

Design Thinking Frameworks:

— How Will You Empathize With Your Customer?

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WEBINAR FOR THE HBCU MAKING & INNOVATION SHOWCASE

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I participate in my personal capacity. My participation does not constitute an endorsement by the National Science Foundation or the United States Government.

Social Media Shout Out

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share it with the world!

Hashtag this session:

#AAASHBCUInnovation

#designingdiversity

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#designingdiversity

Overview

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Design Thinking and STEM

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Exercise

Next Steps and Resources

About Me



Broadening
Participation at
Scale as an NSF PO



Expertise in
Technical Innovation
& Entrepreneurship
Policy



Academic Administration &
Broadening Participation
Expertise

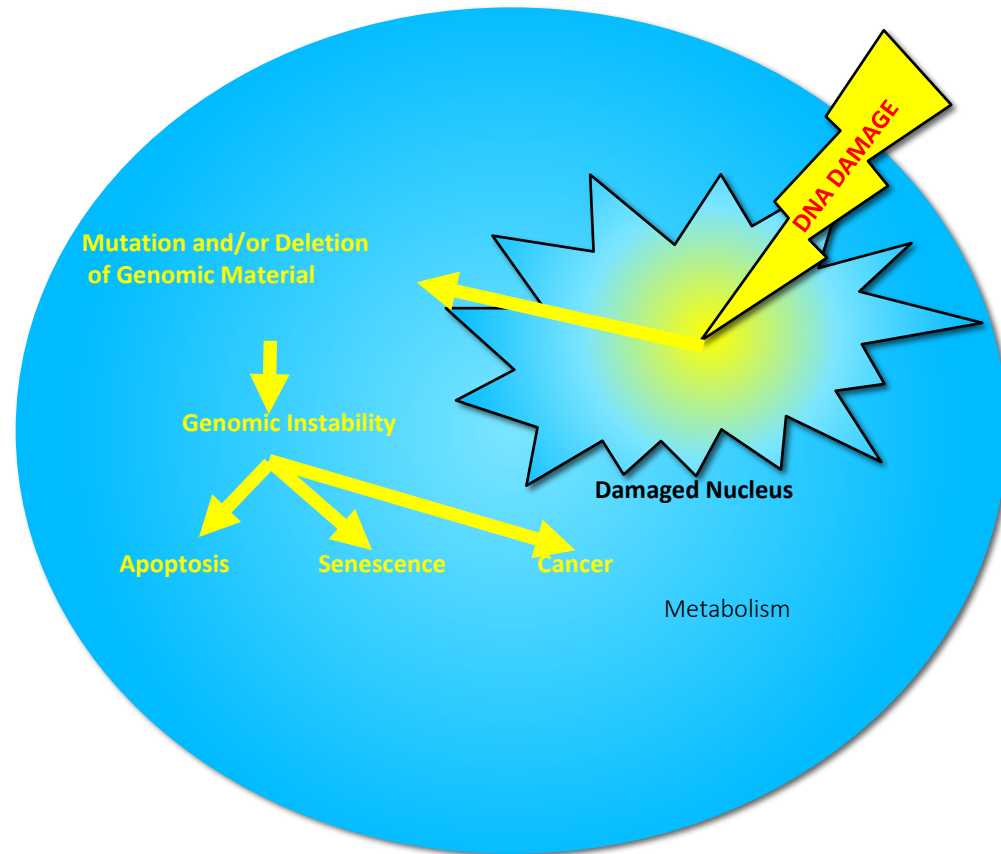


Management Consultant
in Industry



Basic Science Research
Training as a
Molecular Biologist

About Me



Basic Science Research
Training as a
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About Me



Management Consultant
in Industry

Industry Experience

- Managed Markets—Conducted Pricing Surveys and Customer Segmentation Analysis
- Marketing—Product Launch Planning



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About Me



Academic Administration &
Broadening Participation
Expertise



NRMN-CAN: National
Research Mentoring Network
(NRMN) Grantsmanship &
Professional Development
Conference for Big Ten
Academic Alliance Postdocs



Leadership Alliance Summer Student Cohort
and Instructors

About Me

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INVESTING IN ACADEMIC TECHNOLOGY INNOVATION AND ENTREPRENEURSHIP: MOVING BEYOND RESEARCH FUNDING THROUGH THE NSF I-CORPS™ PROGRAM

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In 2012, the National Science Foundation (NSF) took ambitious steps to revisit how they invest in academic innovation and entrepreneurship. Rather than increasing financial investments in technology development, it created NSF I-Corps™, an innovation education program and nationwide innovation network for NSF-funded faculty and trainees. Since its launch, NSF I-Corps has trained over 3,000 researchers and has been adopted by nine federal agencies. This paper provides a brief history of government investment in academic innovation, including the conceptualization of the I-Corps program, as well as its goals, growth, and influence on other agencies. The primary data for the paper includes interviews from 13 key individuals involved in the launch of the program and publicly available program data. We conclude with a discussion of challenges and opportunities as I-Corps-related programs look to scale and sustain their efforts going forward. This paper offers government, university administrators, and faculty insight into alternative methods of promoting academic innovation and explores future research areas for entrepreneurial ecosystems and education.

