

## **Design Thinking and Conservation in the Era for Sustainable Development: Global Interpretations of Conservation**

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### **Abstract:**

The Depletion of the Earth's atmosphere and the territories of the world are seeing stronger depletion with both natural disasters and also recurring climatic events. Is the way the environmental movement educating its public effective? Are Climate leadership organizations doing enough to mobilize the masses in awakening to Climate Change? Can we be more creative in our approach for social movements with User Experience and User Rights? This paper will explore Design Thinking and Climate Change in contemporary era. This paper discusses the history of design thinking along with opportunities for unique applications in conservation fostering new ways of collaboration. These are illustrated through four different case studies in conservation, design, and sustainability in the United States and Chile. This paper also addresses the integration of innovation across the private sector, education, and non profit organizations.

## Acknowledgements

Design thinking is a moving field, praxis, and movement. Throughout this paper, I would like to extend my acknowledgements to some designers along with some exceptional companies and non-profit organizations that were pivotal in being able to write this paper. Design thinking really stems from community, from learning with one another, ideating in trying to solve development challenges. In the past, recall only being able to appreciate design thinking from afar, yet overtime, thanks to exceptional colleagues, deeper optimism in the transformative power it holds, the awakening in how its unique nature brings communities together, design thinking has indeed become an approach for advancing sustainable development and conservation. My acknowledgements to Avishai Mallinger of Pilotworks in Providence ecosystems, Josh Donlan, Executive Director of Advanced Conservation Strategies for his time in the earlier stages of this paper, Becky Donner of District Hall for extending public innovation, and City Awake of the Greater Boston Chamber of Commerce for being creative throughout the years in housing millennials to design solutions for the city. Additionally, I'd like to thank Dr. Jon Chillingierian of the Heller School for Social Policy and Management. Jon is a Leadership and Organizational Behavior Professor at Brandeis University who while could have used several different leadership styles and methods, his one lecture on IDEO truly inspired a journey to understand what this practice actually consisted of, leading to an inspired design thinking event a Fall season at the Heller School. I'd like to also give my extensive gratitude to Tim Cook, whose book *Change by Design*, moved mine along with anyone's development soul towards build and impact.

From the book, along with the various opportunities we have had in design thinking, design thinking has brought us to some post-modern understandings of its nature. Its impact. Design thinking is empowering- it is thrilling, it is holistic, inviting, and truly leads to sustainable development change. While this paper was written for design's capabilities in being able to influence conservation, after the years of seeing it alive in formal and organic arrangements, a strong encouragement is made to all social scientists, conservationists, policy advocates, and social justice activists to experience design thinking and apply it to a social issue. Doing so unpacks complexity, unpacks reality, and trails seeds to create a sustainable solution. This paper is dedicated for all creative systems thinkers who apart from seeing inequality, rising carbon levels, and degradation choose to get up, roll up their sleeves, create, design, and *systems think*.

## Introduction

Design Thinking is a contemporary and unique line of thought that has continuously begun to captivate the interest of Higher Education Institutions, Corporations, Start Ups and also Non Profits. It stems to reduce complexities in communicating information around a particular process. How does it to do this? Often it is these very processes that ensure good program or product development. Design Thinking is unique in its ways of allowing the participants or community to be involved in co creating and designing solutions collaboratively (IDEO, 2015). It allows participants to experience *user experience* (Carr-Chellman et al, n.d.) as well as be part of the solution design rather than externally be prescribed one. Design thinking has great benefits in relational coordination (Gittel 2016), in team building, and also solutions that will actually be long term rather

than short term. This is due to the ability of having communities and social agents involved. This paper explores Design Thinking in across four different scenarios of conservation in environmental media campaigns with engaged citizens, in high schools, in a Territorial User Rights in fisheries (TURFs) program in Chile, and in food systems in Providence. These cases were highlighted for their unique dimensions of design towards people centered design-the roots of *design thinking*.

