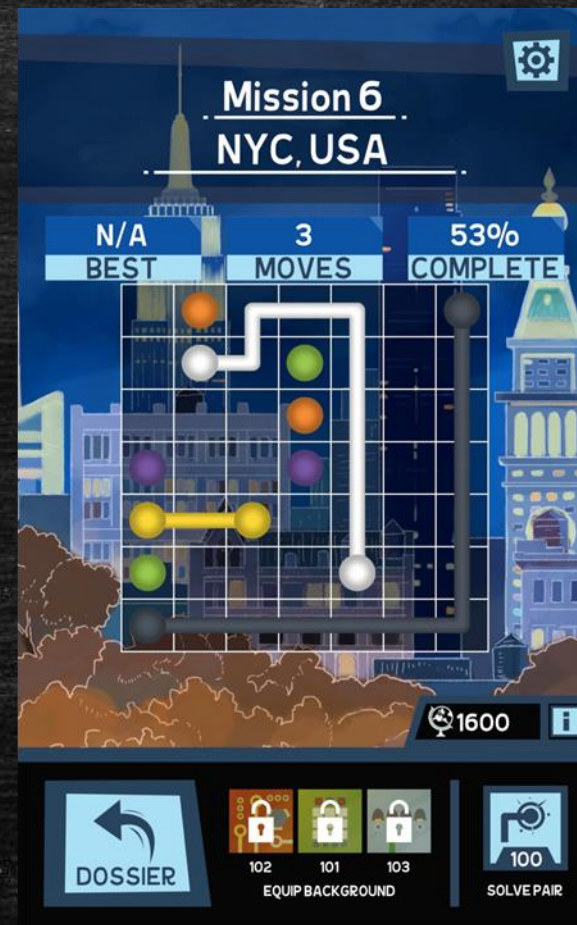# NSF Convergence Accelerator

Anita Nikolich
UIUC

Deep Cover – launching Nov 15th 2023!

Background

- Research Scientist & Director of Research Innovation

- Former NSF PD/TTP Champion!

- NSF Convergence Accelerator Phase 2 : Deception Awareness & Resilience Training (DART)

- DARPA SBIR Phase 2 : Mapping the Impact of Digital Financial Assets

- 2 recent startups:

TL;DR NSF Convergence Accelerator

- Phase 1 $750K Phase 2 $5M

- Teams paired with a VC coach

- Converged Research

- Real World Outcome/Product

- Structured Curriculum – formerly Ideo, now Stanford

- Track Integration – synergies

- Phase 1 to 2 : separate evaluations. Competition to downsize teams
  - Proposal (traditional)
  - Pitch
  - Phase 2 Year 1 Review presentation

SBIR + TTP + Research + I-Corps

[manic laughter]

NSF Convergence Accelerator: Convergent Research Approach

- Use-inspired and application-oriented.
- Fed by basic research and discovery.
- Integrates teams from industry, academia, nonprofits, government and other.

IDEATION

CONVERGENCE RESEARCH FOCUS

PHASE 1

PHASE 2

SOCIETAL IMPACT
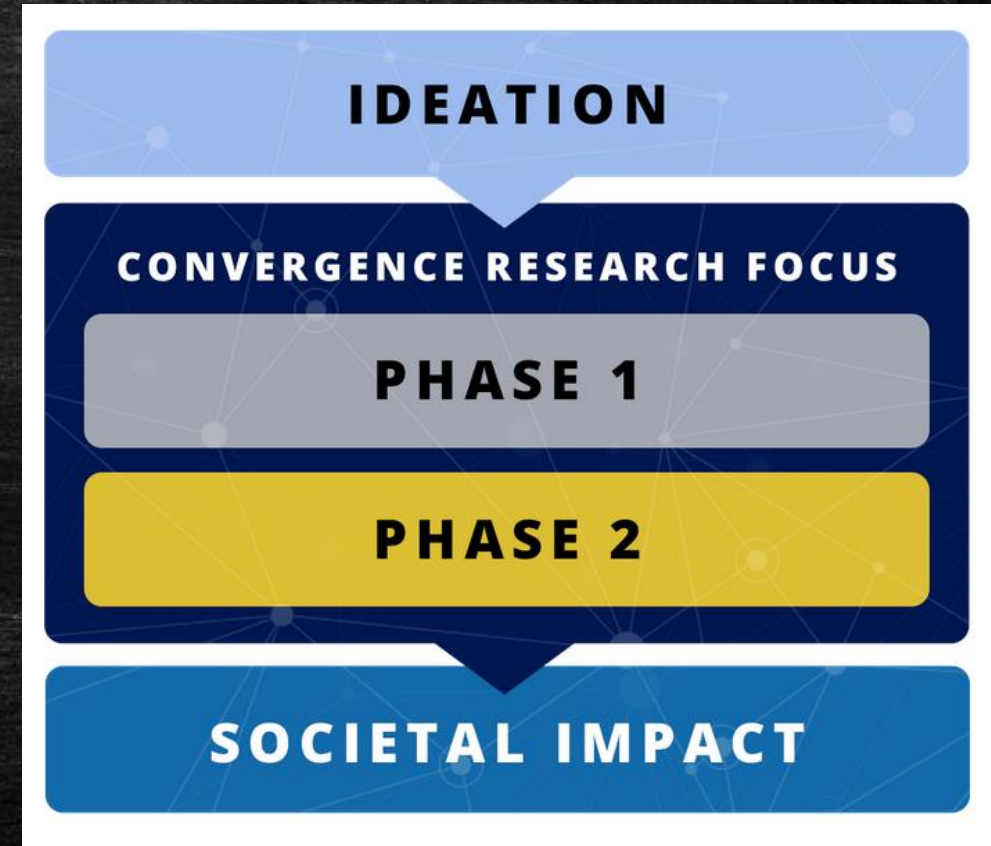
"If you build it, they will come…"

-Disembodied Voice, Field of Dreams

Tracks: What Does NSF Want?

Ideation process: Topic identification

Convergence Accelerator research topics begin in the ideation process. Ideas from the community are gathered through a Dear Colleague Letter, Request for Information, DCL/RFI.

Submitted topic ideas must fulfill all the following requirements:

- Be broad in technical scope.
- Be impactful to society at scale.
- Build upon foundational research.
- Be suitable for a multidisciplinary, convergent research approach.

Workshop to Further Refine an Idea for Track

Inauthentic Behavior in Online & Digital Systems

Final Conference Report

THE UNIVERSITY OF CHICAGO

HarrisCPI
CYBER POLICY INITIATIVE
THE UNIVERSITY OF CHICAGO

Identify major sub-themes that form the basis for interdisciplinary research into IB.

Highlight research agendas in inauthentic behavior in a range of fields, including medicine and health, banking and finance, biology, marketing, education, sports, and the intelligence community.