Key words: National Science Foundation, I-Corps, Innovation, Entrepreneurship, Academic innovation

INTRODUCTION

Innovation is viewed as the economic driver of today's knowledge economy. The U.S. federal government has consistently supported innovation through policies, regulations, and funding (1). For years, funding has been viewed as the major factor for the U.S.'s innovation success (2), contributing 20% to 25% of early-stage investments (3). Government investments in early-stage technology development

reduces technical uncertainty by bridging the "valley of death" finance gap (4). The phrase "valley of death" is often used to describe the early-stage capital gap between federally funded research and late-stage venture capital financing (2).

In 2012, the National Science Foundation (NSF) launched I-Corps™, drastically changing their approach to stimulating research translation by redefining the role of government funding. Unlike

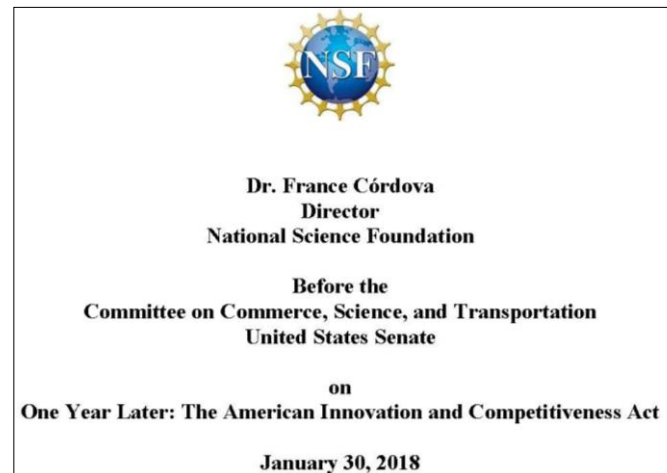
Accepted: March 1, 2018.

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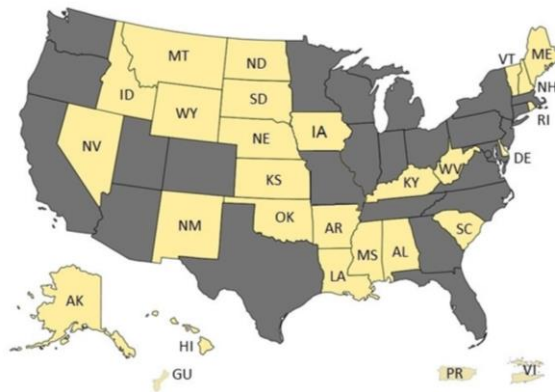
Expertise in
Technical Innovation
& Entrepreneurship
Policy



underway. The first pilot is focused on the Expansion of I-Corps, and the second pilot is focused on developing Follow-On Grants. NSF is funding eight I-Corps sites to increase participation and promote inclusion of underrepresented populations in entrepreneurship. These sites will pilot novel approaches and partnerships to engage differently-abled individuals, first-generation college students, racial and ethnic minorities and women, as well as Minority-Serving Institutions.

About Me

EPSCoR catalyzes research capability across and among jurisdictions



Broadening
Participation at Scale
as an NSF Program
Officer



6/28/2021 Dear Colleague Letter: Broadening Participation in STEM Entrepreneurship and Innovation (BPINNOVATE) (nsf21023) | NSF - National ...



National Science Foundation
WHERE DISCOVERIES BEGIN

[Home \(/\)](#)

NSF 21-023

Dear Colleague Letter: Broadening Participation in STEM Entrepreneurship and Innovation (BPINNOVATE)

November 19, 2020

Dear Colleague,

My Cred

Developed and launched new initiatives and partnerships designed to improve the life of others.

Various scales—local, national

Extensive human engagement as part of the development

Human Centered Design

An approach to problem solving, commonly used in design and management frameworks that develops solutions to problems by involving the human perspective in all steps of the problem-solving process.

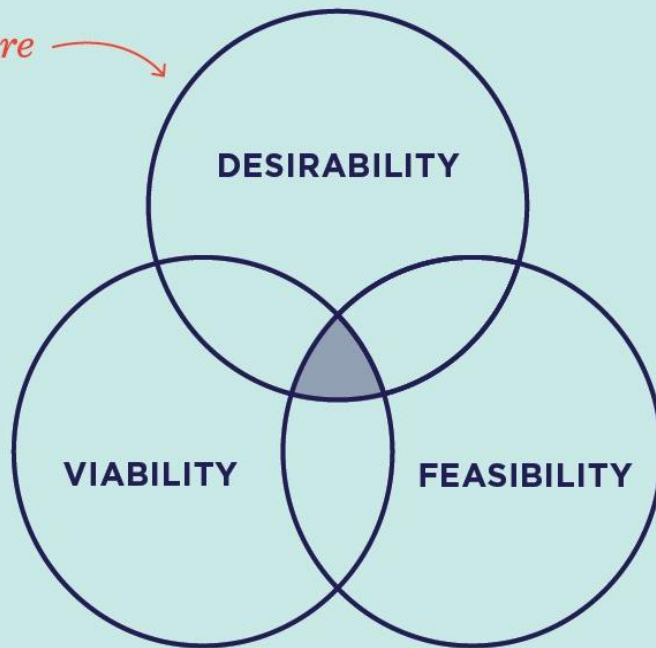
Four Principles

1. Understand the people
2. Focus on the people
3. Solve the right problem
4. Iterate, Iterate and Iterate

Nielson Norman Group:
<https://www.nngroup.com/videos/principles-human-centered-design-don-norman/>

What is Design Thinking?