### **Methodology**

The paper has been structured with quantitative approaches using both scholarly research, human design thinking tool kits created by

“Being a human-centered designer is about believing that as long as you stay grounded in what you’ve learned from people, your team can arrive at new solutions that the world needs.”  
- IDEO Field Guide to Human Centered Design ( p.9)

leading institutions as well as interviews with design thinker facilitators. Design Thinking does not involve heavy rigorous data analysis.

### **Design Thinking, The Movement and Its Origins**

#### *The Roots of Design Thinking*

Historically, design thinking has been an evolving generating production of new ideas introduced into learning and design that stemmed from the 1960s onwards (Szcepeanska, 2017). Today it is revered amongst Harvard Business Review and Forbes as a new movement in business that is creating a framework in designing new management, products, and for the sake of this paper, new approaches to conservation. Across management schools, it is also growing with momentum featuring schools such as the D-School at

However, this paper is complimented by some statistical inferences regarding innovation from secondary sources. Among some of the other decisions that were made through this research, were the types of case studies chosen to illustrate design thinking in various scenarios as previously noted. Originally, eight case studies were selected including start up competitions centered around water scarcity, however, a more rigorous selection was made that could show holistic impact towards communities along with cases that were deeply engrained to the IDEO Design Thinking toolkit, a tool kit that has spurred innovation around the world. This is featured in Appendix I of this paper. Design thinking is creative, and outlines diverse range of activities; however, not everything is design thinking. Thus, reviewing the toolkit, ensures users and new supporters of the movement, the philosophies and practices of its practice. Figure II. has also been embedded throughout this paper to encourage academics, the private sector, systems thinkers, and activists to use tools in design thinking in their own entities to strengthen the sustainability movement.

Stanford University. While the concept is being established as a well-known concept thanks to the company of IDEO along with Tim Brown, CEO of IDEO, who has led this movement in modern era, design thinking has been evolving with a different name since during the mid 1900s. According to Szcepeanska’s article, innovation has been described as a “framework” as well as a “tool” (2017). Centered around human design, and a people centered approach, fifty years ago it commenced during the Design Science era in the Americas in industrial design. Among the fields of engineering and science, industrial design was a common approach that was logical, efficient, quantifiable, that could be tested, “measured, and improved on” (Szcepeanska, 2017). Much of these designs

however were centered on science and market based approaches. Later in this paper, we will provide contemporary case studies that outline its interconnectedness to the environment.

Amongst some of the leaders that commenced the movement with science, Buckminster Fuller of MIT, was coined as the leader of “Design Science” (2017). Creating dynamic design teams with diverse experts from distinct disciplines to try to solve systems based challenges, Fuller believed it was the ability of “conscious design” that would enable sustainable change.

“The effective application of the principles of science to the conscious design of our total environment in order to help make the Earth’s finite resources meet the needs of all humanity without disrupting the ecological processes of the planet.”

– Buckminster Fuller

### *Scandinavia Cooperative Model*

His work has been cited and carried throughout with various models he designed to try to solve problems with the hopes science could be created in a way that would benefit everyone. However, this did not reside itself only to North America. In the 1960s, cooperative design began to emerge in Scandinavia. The design models stemming out of Scandinavia were distinct from the ones from the Americas, as rather being expert led, it involved incorporating everyone. The management also was unique in its abilities to create “facilitators and guide” rather than separating designers based on other criteria. The co-designing of both products and services emerged as a result from this model. Some examples, according to Szcpeanska (2017), are projects such as UTOPIA, NJMP, DEMOkratiske, DEMOS, TIPS, and DUE. Some of these projects developed at governmental levels while some in more socially just communities advancing workers efforts and unions. This “cooperative design,” as situated,

truly believed in collective inclusion with a strong idea that systems needed to be developed and designed by those using the products (DEMOS, n.d.). In contemporary legacies to the Scandinavia Cooperative Model, the developments of future circles, organizational games, co-operative prototyping, ethnographic field research, along with democratic forms of communication in idea generation or idea improvements, greatly stemmed from this cooperative model. It then transferred in the 1980s to the United States adopting a different name titled *participatory design*.