Workshop Reports Give Insights

Chosen Track Topics Aligned to the 2021 Cohort

Two workshop topics were chosen for the 2021 cohort track topics, creating the Networked Blue Economy (Track E) and Trust & Authenticity in Communication Systems (Track F).

- Ocean Internet-of-Things / Networked Blue Economy (PDF, 732.89 KB) , led by Massachusetts Institute of Technology (Award ID: 2035143)

- Inauthentic Behavior in Online and Digital Systems (PDF, 340.13 KB) , led by University of Chicago (Award ID: 2035349)

Past Funded Workshop Topic Reports

- Advancing Sustainable Low-Carbon Energy through Convergence (PDF, 1.07 MB) , led by University of Houston (Award ID: 2037573)

- Design for Circular Economy from Molecules to the Built Environment (PDF, 13.93 MB) , led by University of Pittsburgh (Award ID: 2035223)

- The Development of Infrastructure for Distributed Bio-Manufacturing and Bio-Readiness (PDF, 878.89 KB) , led by Boston University (Award ID: 2035346)

- Improving Online Education Through Technology, Research and Data (PDF, 346.7 KB) , led by Georgia State University (Award ID: 2035359)

- Privacy and Pandemics: Responsible Use of Data During Times of Crisis (PDF, 798.27 KB) , led by FPF Education & Innovation Foundation (Award ID: 2035358)

- Re-think Nature for Innovative Solutions to Grand Challenges (PDF, 1.33 MB) , led by University of Maryland College Park (Award ID: 2035307)

- Socioresilient Infrastructure: Precision Materials, Assemblages, and Systems (PDF, 308.31 KB) , led by Massachusetts Institute of Technology (Award ID: 2035215)

Annual Tracks Announced

New Funding Opportunity: NSF Convergence Accelerator Phase 1 and 2 for 2023 Cohort

May 16, 2023

NSF Convergence Accelerator

Track K: Equitable Water Solutions

Fresh water is critical for future ecosystems, human health, and national security. This track will converge foundational knowledge and advancements in environmental sciences, geosciences, engineering, computing, social and behavioral sciences as well as other disciplines to develop solutions for water quality, quantity, and equity issues.

Track L: Real-World Chemical Sensing Applications

Society is faced with challenges related to environmental quality and monitoring, food safety, agriculture, disease diagnostics, security, and terrorism. This track builds on foundational knowledge and recent advances to transform scientific discoveries into practice for societal and economic benefits. Science advances include olfaction and chemical sensing, sensor technologies, digital olfaction, artificial intelligence, neuromorphic systems, computational modeling, biomanufacturing, and robotics.

Swedish Research Council ☑ and Vinnova ☑, two Sweden government agencies, are partnering with the NSF Convergence Accelerator on Track L. Swedish researchers and innovators can submit proposals to lead or be a team member on a multidisciplinary team for Track L.

Track M: Bio-Inspired Design Innovations

Bio-inspired solutions are needed to mitigate complex societal challenges, including climate change, infrastructure monitoring and resilience, food production and human health. This track capitalizes on
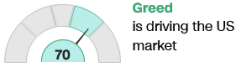
Forming a Team

Clemson Profs Unveil Russian Trolls' Information War, Tweet By Tweet

A year ago, over beers, a pair of young instructors began a project that opened a window on a campaign against America that continues unabated

January 10, 2019 / Greg Lacour

33,342.34	0.25% ▼
4,197.23	0.13% ▲
12,711.89	0.43% ▲

Fear & Greed Index →

Greed
is driving the US market

70

Latest Market News →

Meta slapped with record $1.3 billion EU fine over data privacy

Debt ceiling woes could kill dealmaking on Wall Street

China imposes sales restrictions on Micron as it escalates tech ...

emocratic Party deepfaked its own chairman to highlight 2020 concerns

By Donie O'Sullivan, CNN Business
Updated 9:58 AM EDT, Sat August 10, 2019

MORE FROM CNN BUSINESS

A growing number of sports bras, shirts and leggings brands found with high levels of toxic chemical, watchdog warns

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I School of Information Sciences
Informatics Programs