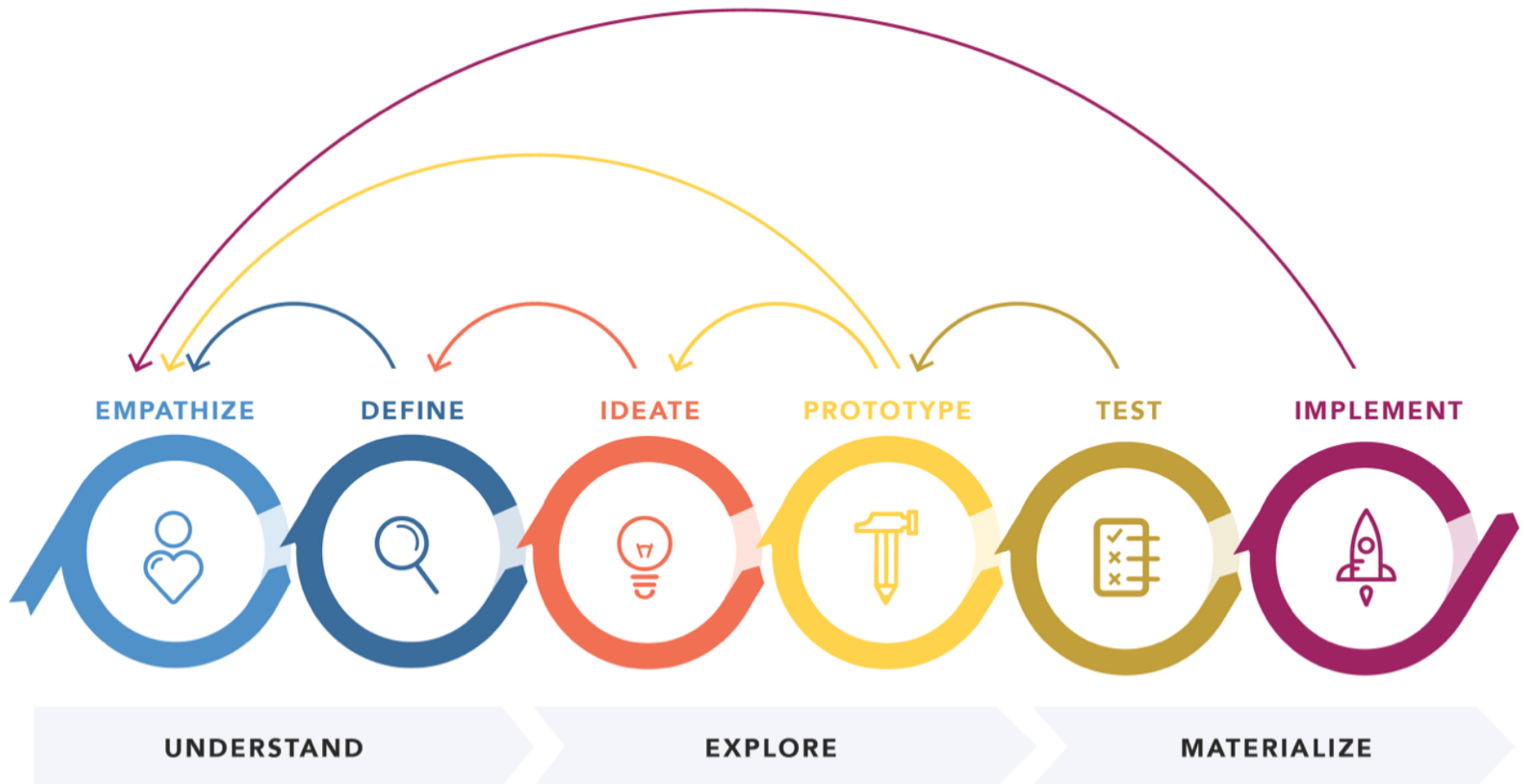
Start Here



Design thinking is a human-centered approach to innovation—anchored in understanding customer’s needs, rapid prototyping, and generating creative ideas—that will transform the way you develop products, services, processes, and organizations. By using design thinking, you make decisions based on what customers really want instead of relying only on historical data or making risky bets based on instinct instead of evidence.