During the 1960s and 1980s prototyping and design stemmed to human centered design adopting physical tangible outputs with now complimented aspects of social science including psychology and anthropology that helped designers better understand *user experience*, among the ways human would react, along with respond to new products. From this era forward, cooperative design took on other shapes such as more developed designer toolkits (Szcpeanska 2017).

This particular diagram has been used in design theory in education (Carr-Chellman et al, n.d.). Across design thinking application, apart from it being used in organizational management, design thinking has now also become adopted gradually in school curricula. The teaching methods is stemming from several management institutes along with universities such as Stanford University as previously stated. This particular user centered theory stems from the research of Alison Carr-Chellman and Michael Savoy (n.d.).

Figure I. Design Theory in Education

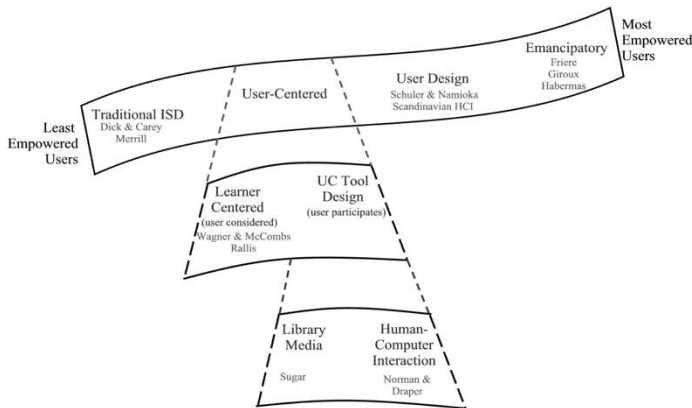


FIGURE 27.1. Continuum of empowerment in user-participation levels. ISD, instructional systems design; UC, user-centered.

This figure shows the evolution of different types of theorists and scholars who have advanced the user-centered approach that is fundamental to design thinking. For the sake of this paper, an applied approach to understanding design thinking has been prioritized. For more understandings around the theory, recommendations are made to explore the theorists used in Figure I.

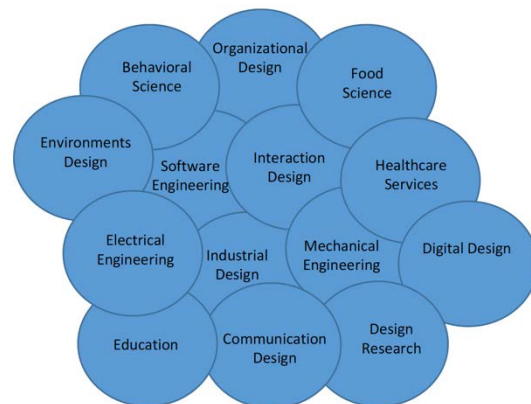
**Design Thinking and “Living Climate Change”, Post Effects of the Paris Agreement Case Study I**

The Paris Agreement was historic in its landmark accomplishment of bringing 175 countries together in efforts of putting an emissions limit to carbon of 2 degrees (UNFCCC, 2016). For those in the conservation community, Paris marked a step forward for conservation and sustainable development. Momentums for sustaining these goals, were also adopted earlier in the United Nations Framework of the Sustainable Development

Goals (SDGs) commencing in 2015 with several SDGs adhering towards climate change. Amongst climate activists, environmental political theorists, political scientists, entrepreneurs-businesses also started to want to play a larger role in climate change solutions. While the triple bottom line economy has certainly created a platform and movement for companies to do so, the actual action of companies committing to sustainable development and climate change can be approached with the design thinking approach by Tim Brown, CEO of IDEO.

*Living Climate Change* was developed in 2009 by Tim Brown and his entire team at IDEO. IDEO is a global design company in Palo Alto, California centered around “creating positive impact” (IDEO, 2018). Located in San Francisco, New York City, Shanghai, Tokyo, and Cambridge, they have taken a role of leadership across companies in designing products that provide “digital experience.” IDEO has several departments in its structure that allow its company to innovate, continuously.