Home ⌄   People ⌄   Programs ⌄   Focus Areas ⌄   In the News

Game Studies and Design Undergraduate Minor

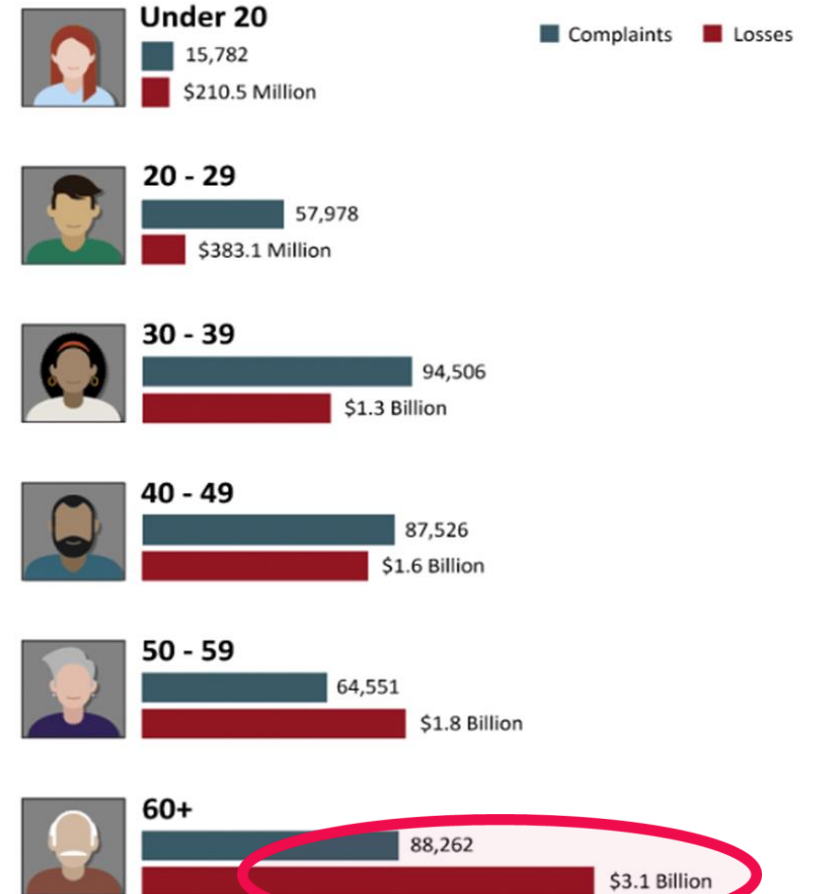# First Idea: Gamified Solution to Disinformation. K-12! Digital Literacy!
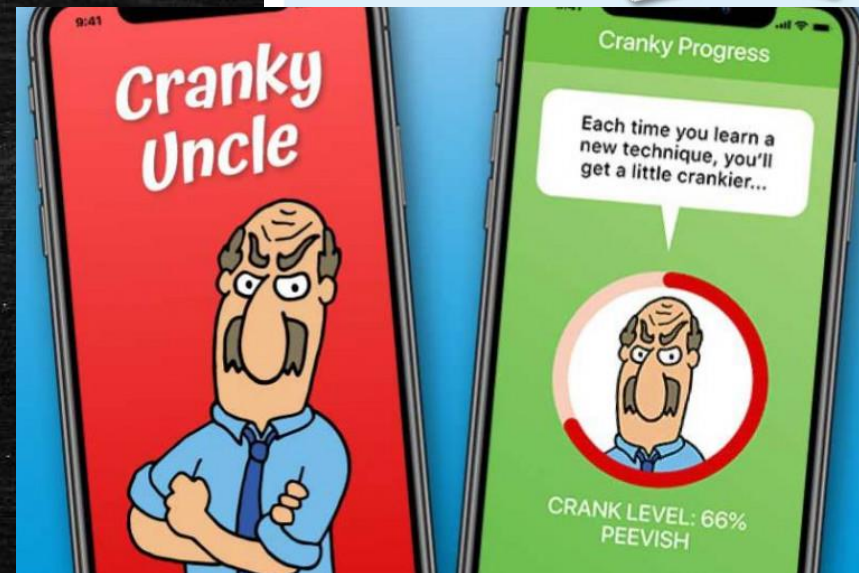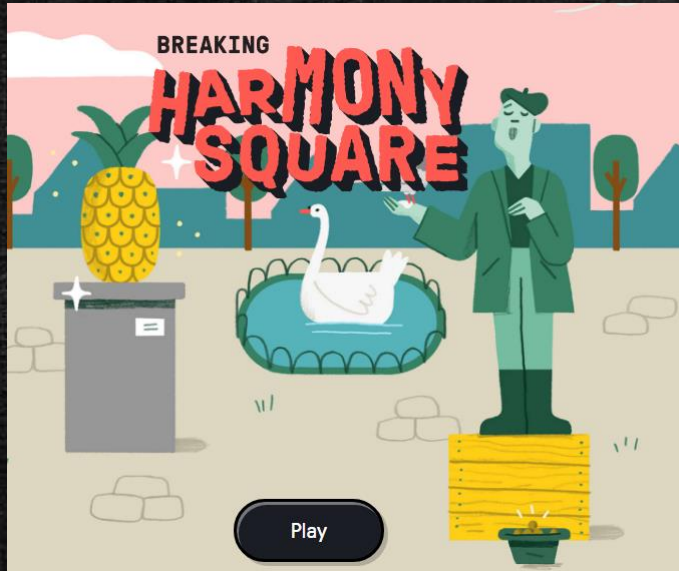
Other Uses of Gamification: Cyber Range, Digital Literacy, Security Training, etc

Older Adults

- Disproportionately targeted by scams

- Feelings of shame and/or confusion when scammed

- More susceptibility to false narratives

2022 - VICTIMS BY AGE GROUP[17]

Complaints   Losses

Under 20
15,782
$210.5 Million

20 - 29
57,978
$383.1 Million

30 - 39
94,506
$1.3 Billion

40 - 49
87,526
$1.6 Billion

50 - 59
64,551
$1.8 Billion

60+
88,262
$3.1 Billion

Older Adults

- ~~Disproportionately targeted by scams~~

- ~~Feelings of shame and/or confusion when scammed~~
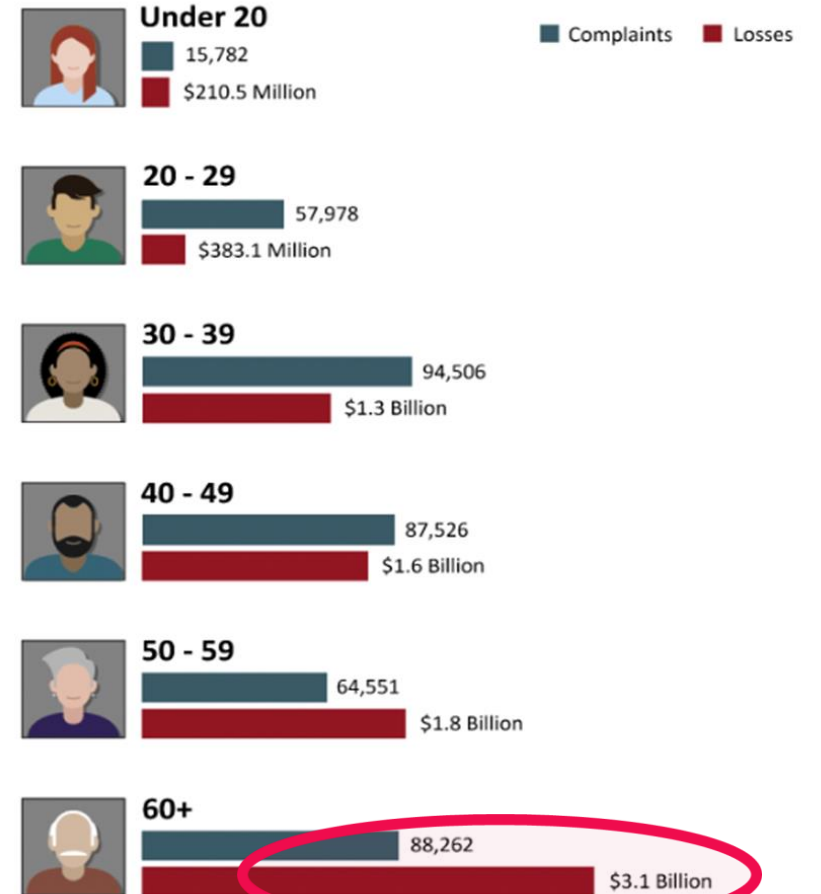
- ~~More susceptibility to false narratives~~

- More acceptable broadly

- Can focus on tangible effects

- K-12 = too politically charged

2022 - VICTIMS BY AGE GROUP[17]

Under 20
- Complaints: 15,782
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20 - 29
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"Ideation" Refining Your Idea