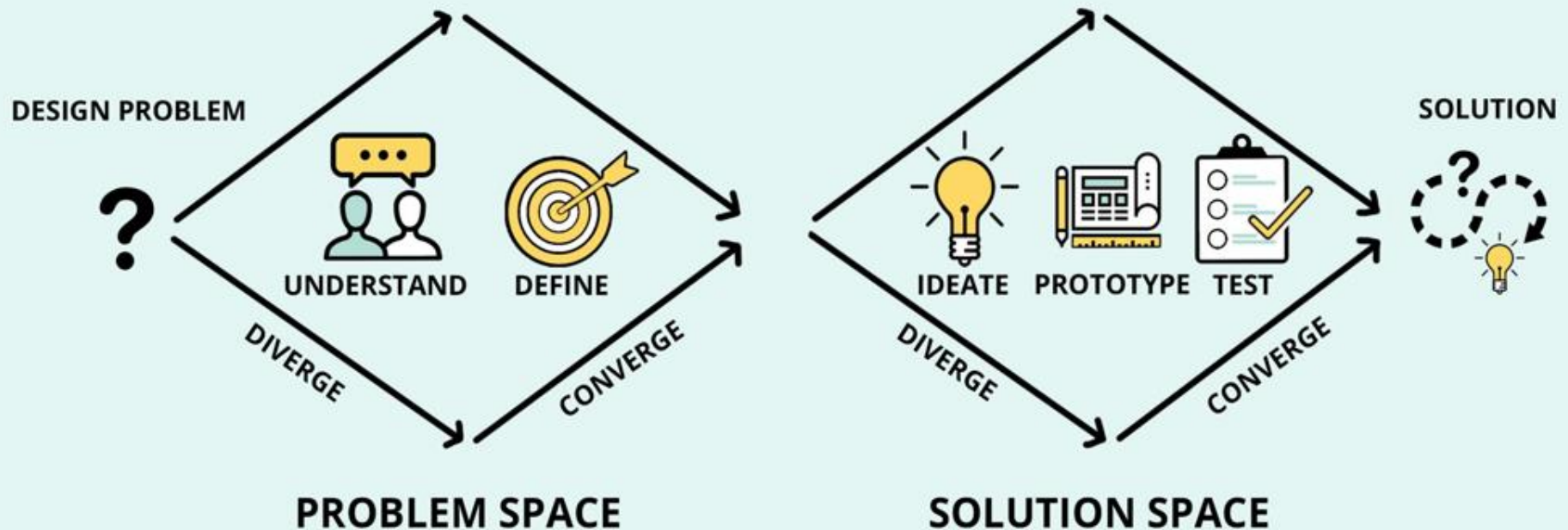
Let’s take a Poll!