Figure II. IDEO’s Departments



*Living Climate Change* (IDEO, 2009) was designed shortly after the UNFCCC Copenhagen climate change conference. It held different functions to align itself to in accordance to advancements towards conservation and climate change. *Living Climate Change* had aims around hosting conversations around the globe to citizens about climate change. What will you do for the future for climate change? How will you support sustainability? What does climate change mean to you? These are some of the learning that IDEO wanted to undergo as a company not with a goal of designing a product, but rather developing narratives and a story to support social activism and include its community in trying to understand and bring creative solutions together (IDEO Living Climate Change, n.d.). According to IDEO (n.d), this project also prompted a lot of user participation. The introductory video featured Tim Brown with his exceptional team Client and Design Director, Roshi Givechi, along with families and day to day global citizens. A video cited in this paper was produced by a family in the United Kingdom in which mothers read their children climate scenarios asking their children what they would do to respond to climate change. The ages of the children were not provided, yet the reactions of the children were shared. The video simply was one of the many received by IDEO throughout its *Living Climate Change* program centering climate change as something for *all* to be involved in as change agents, designers, and peoples impacted by climate vulnerability. The video is from IDEO (IDEO, n.d.).

## **Case Study II: Design Resilience to Climate Change Workshops for College with IBM**

As stated earlier in this paper, the efforts of the business arena supporting stronger activities towards sustainable development is evident. It seeks to bring forward more activities and new

engagements for companies particularly with communities. Communities, being at the heart of sustainable development, in the current contemporary environmental era, is being designed in ways to be inclusive, and bring new actors to the table for systems change and sustainability. In December 2016, Cooper Hewitt and IBM created an event inspired by an exhibit titled, “Designing a Better America.” This brought forward collaborative design of over sixty designs that showcased persistent and economic inequalities in urban cities. This was conducted by a designer whom had over two years of worth of field research with travels from various industrial cities along with metropolitan districts and rural lands with a lens on “persistent poverty.” This project that was the prelude to the IBM workshop was partly sponsored by the Ford Foundation and IBM.

Throughout this workshop, facilitators from IBM along with a co founder, entrepreneur, Dorn Cox from FarmHack presented to a high school the notion of environmental scenarios following the aftermath of Superstorm Sandy. The two scenarios were 1) Given Massive Flooding in an Urban Community and 2) Unseasonable drought in a Rural Farming Community. The question posed, following no particular design thinking format other than *design thinking*: “How might we be able to empower urban and rural communities to design solutions in the context of climate change?” Throughout this process, students were able to “ideate”<sup>1</sup> together towards ideas generating adaptation, solutions, and pure creativity. The facilitators or as this article claims “subject matter experts,” provided feedback and advice as high school students presented their ideas. According to Cooper Hewitt (2016), some of the

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<sup>1</sup> Ideate – a term that is used in entrepreneurship and design thinking in the activity level of collaboratively exploring new iterative ideas towards designing solutions. It is originated from the word “idea,” then transformed to an *action verb*.

outputs or takeaways from the students from participating as users in the design thinking activity were: the need for trust, strong community partners, and open communication. In equation forms the [=] to these activities [design thinking scenario 1 + design thinking scenario 2], as referenced in the article would be “designing resilience to climate change.” It is illustrated here as well and outlined as a formula for a reader base of potentially data driven practitioners.

Steps Used to Carry Out Workshop Activity<sup>2</sup>:  
Based from the article and also photos, we can infer it consisted of:

- Physical Space
- Post it Notes
- Group of High School Students
- Markers, Writing Materials
- Paper

Formula for Design Thinking Activity:

Design Thinking Scenario 1 + Design Thinking Scenario 2 = Designing Resilience to Climate Change<sup>3</sup>

## Innovating Fisheries with Design Thinking Approaches in Chile

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<sup>2</sup> A description of the materials that were used to carry out this particular climate design thinking workshop has been shared to show the also cost effective approach of this solution driven activity. The expenses of the design thinking activity are minimal in comparison to largely funded conferences that often times do not provide incentives for *all* to participate, rather a selection towards affiliated professionals, advocates, policy makers, among other distinguished roles in sustainable development.