Phases 1 and 2: Weekly Curriculum

> **Innovation curriculum**

The innovation curriculum provides teams the tools to move from idea to proof of concept, to prototype and then solution. Researchers gain knowledge in human-centered design, team science, communication, and storytelling and pitching.
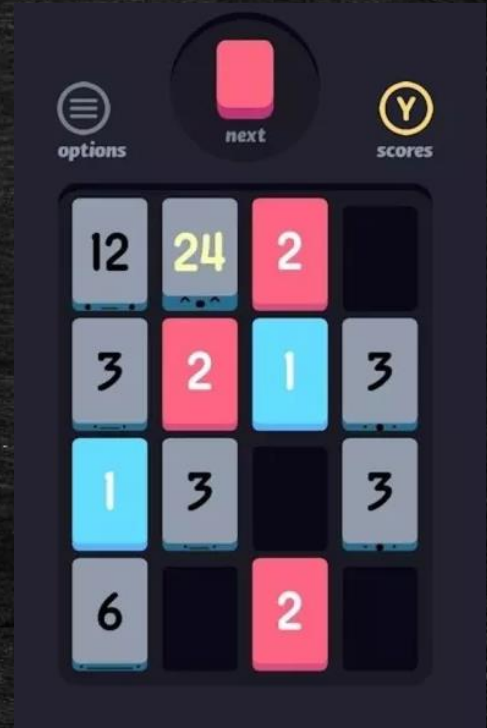
Phase 1: Your Frenemies

> **Coopetition environment**

A "coopetition" environment stimulates innovative ideas. Funded teams compete and share expertise and resources to assist solutions in advancing to the next phase.

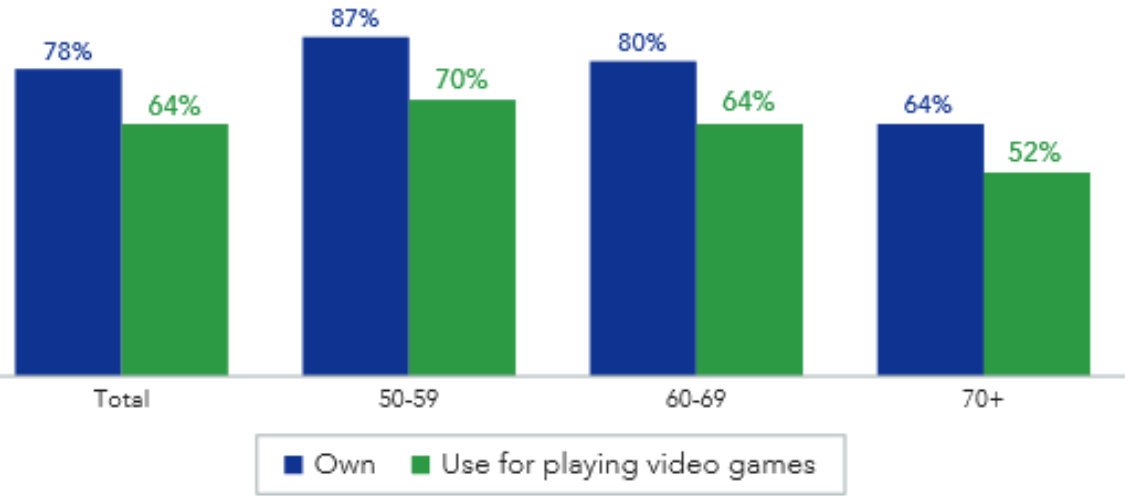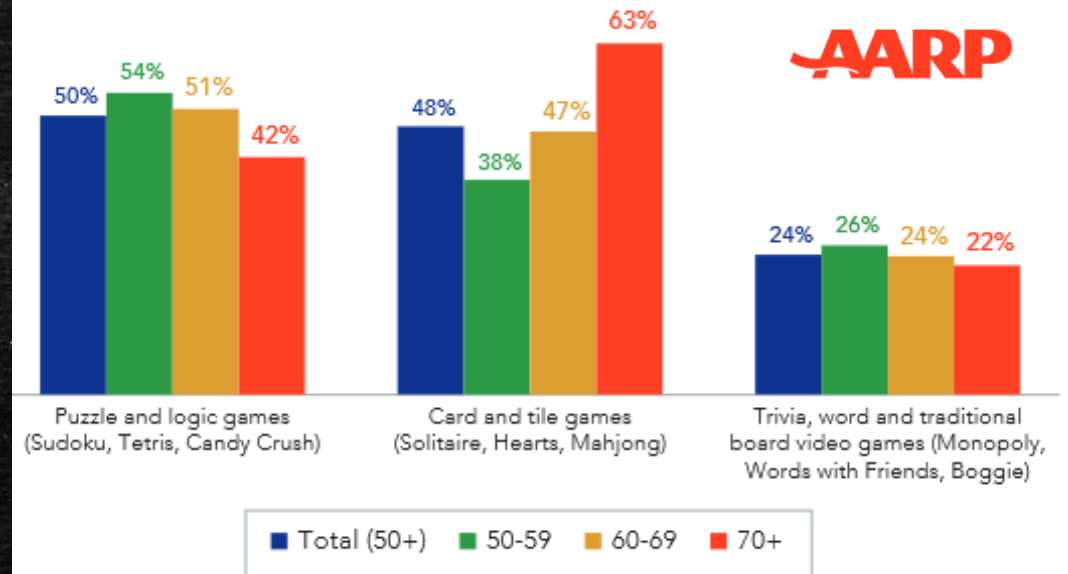# Research vs Product

Why a Game?

Smartphone ownership and use for playing video games by age

Top three types of video games adults 50+ like to play

Avoid Edutainment

What Makes a Game Popular?

- Levels/Achievements/Badges

- Quick rounds

- Leaderboard/Compare with friends

- Can keep playing
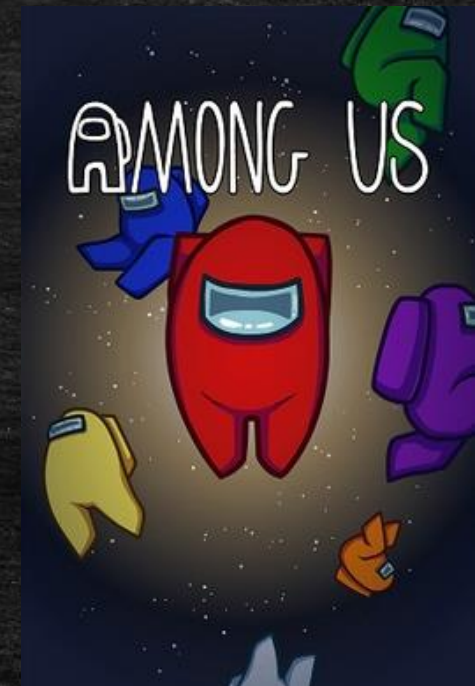
Deep Cover invites the player to join DART spy agency and help save the world from the likes of FANG, an evil group of individuals trying to rob the public in any way they can

