helps companies make more wise and ecological purchases
Pulling Together Traditional Tools and New Ideas

- **Sustainability framework**: aligning our traditional knowledge base with a framework that speaks to collecting targeted use data by product design phases
  - Move ahead and integrate new concepts of sustainability
- **Software cycle**: (system design) aligns product cycles already mentioned in Chapter 3 (life to end)
- **Product cycle**: describes product design
- **Software vs. Product cycle**
  - Both give the opportunity for consumers to think about their role as experience designers and how they can infuse sustainability principles
- **Life cycle Assessment**: life of a product from a cradle to grave
  - Materials, sourcing, refining, manufacturing, transportation, usage, etc.
Software Cycle

- **Project planning and feasibility study**: determine products goals
- **Systems analysis and requirements definition**: functions and operations of intended application to be designed
- **Systems design**: Product’s desired features and operations (ie. screen layouts, business rules, diagrams, documentation)
- **Implementation**: building of application
- **Integration and testing**: checks for errors and bugs
- **Acceptance, installation, and deployment**
- **Maintenance**: updates, changes, improvisations
Product Cycle

- **Ideation**: Idea of design of product
- **Conceptualization**: brainstorm session to help fine tune design
- **Design and Development**: use virtual tool to model concept
- **Prototypes**: virtual building
- **Testing**: redesign, rework
- **Marketing**: on its way to be used by users

When incorporated with the Product Life Cycle, all 3 cycles create a great sustainability plan for each phase of a product.
Global Initiative Framework

- **Goal:** to accomplish social, economic and environmental standards
- **Purpose of companies**
  - To create an item or service through user research (ex. surveys) so that their items or services improve over time
- **User reported research**
  - What do users think of the product’s durability?
  - Are users able to service products that are broken?
  - Are products designed to optimize energy use?
  - Are users recycling products as they were intended?
  - Do users feel that companies are providing enough out-of-the-box information about proper disposal of a product if it is not recyclable?
Methods and Practices

- Participant Observation: researcher interacts with consumer
  - Methods
    - End-User Interviews
      - question and answer type (traditional)
    - Focus Groups
      - workshop style where a small group provide input and opinions
    - Contextual Inquiry
      - the user describes the product as much as they can as if they were the teacher and the researcher takes the role as a the user
    - Ethnography
      - researcher observes consumers use the products in a public setting
Methods and Practices

- Naturalistic Observation: researcher does not interact with consumer
  - Methods
    - Heuristic Evaluation
      - user reviews guidelines to help understand the product
    - Competitor analysis
      - User compares each company’s products and rank
    - Questionnaires and surveys
      - open ended type questions
    - Panels and forums
      - virtual focus group
Methods and Practices

- Fly-on-the-wall observation
  - observe consumers overall in a public type setting
- Cultural probes
  - consumer is asked to test the product at home for a certain time
- Photo ethnography
  - observe consumers while using the product but use video or audio recordings
- In-house brainstorm
  - discussion amongst the consumer groups about improvements
Product Function

- Companies, generally, still focus their products on how it works rather than the input of the consumer
- ex) phone companies
  - 80% of the world has a phone
  - As the years progressed, phone companies included more features
    - This can eventually become a problem because users may become overwhelmed and frustrated with the product
- Companies should focus on the functions that assist the consumer
Chapter 5: Usable and Sustainable

This chapter emphasized the ideals of sustainable design in several aspects

- There are 5 fundamental principles of data collection and usability
  - Efficiency - ways we work to produce solutions that responds to the users needs
  - Learnability - familiarity of a concept is natural
  - Effectiveness - if it’s efficient, easy to use, and learnable, it is effective
  - Memorability - how easy it is for user to navigate and accomplish a task
  - Satisfaction - user must be satisfied with the product’s performance
Sustainability and Accessibility

- Accessibility - “to focus on people with disabilities or special needs, and their right to access to these systems and solutions, often through the use of assistive technology”
  - People with disabilities have a right to use solutions to which we design
  - Having access to the World Wide Web is an example of having access to design
    - Interaction with the WWW through blogs, social media, information etc.
  - For a designers perspective, sustainable design is universal in appeal
The User is Always Right

  - Understanding the psychographic and behavior in a way to drive design
  - They believe not to listen to users but pay attention to them
    - Ex. Spinning Logo and Drop Down Menu

- 3 Rules of Usability
  - 1. Watch what people actually do
  - 2. Do not believe in what people say to do
  - 3. Definitely don’t believe what people predict they may do in the future

- 3 strategies for how products and users interact now and in the future
  - 1. Contextual mapping and product adaptation- adapt products and solutions to user habits, positive usage patterns, minimize negative ones
  - 2. Forced usability- make products and solutions auto adapt to changing usage and user circumstances and design built in obstacles with positive impact encouraging usage
  - 3. Eco-awareness messaging- user is presented with info on the impact of his/her behavior, up to the user to relate info to his/her behavior
What Makes a Product “Green?”

● Green means ecologically “good” for the environment

● Examples of products that aren’t green and why
  ○ Mobile phones and computers
    ■ Tend to generate an abundance of carbon emissions during creation, shipping, and usage
    ■ The average laptop produces 1,060 lb. of CO$_2$ annually
    ■ Desktops can produce 3,500 lbs. of CO$_2$ yearly

● Two solutions that green consumers prefer and actively seek out:
  ○ Energy Star Appliances
  ○ User Serviceable Products
Sustainability, Consumerism, & Usage Experience

What contributes to a positive buyer experience for green shoppers?

- Buying responsibly sourced goods
- Shopping with companies that practice sustainable production
- Purchasing Fair Trade Goods
- Supporting local businesses
Product Brand & The User Experience

Benefits of Promoting Practices

○ Attracts more green customers
○ Develops an eco-aware brand image
○ Raises the likelihood of establishing returning customers

● Companies must also provide these three essentials to customers:
  ○ 1. Information
  ○ 2. Demonstration
  ○ 3. Communication
The Special Case of Visual & Interaction Design

- Interaction designers optimize designs that aren’t ethical and are in need of improvement
  - They also promote more efficient task flows
    - E.g. The Android HTC’s ability to quickly add a new contact right after a phone call vs. The Blackberry’s many steps to perform the same task
Interaction Design continued

  - Ethical $\rightarrow$ considerate
  - Purposeful $\rightarrow$ useful
  - Pragmatic $\rightarrow$ viable
  - Elegant $\rightarrow$ efficient
The Goals of Interaction Design

● To avoid causing harm resulting from unethical design
  ○ Potential types of harm:
    ■ Interpersonal
    ■ Psychological
    ■ Physical
    ■ Environmental
    ■ Social and Societal

● To incorporate ethical design which helps to......
  ■ Increase understanding
  ■ Increase efficiency
  ■ Improve communication
  ■ Reduce socio cultural tensions
  ■ Improve equity
  ■ Balance social diversity & social cohesion