<sup>3</sup> The outputs of some specific resilience activity levels or outputs would be: need for trust, strong community partners, and open communication

## Case Study 3: Advanced Conservation Strategies

Advanced Conservation Strategies (ACS) is a company<sup>4</sup> based out of the Design – Driven Solutions for People and the Environment (2018). They are driven towards enhancing the fields of science, human centered design and innovation. With a focus on creating sustainable outcomes, incentives, and sustainable finance, ACS supports finding creative solutions to conservation issues such as seabird bycatch, coastal systems solutions, economic drivers to marine protected areas, understanding constraints in legal fisheries in Chile, seafood fraud, and community based monitoring programs. This company was started by Josh Donlan and has then grown as a community of facilitators, and team in supporting some of the diverse constraints for an effective biological ecosystem.

Among the many ACS projects that the company holds, for the sake of this paper, the Territorial User Rights in fisheries (TURFs) | program was analyzed as it was founded upon the idea of creating user rights towards fishers in order to have outcomes of sustainable management and a positive net contribution margin in Chile. Upon ACS taking on this sustainable development project, ACS operated on a framework that is deeply embedded with *user rights*, as described in the title of the project but also in its approach to understanding constraints, collaborating multi-sectorally, and designing outcomes through a user rights centered approach.

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<sup>4</sup> While this is a company, it strongly adheres itself to a benefit corporation type of enterprise following much of its services and products to be community driven with its social change agents being the main beneficiaries to their performance.

Figure II. Advanced Conservation Strategies Framework applied to TURF Project



In Donlan et al (2009), enabling conditions that allowed this program to advance were described with “spatial user rights,” being fundamental to encourage sustainable management. According to Donlan et al (2009), “securing access and sharing control over resources can create incentives for sustainable institutional arrangements among fishers, who will then be incentivized to manage and harvest collectively and sustainably.” This also is said to have an effect on increasing compliance amongst fishers. These types of conditions also make it ripe for innovation to advance through.

As all projects also need to be assessed under results, how did design thinking play a role in shaping outcomes? Based on the 2009 paper, the fishers due to the user experience approach carried out by understanding the development constraint holding back fishers from higher levels of income along with the low levels of coordination across groups. Amongst some of the results gained from this project, the collective group learned that Chile Artisan Fishers were already participants of mature markets, yet that there needed to be more creative payment mechanisms for their work in biodiversity. Collectively, the group co designed payment mechanisms in either 1) good faith

payments or 2) biodiversity maintenance payments. Along these takeaways, fishing cooperatives in Chile were also understood as wanting to improve more of their abilities to be able to conduct surveillance across other fishing grounds with the support of the program. Both the existing fishing cooperatives and Advanced Conservation Strategies (ACS) were able to align a shared value of “behavioral changes” that would result in biodiversity benefits. In conclusion, a model was designed in order for not ACS to run this program but a local non-profit organization with collective goals of financing viability. The act of this program, that was entirely design thinking led – with the user experience focus, created enhanced environmental stewardship as well as the pressing goal of improve small scale fisheries.

#### Case IV. Food systems and Design Thinking

“When I think about food systems I am trying to add to the conversation and bring in elements of community and economic development that are often left behind by the academic world. Academia tends to frame food in the context of both climate change (agriculture/aquaculture) and public health (nutrition/access).

As I have shared, "Sustainability" carries with it a certain context that, at times, can narrow the scope of the conversation.

Usually when I think of Design with relation to food, its actually, usually in the traditional "aesthetic" sense. How will people react to food and their environment if aesthetic aspects are taken into consideration? How will this encourage engagement, access, movement, diverse interactions, cultural exchanges, and most importantly gains in employment and wealth in traditionally impoverished communities.

But with that said, it is with the framework of perhaps Design Thinking that others might be able to consider these other attributes to the food system. By providing the human context



we can shift the conversation deeper and recognize the complexity that these words carry.