3 sections coalesce into a unified gameplay loop;
- Operations (Casual Play)
- Contracts (Educational Play – teaching moments)
- The Profile (Achievements, Reward Viewing, and the Customization experience)
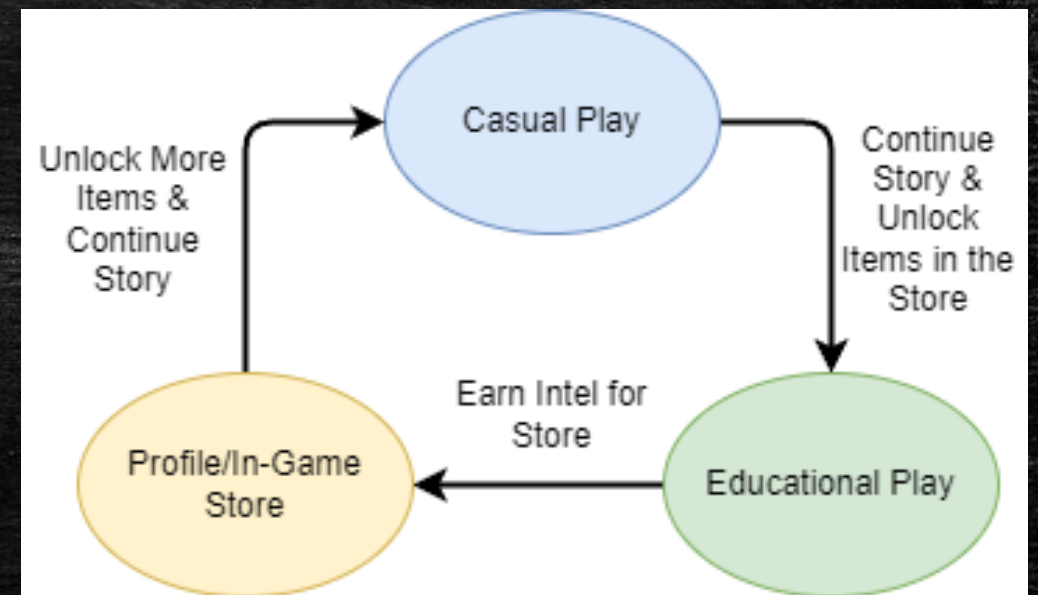
The Core Gameplay Loop

Initial Stages of User Research

- Demographic Research
- **Qualitative Interviews**
  - Clusters of 6-10 interviews, collected individually and in dyads
  - Flea market, museums, senior centers
- User Surveys (theory not practical)
  - Larger scale data collection to validate themes and heuristics identified through initial interviews

User Personas

Barbara Jones

Educated   **Empathetic**   **Anxious**

Bio

Barbara is a retired middle school history teacher who was recently widowed. She has abruptly had to take on a number of household and financial management tasks that were previously handled by her husband. Often, she feels that the people she's asking for help -- at the bank and credit card companies, phone company, etc. -- talk down to her, and her children keep telling her everything she's doing wrong. They mean well, but it's frustrating to hear about how her passwords should be different or she shouldn't fill out those silly quizzes on Facebook or whatever. It's constantly something new, and they act like she's being ridiculous. But, how is she supposed to know all of this? Plus, she's been so forgetful since Bill died. She wants to feel confident and in control of her finances and information.

Age 76

Occupation Retired middle school teacher

Status Widowed

Location Georgetown, TX

Archetype Bereaved

Tech Use: Confident with email and social media; uses mobile and web apps; uses web but rarely on computer despite having home internet

Goals

- Practice/improve technological literacy
- Feel secure and confident in using technology, managing finances, and interacting with various agencies and service providers
- Spend time in ways that feel fulfilling or meaningful

Frustrations

- Feels talked down to as she takes on financial and household tasks previously handled by husband
- Overwhelming to "keep up" with latest issues in information security
- Not obvious where or how to find help with addressing potential scams

Favorite Brands

amazon.com   TALBOTS Established 1947   macy's   James Avery   YANKEE CANDLE   CLINIQUE

- Guide Priorities and Inform Design
  - Does this meet a need for Barbara?
  - How?
  - If so, would Barbara be willing to use it?
  - Does this look/sound/feel like something Barbara would be interested in?

Initial User Personas

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Favorite Brands

amazon.com, TALBOTS, Macy's, James Avery, YANKEE CANDLE, CLINIQUE

Dolores Rodriguez

`Generous` `Caring` `Cautious`

Bio

Dolores moved from Mexico to Chicago in the mid 1990s, following her daughter, who married a a man from Chicago after attending college there. Dolores worked a variety jobs both before and after moving to Chicago, many of them customer service or administrative assistant roles. Her favorite job was as seasonal staff at the American Girl flagship store downtown, which she did for a few years. Her grandchildren are grown now, but she loved helping to care for them when they were younger. She is bilingual, but prefers to speak Spanish with friends and family. She is active in her church community and loves playing dominoes and cards.

Age 81
Occupation Caretaker, retired customer service
Status Widowed (long ago)
Location Chicago, IL
Archetype Caretaker

Tech Use: Has a smart phone and is active on Facebook; uses email primarily for correspondence; uses limited apps to access books from library, play some games (mostly solitaire and hearts).

Goals

- Maintain connections with family and friends
- Manage personal, financial, and medical information in a way that is secure and safe so she doesn't have to rely on her daughter too much

Frustrations

- Keeps getting emails about Paypal, Amazon, and other services she doesn't even use (these are probably phishing attempts)
- Learning whatever new platform the grandkids are using is exhausting
- Wants to be able to use more things -- like streaming movies or other things she hears about

Favorite Brands

KOHL'S, Cermak Produce FRESH MARKET, BIMBO, Walmart, MARY KAY

Howard White

`Energetic` `Outgoing` `Impulsive`

Bio

Howard is a retired civil engineer who's excited to finally spend time traveling with his wife. He is active in his local Rotary Club, meets up with old coworkers for coffee once a week, and likes to take Osher classes. He reads the news every morning and likes to talk about new gadgets with his grandkids. He's still a big fan of the Roku the kids set up for him a few years ago, and he loves keeping up with whatever period dramas Judy wants to watch, even though he's more into documentaries, himself. For the most part, Howard is comfortable and enjoying this time focused on his family, community, and hobbies -- he's been working on stained glass most recently.

Age 68
Occupation Retired civil engineer
Status Married
Location Seattle, WA
Archetype Active

Tech Use: Confident with email; uses mobile and web apps; likes to read the news on his tablet and often looks up content on YouTube; doesn't really see the point of social media, but has an account on Facebook to see what the kids and grandkids are doing.