Design Thinking is a Non-Linear Process



Convergent and Divergent Practices

THE DESIGN THINKING PROCESS



Actions Central to Design Thinking



Bias toward action

Focus on human values

Collaborate across boundaries

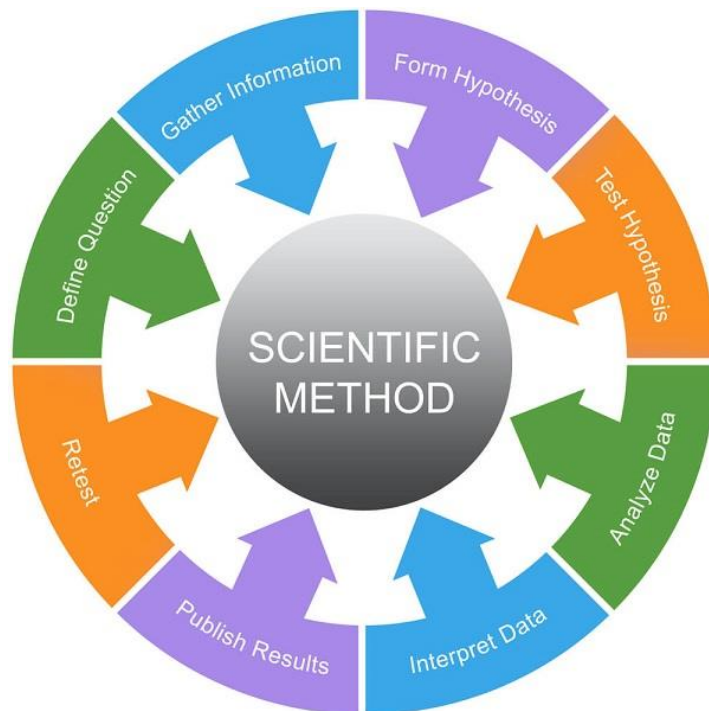
Be mindful of process

Prototype toward a solution

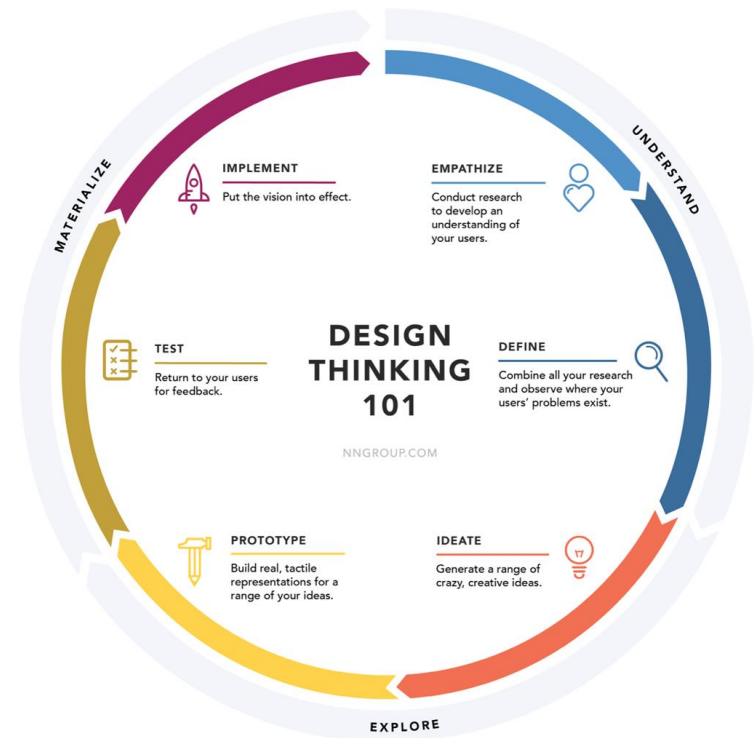
Show don't tell

Science and Design Thinking

Scientific Method



Design Thinking Framework



Empathy Deep Dive: Definitions and Guidance

Empathy is the foundation of a human-centered design process.

To empathize we:

- **Observe:** View users and their behavior in the context of their lives
- **Engage:** interact with and interview users through both schedules and short “intercept” encounters
- **Immerse:** Experience what your user experiences

Why: To work past any preconceived biases that may alter what will be designed for customers

Why: To align your value proposition with their needs

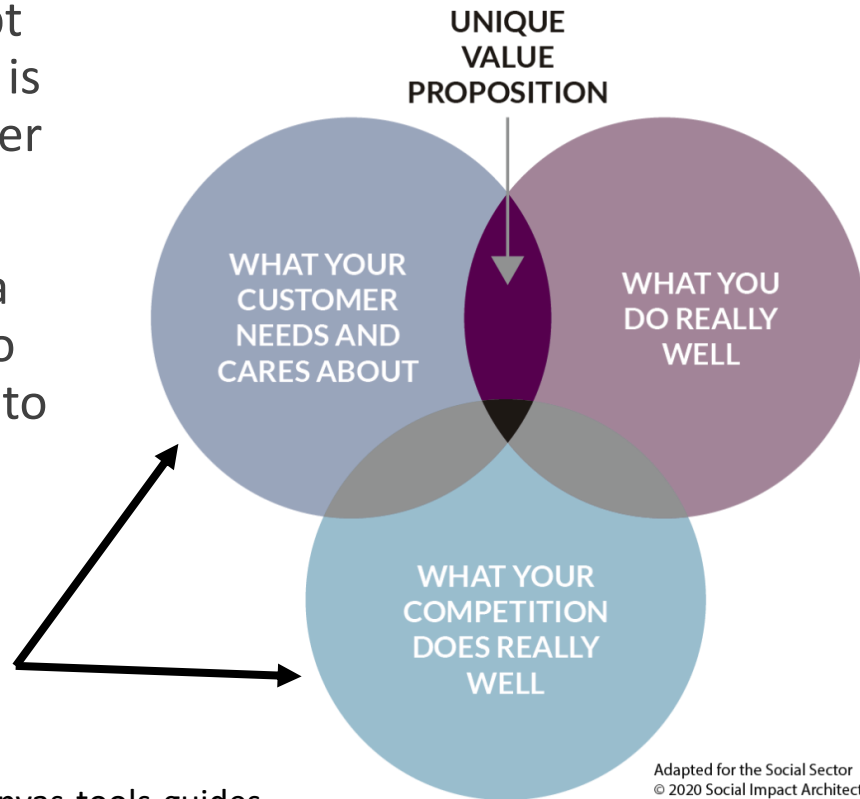


What is a value proposition?

A value proposition is a concept that describes what a business is providing that makes a customer choose their innovation.

Googled definition: The value a company promises to deliver to customers should they choose to buy their product.

Developing empathy plays a key role here!



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Resources: <https://www.strategyzer.com/resources/canvas-tools-guides>
<https://blog.hubspot.com/marketing/write-value-proposition?toc-variant-a=>

Empathy Deep Dive: Start With Your Customer

Think about all of the different types of people that will benefit

Your customer is the person who is buying you're selling

Sometimes customers are not users but you also need to consider users, regulators, saboteurs/competitors and others in the ecosystem of your product

Then, go out and talk to them!



Empathy Deep Dive: Tips for Empathizing with Customers

Use these approaches to understand your customer:

- When possible, interview them in-person, then videoconference, then phone
- Visit them in their environment
- Photo-journaling
- Use Body language for engaged listening
- Ask Open Ended Questions
- Ask for a referral—“Who else should I talk to?, Do you know anyone else that I should talk to?”



Empathy Deep Dive: Tips for Empathizing with Customers

- Use Body language for engaged listening
 - Ensure that your body is on the same level as the person you're interviewing.
 - Make and keep eye contact. Smile and nod your head to communicate that you are listening to them, and they have your full attention.
 - Taking notes is another physical cue to the person that you're listening and appreciate what they say.
 - You may be tempted to fill a moment of silence with a personal anecdote— But keep focused on the person you're interviewing and make them the center of attention.

Empathy Deep Dive: Do Not Talk About Your Business

At this stage of customer discovery, you want to avoid describing what you are trying to do to avoid

- Confirmation Bias
- Disclosing Your Intellectual Property



Empathy Deep Dive: Starter Questions



1. What do you currently use to do X?
2. What do you like about your work?
3. What does a day in your life look like?
4. What projects are you working on?
5. What challenges are you having?
6. What has or has not worked?