-Avishai Mallinger, Pilotworks  
Providence, Rhode Island  
(General Manager, Entrepreneur)

These words were expressed by Avishai Mallinger, the General Manager of Pilotworks in Providence, Rhode Island that fosters innovation, design, and food entrepreneurship through a community kitchen incubator. Avi is a committed systems thinker, who for years working at the Rhode Island School of Design, food scene in San Francisco, along with in Washington D.C., has some significant observations on how the ability and right to design in a very unconventional space defines sustainability, and transforms ecosystems to avenues of social change and economic development. Avi holds deep appreciation to food entrepreneurs along with start-ups and cities that work with existing hubs of innovation. While food design is not measured by a framework, as mentioned in Avi's experience, it is the focus on aesthetic, on access, movement, culture exchange, and employment that brings food design as a major contributor to food systems and according to this paper, conservation too. With this case study we hope to have demonstrated that design thinking can be applied to not only scenarios of degradation and environmental vulnerability, but to also food entrepreneurship.

### **Conclusions**

Upon these four case studies we have explored corporate organized design thinking with communities, IDEO Living Climate Change open citizen engagement forums, user rights across fisheries in Chile, and food design in New England create economic opportunities and disrupt the marketplace. It is very clear that design thinking can be used and applied in many

different conservation challenges and communities. In Appendix I and II, a list of the different ways in which design thinking can be carried out as given. These greatly outline different styles in the Design Thinking Toolkit by IDEO. Included is also the design thinking approach of IBM that co organized the design thinking workshop (IBM, 2018). This is particularly unique allowing us to see how it can get embedded within a business model. Following some of these cases, along with considering the support that designers or the movement itself could use to reflect more impact, the following recommendations have been suggested.

Social Movements Embeddedness – From the civil rights era, to the Occupy movement that stemmed itself in the 2000s during America's recession, social movements have often been tied to the "power of the people." Many of these strategies have certainly taken creative nature, yet it has not been able to adapt towards forward thinking, to the tools available and present in mobilizing communities, across generations, in unique ways. The design has been a permanent blueprint. Design thinking is at the heart of creativity. It is at the center of innovation. It involves inclusion in understanding systems, gaps, and complexities without pointing culprits, breaking rules of law to prove points, yet as a creative space, on a post it, on a board, in a room. The first recommendation this paper suggests is the urgency of social movements to adopt another method of civic dissent. This being, design thinking. As conservation continues to raise attention to rising sea levels, melting glaciers in Antarctica, loss of bycatch or mercury found in the scales of fish in Northern Ontario, design thinking can bring us together, to design, prepare, adapt, and create ideas for communities to become resilient and prepared for climate change. The quicker civic dissent communities awaken to its capabilities, the more

enriching, coordinated, and close will social movements be towards truly adhering to the goals they set themselves.

Higher Education, Design Labs – Where is design thinking learned? How can it be learned? Are there enough spaces to build leaders and facilitators to carry out these scenarios with communities? While this paper originally wanted to feature case studies on higher education facilities, we chose specifically to highlight examples that would best show the impact of real life examples of design thinking. Higher education certainly can hold such value, however, it is siloed at times from reality, and there is already something to be said about the nature of students in higher education, as design thinking holds no criteria, no merit requirement, for one's opinion to be heard, to be understood, and validated as an idea for conservation. This second recommendation for conservation and design thinking is for universities. Higher education needs to flex and be open to new ways of teaching that better responds to less top down management and more towards inclusion and cohesion of ideas. Design thinking. Students, particularly those stemming out of the millennial generation are yearning to be in places where they can channel their energy, where they can be heard, work together, and see results. While there is much to learn from generations working together, in order for teachers, academic, and instructors to be successful in supporting conservation, design thinking is strongly encouraged. This can occur through training teachers, faculty members, along with students to facilitate design thinking. Courses can be found online, along with several events or workshops in metropolitan cities. Hosting several can create launching pads for universities to bend towards innovation along with extend capabilities towards future facilitators in the conservation movement.