Goals

- Enjoy retirement through travel, community engagement, and spending time on hobbies
- Keep up with new technology and learning new things
- Feel well informed and connected to current events and culture

Frustrations

- Seems like every time he logs onto Facebook there's someone pretending to be him or Judy or one of their friends
- He gets so much spam he can barely pay attention to his email
- People keep warning him about cybersecurity like he doesn't even read the paper

Favorite Brands

NETFLIX, fitbit, TOYOTA, Roku, COSTCO WHOLESALE, REI

Mike Williams

`Outgoing` `Confident` `Cynical`

Bio

Mike worked at the optical fiber plant for most of his career. He was head of one of the daytime maintenance crews by the time he retired. He has a decent pension, and he paid off his house years ago. He lives alone but loves to spoil his grandkids; he's taught them all how to play cards and he's made furniture for most of them, too. His sons don't live too far away, and everybody loves visiting the grandpa that lives near the beach. Fishing is his favorite retirement activity, and he keeps waffling on buying a boat, but he isn't sure he wants to deal with the maintenance. He manages most things himself. The kids have enough to worry about, and he's done ok so far.

Age 75
Occupation Retired factory mechanic
Status Divorced
Location Wilmington, NC
Archetype Working man

Tech Use: Has a smart phone and has accounts on Instagram and Facebook (mostly just to follow the grandkids). He likes to use NextDoor to read neighborhood news and Craigslist to sell and occasionally buy things. He loves eBay.
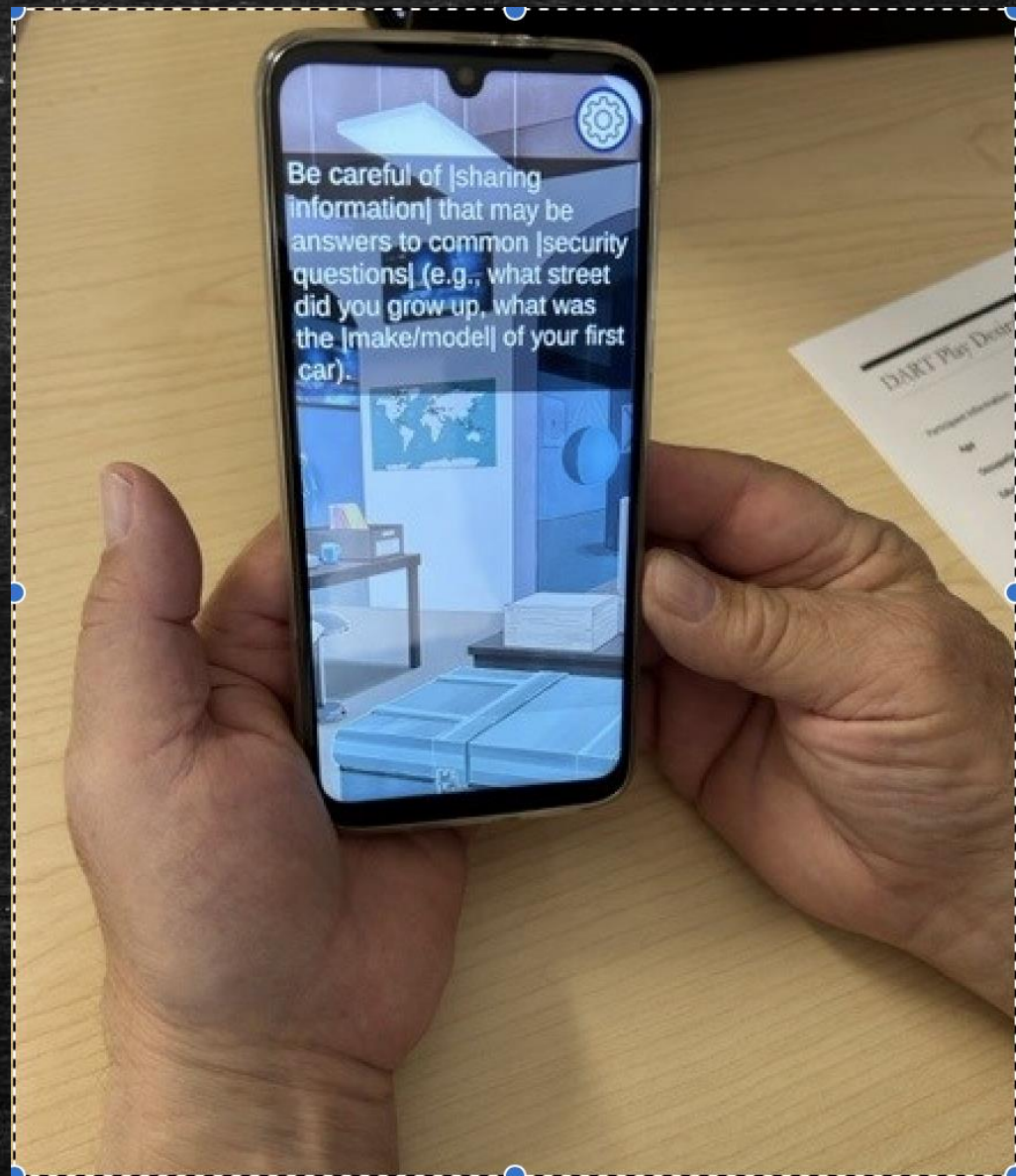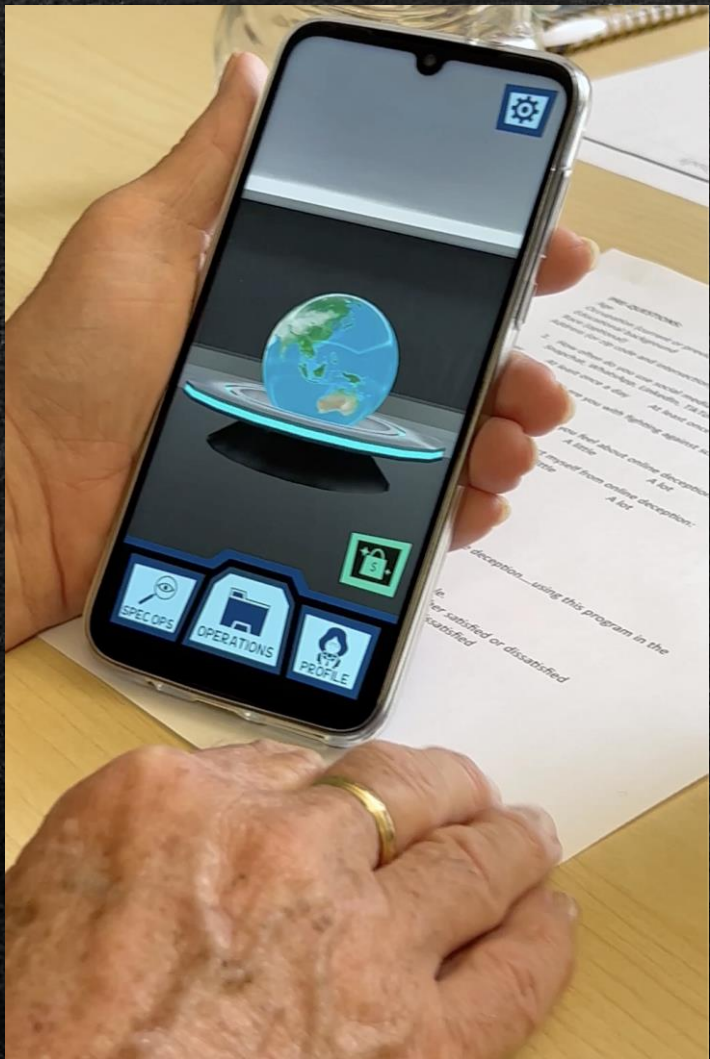
Goals