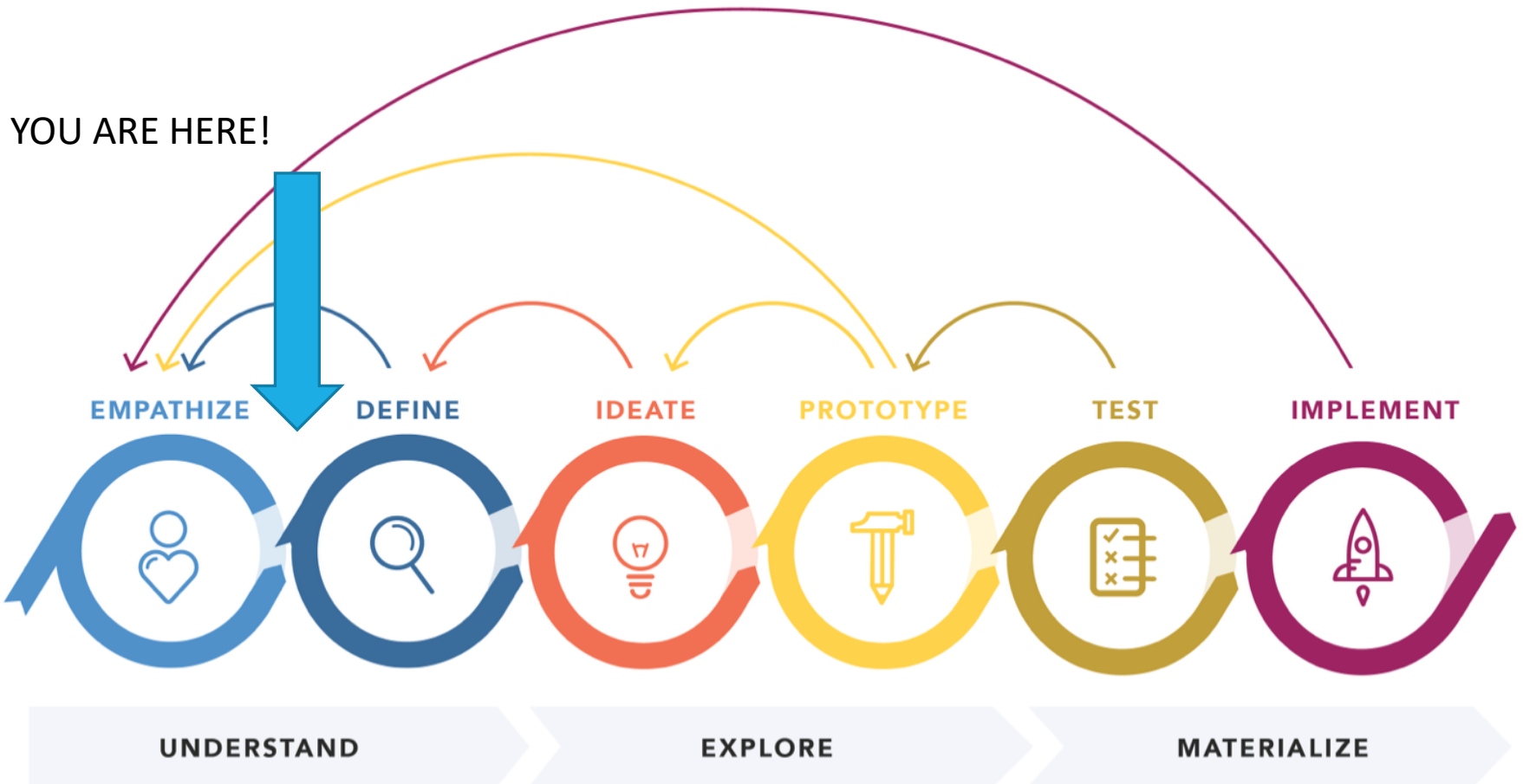
Empathy Deep Dive: Dig Deeper

- Use 5 “Whys”—ask why 5 times when applicable
- Is it “nice to have” or absolutely needed
- Seek to understand what their **jobs** are, their **pain** creators, and their **gain** creators

Tip: You want your customers to tell you what they needed, yesterday!



Design Thinking Debrief



Empathy Deep Dive: Exercise

Questions:

1. Who is your customer?
What is their title?
2. What are their jobs, pain creators, and gain creators?
3. How do they feel about these jobs, pain creators or gain creators?
4. What insights to you hope to learn?