Working Capital, Funding and Grants – No movement can operate without expenses. While costs is something social movements often do not consider, it is evident that it matters. While design thinking has limited expenses, such as post it notes, markers, chart papers, and communities (priceless), securing more funding for marginalized communities to host design thinking is suggested. Apart from marginalized communities, corporations, and companies can also host these activities, through extending innovation funds to cover the costs of these design thinking workshops and experiences for their staff or community engagement such as illustrated in Brown (2016). Start ups are also increasingly becoming interested in adopting human centered approaches along with design thinking into their business model in product development. For start ups, having funds set aside too for this in, Research and Development for product development or Innovation could also greatly bend towards institutionalizing design thinking across sectors.

Design thinking aims to foster creativity, new ideas, and innovation. The quicker ecosystems start acknowledges these realities, the more momentum and precision there will be on advancing sustainable development.

Appendix I:  
Mindset for Design Thinking, IDEO



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<b>Mindsets</b>	<b>Methods</b>
<p>Creative Confidence Make It Learn from Failure Empathy Embrace Ambiguity Optimism Iterate, Iterate, Iterate</p>	<p><b>INSPIRATION</b></p> <p>Frame Your Design Challenge Create a Project Plan Build a Team Recruiting Tools Secondary Research</p> <p>Interview Group Interview Expert Interview Define Your Audience Conversation Starters Extremes and Mainstream Immersion Analogous Inspiration Card Sort Peers Observing Peers Collage Guided Tour 65 Draw It Resource Flow</p>
<b>IDEATION</b>	<b>IMPLEMENTATION</b>
<p>Download Your Learnings Share Inspiring Stories Top Five Find Themes Create Insight Statements Explore Your Hunch How Might We Create Frameworks Brainstorm Brainstorm Rules</p>	<p>In the Implementation phase you'll bring your solution to life, and to market. You'll build partnerships, refine your business model, pilot your idea, and eventually get it out there. And you'll know that your solution will be a success because you've kept the very people you're looking to serve at the heart of the process.</p>

<p>Bundle Ideas Get Visual Mash-Ups Design Principles Create a Concept Co-Creation Session Gut Check Determine What to Prototype 113 Storyboard Role Playing Rapid Prototyping Business Model Canvas Get Feedback Integrate Feedback and Iterate</p>	
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## Appendix II: IBM Guiding Principles of Design Thinking Framework



### IBM Design Thinking Framework

Below is the design thinking framework of IBM, this is part of their institutionalized business model. IBM offers multiple avenues towards training in Design Thinking for companies through these principles.

#### Guiding Principles:

- A focus on the User Outcomes
- Restless Reinvention
- Diverse Empowered Team

#### The Loop:

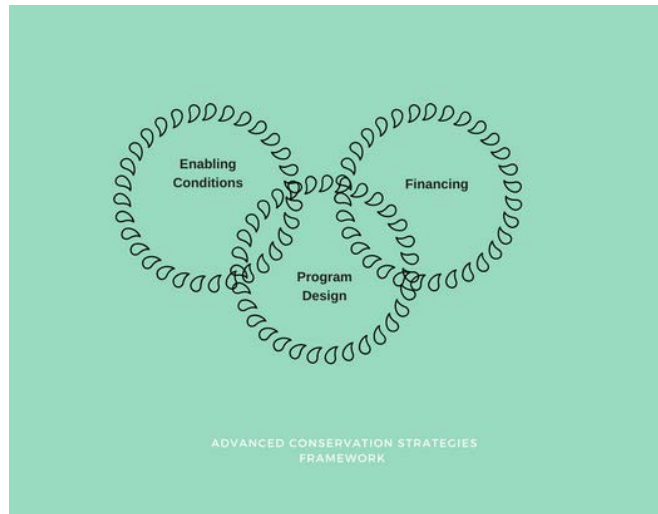
“Understand the Present and Envision the Future in a Continuous Cycle of Observing, Reflecting, and Making”

Observe. Reflect. Make.

#### The Key Align Us:

Hills. Playbacks. Sponsor Users.

### Appendix III. Advanced Conservation Strategies, Framework



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