- Maintain independence and enjoy retirement
- Buy and sell used furniture, appliances, and other household items
- Find interesting gifts or collectibles for grandkids -- he's very proud of the vintage dollhouse he rebuilt for his granddaughter's birthday
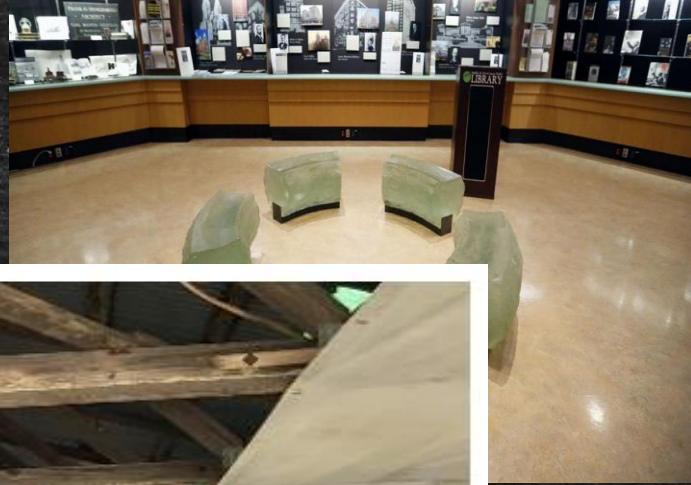
Frustrations

- Learning new online interfaces is hard and maintaining his own accounts increasingly requires he use apps he finds overwhelming
- Managing passwords feels completely overwhelming
- Wants to do everything himself but sometimes can't figure out how to use some site or app that's supposed to be easy

Favorite Brands

carhartt, LOWE'S Home Improvement Warehouse, Hanes, Levi's, Walmart, GM

Be careful of |sharing information| that may be answers to common |security questions| (e.g., what street did you grow up, what was the |make/model| of your first car).

Pickens County Flea Market, May 31, 2023

Interviewing Users

Do you use social media? What platforms? Which one do you like best? Why?

Facebook Marketplace   under false name

More items to peruse

Do you use apps on your phone? What kind? Which one is your favorite?

Favorites
Sam's Club
Alexa

- Yes
- Smart House → Alexa controls
- Sam's Club ⟩ because you get discounts
- WalMart

Do you play any games on your phone? Which ones do you play most frequently? Which do you like most?

NO

Do you play other games, for example, card games, mah jong, chess, or other games? What makes you want to play a game?

No games

Do you have concerns about identity theft, fraud, or scams? Where do you learn about these issues? Do you think you know enough about them?

Yes. Just today got a fake message on Facebook Messenger. Looked like it was from friend saying another friend died + click on link. From link, tried to get her to download. Contacted friend directly + found out it wasn't real.
- Learns about from Google search, news + talking w/ friends
- No, obviously not because almost got caught today

Have you or someone you know been a victim of any fraud or scams? What happened? Where did (you/that person) get help?

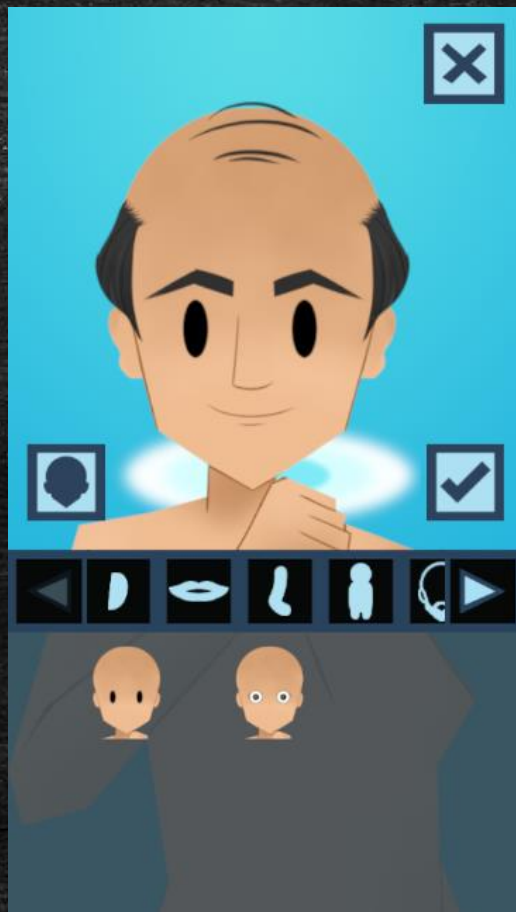Yes. Has heard of friends + family who have been victims but doesn't know details.

Research perspectives

- **Avatar representation and customization**
  - How do older adults want to represent themselves through digital avatars?
    - Age? (dis)ability? Body type? Accuracy?
  - How does avatar representation and customization affect
    - Identification with character
    - engagement with activities
    - learning
  - How might the continuity of avatar across Play and Learn affect learner's experience?