Next Steps: Download Your Learnings

Typically, after each interview, take the notes, photos, quotes, etc... and share them as a team:

- Have each team member take turns and describe what was learned and ideas generated from the interview
- Capture ideas and compelling stories on Post-It Notes or large sheets of paper
- Use concise and complete sentences that everyone on your team can easily understand. Capture quotes, the person's life history, household details, income, aspirations, barriers, and any other observations.
- Cluster your notes into categories and themes
- Individually write down the top five ideas that emerge and share

Share Your Thoughts

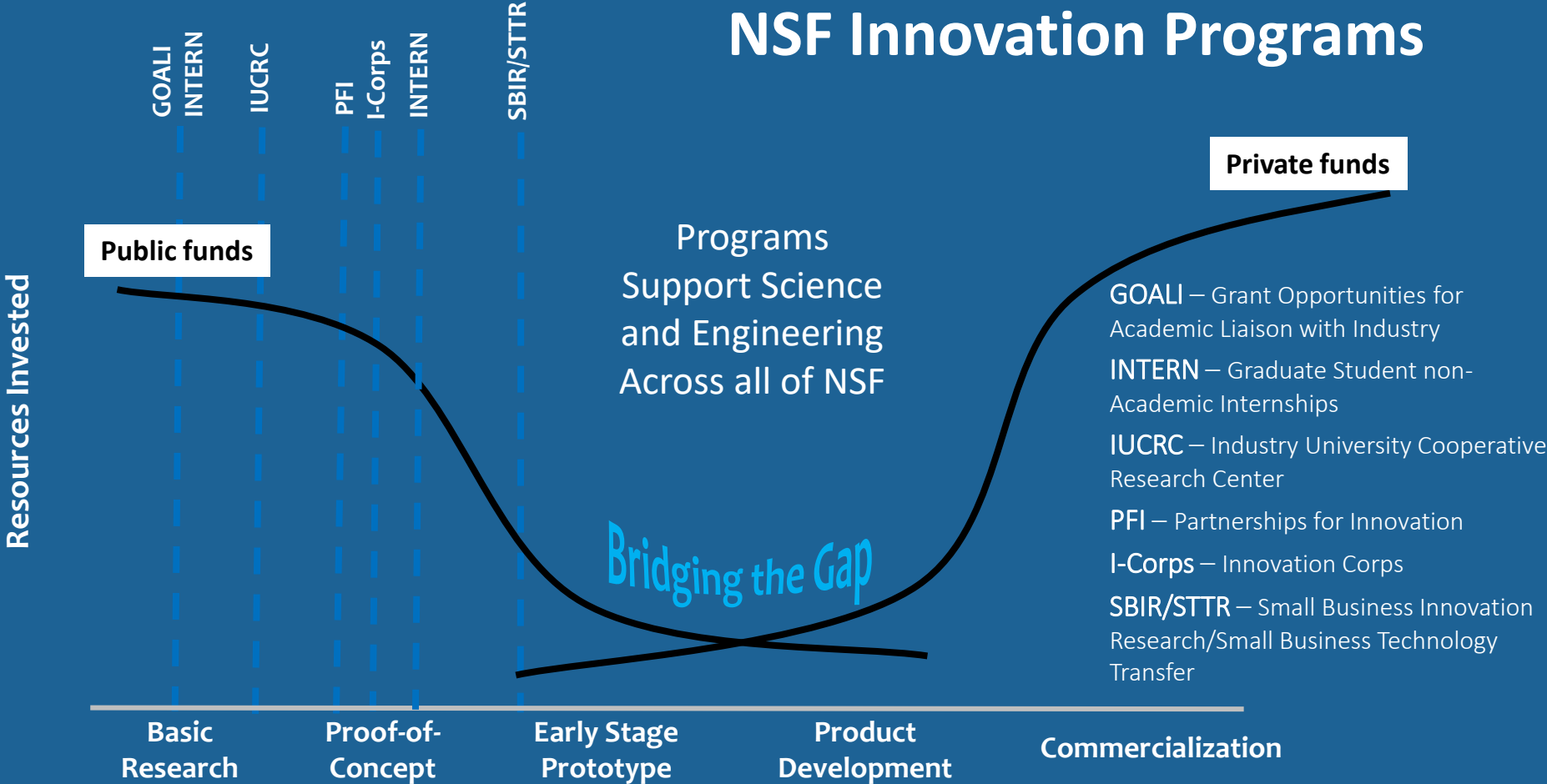
What will you take away from this session?

What did you learn that was new?

Tag your thoughts on Social Media!

##AAASHBCUInnovation
#designingdiversity

NSF Innovation Programs



NSF Convergence Accelerator

WHY: Leverage the science across all fields of NSF research to produce outcomes in an accelerated timeframe, with streamlined operations allowing for nimbleness to support the most innovative results

WHAT: A new organizational structure to *accelerate* the transition of basic research and discovery into practice, in areas of national importance

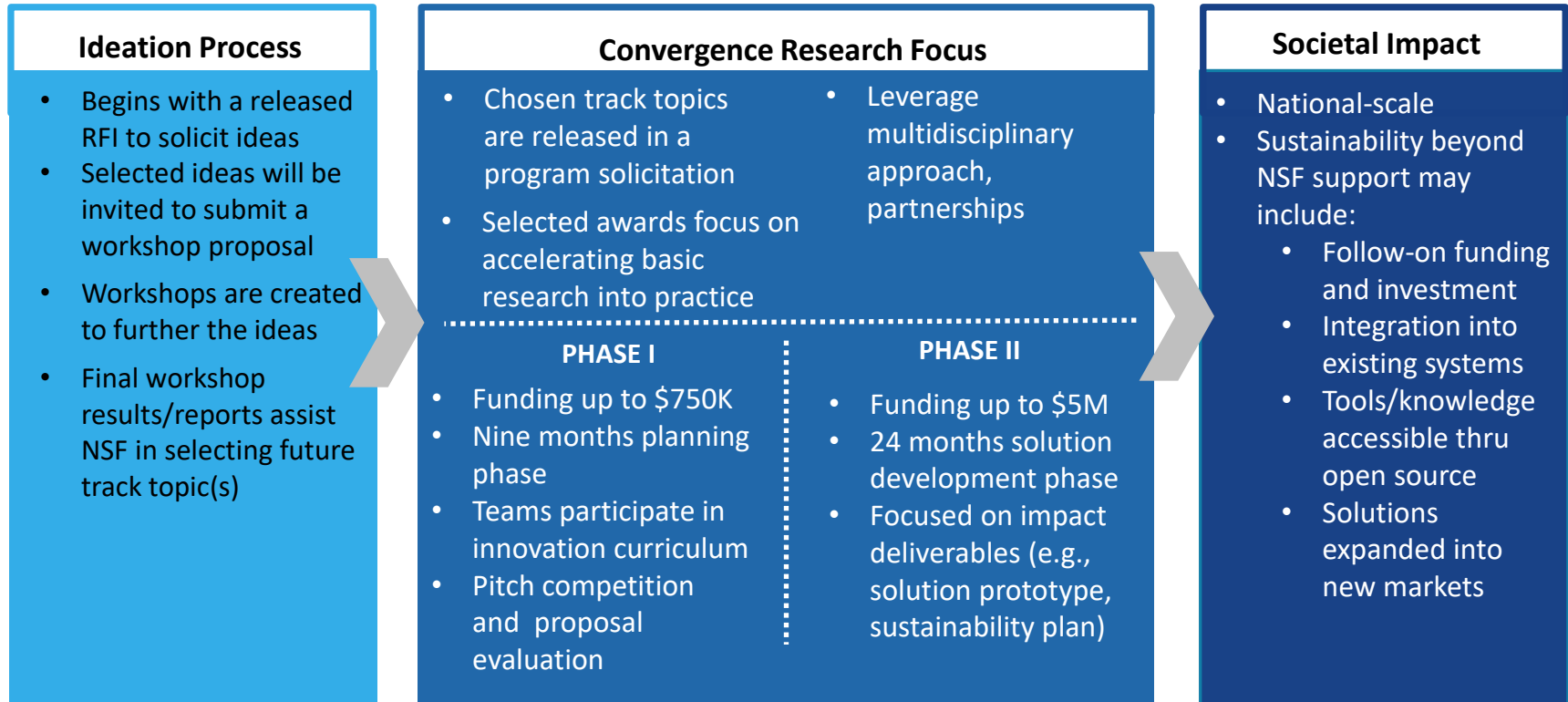
Characteristics

- Use-inspired research
- Clear goals, milestones, high-impact deliverables
- Leverages multidisciplinary teams
- Larger, national scale
- Requires diverse partnerships – industry, non-profits, academia

Proactively & Intentionally Managed

- Teams and Cohorts—“Tracks”
- Cooperation and Competition
- Intensive education and mentorship—human-centered design thinking, team science, and customer discovery
- Mission-driven evaluation

NSF Convergence Accelerator Model



For additional information, visit www.nsf.gov/od/oia/convergence-accelerator

New Opportunities For Learning About Entrepreneurship, Startups, or Industry: Trainees

- **Innovative Post-doctoral Entrepreneurial Research Fellowships (I-PERF)** provide early-career STEM Ph.D. recipients from underrepresented groups with paid opportunities for training, mentorship, entrepreneurial activities, and innovative research at NSF-funded startups. <https://iperf.asee.org/>.
 - **The matching phase closes in March**
- **The National GEM Consortium (GEM)** helps people from underrepresented groups pursue their master's or doctoral degrees in STEM-related fields. GEM has a cooperative partnership with NSF to support and encourage underrepresented researchers along entrepreneurial pathways through the I-Corps National Innovation Network. <https://www.gemfellowship.org/i4/>.
 - **GEMpreneur Workshops are offered one Wednesday each month at 12-1:30 pm ET.**
- **NSF INTERN program** (NSF DCL 21-013) enables graduate students already supported on an NSF grant to pursue internship and training opportunities outside of academia and gain professional development experience. <https://www.nsf.gov/pubs/2021/nsf21013/nsf21013.jsp>.

More information is available on Division of Industrial Innovation and Partnerships page -

<https://www.nsf.gov/eng/iip/about.jsp>

Point of Contact: iip@nsf.gov

Resources

Your Campus Innovation Center

Stanford d.school (d=design):

<https://dschool.stanford.edu/resources/>

IDEO: <https://www.ideo.com/us>

Nielson Norman Group: <https://www.nngroup.com>

“Designing Your Life—How to Build a Well Lived, Joyful Life” by Dave Evans and Bill Burnett: <http://designingyour.life/>

Thanks for Participating!

Stay in Touch!

Chinonye "Chi-Chi" Nnakwe Whitley, Ph.D.

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Questions?