Designing the Game: UI/UX

- UI for Older Adults

- Fonts/Typeface – Helvetica or arial

- Pictures that aren't too dark - a lot of whitespace for eye fatigue

- High contrast pictures and type

- Easier navigation

MENTOR OUTFITS

360

100	100
100	100

KAMPALA

BLANC SPINE

MUMBAI

BACK   HQ   CODE

SELECT LOCATION

DART HQ, ????   9/9

NYC, USA   24/24

London, UK   24/24

Lisbon, Portugal   24/24

HQ   SPEC OPS

Professional Development Partner

- White Thorn: Indie Publisher
- Known for casual games
- 30+ titles published

In-house development team

- Proficient and effective

Pitching
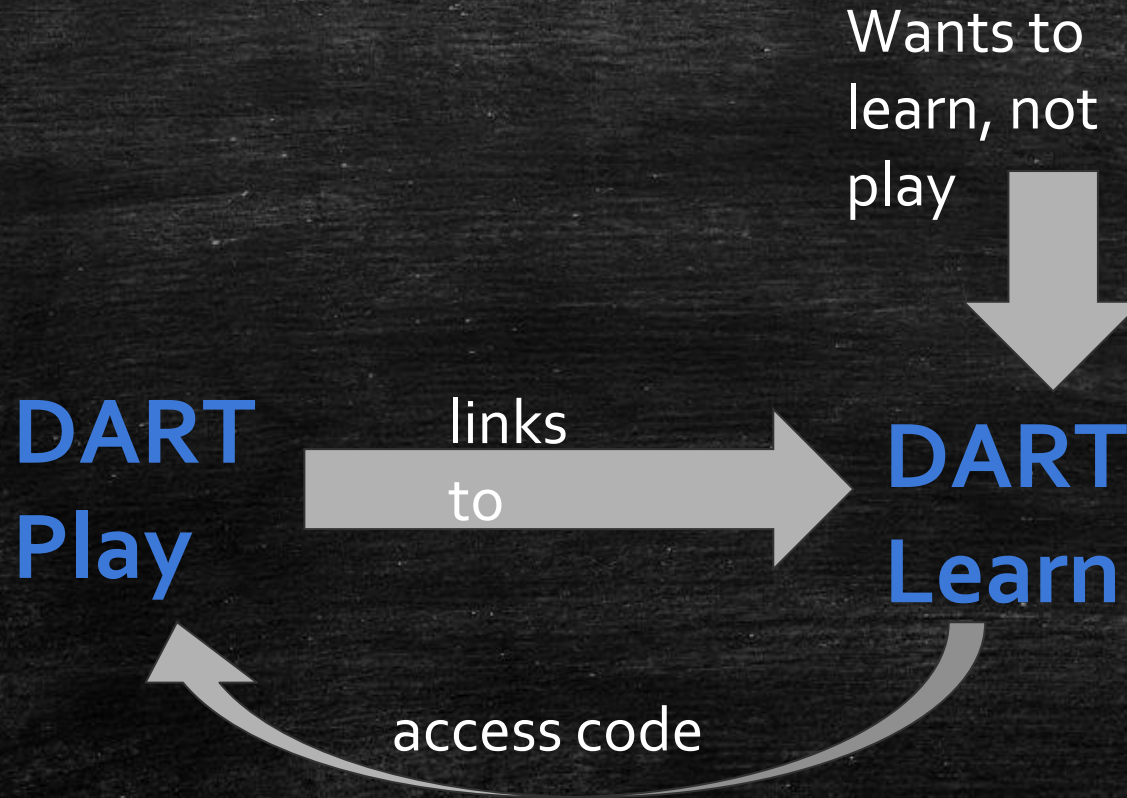
Other (Smart) Ways to Spend Money

- Branding

- Marketing

- Coding

- Infrastructure Support

DART Learn and Play

Marketing Goals

- Build Brand Awareness

- Consistent Messaging

- Clear Communication

- User Metrics

- Successful Launch

Build Brand Awareness

- Visual Brand Identity Design
  - Cohesive messaging, logos, tag line, visuals, color palette, brand guidelines

- Differentiate from existing efforts

- Promote Deep Cover Game vs Learn
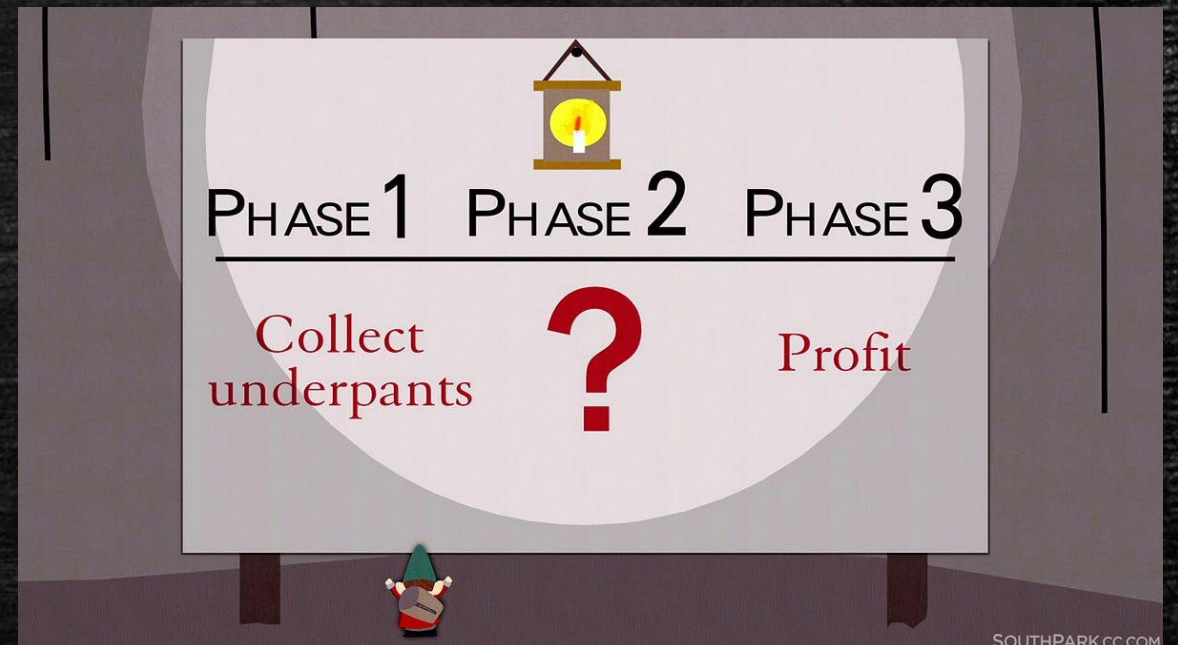
- Family, caregivers, friends

Random Observations on Convergence Accelerator

1. Confusing Messaging

- Commercialize
- Don't charge money
- Start a company
- Merge teams
- Research but also a thing people will pay for

2. Curriculum Gaps

- What is IP? Who owns it?

- What should I patent/trademark/license?

- Role of my University TTO

- Customer base

- Focus on "VCs"

3. Business Terms Scare People

- "We don't have **customers**, we have researchers/users/students"

- "Why would I ask **users**? I know what they want"

- "No one else does this. There are no competitors"

- "*Everyone* is the potential market"

- "I'm famous in XYZ field. I know the best **solution**"

- "I need IRB approval to talk to users"

4. NSF PI Culture Hard to Overcome

- Misaligned time scales
  - Proposal timeline vs hot idea vs hot product

- "NSF should only do basic research!"

- Use of MS students or professionals frowned upon

- Unwillingness to really talk to and listen to feedback of potential users

5. Other concerns

- Time on curriculum

- Our track had several people FOIA'd

- Several articles and confusing press about Track scope

- NSF wouldn't publicize any projects

Collaborate with me!

Send love or hate mail!

anitan@illinois.edu