Think, Design, Impact:

Student Innovations for Community Transformation

Susan McKenzie Reeves

& Claire Dancz

# Conation and Creativity in Engineering (CCE)

+ Creative Inquiry Course (ESED 1990-4990)
+ Started in 2016
+ 8-10 students/semester
+ May repeat for multiple semesters
+ No prerequisites; open to all majors

"Conation" in CCE: Kolbe A™ Index

Three Parts of the Mind

Cognitive
Thinking
IQ
Skills
Reason
Knowledge
Experience
Education

Conative
Doing

Affective
Feeling
Desires
Motivation
Attitudes
Preferences
Emotions
Values

Drive   Instinct
Necessity   Mental Energy
Innate Force Talents

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Kolbe A™ Result

Georgia Minton

Continuum   Kolbe Action Modes®   Your Kolbe Strengths™
              Fact Finder Follow Thru Quick Start Implementor

Prevent Problems 1
                  2   2   Specify
                  3
                  4   4   Maintain
                  5
                  6   6   Modify
                  7
                  8   8
Initiate   9
Solutions   10   Imagine

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+ Identifies striving instincts that drive your behaviors

+ Theory: individuals have persistent predispositions that can be measured through behavioral manifestations reflected on a continuum
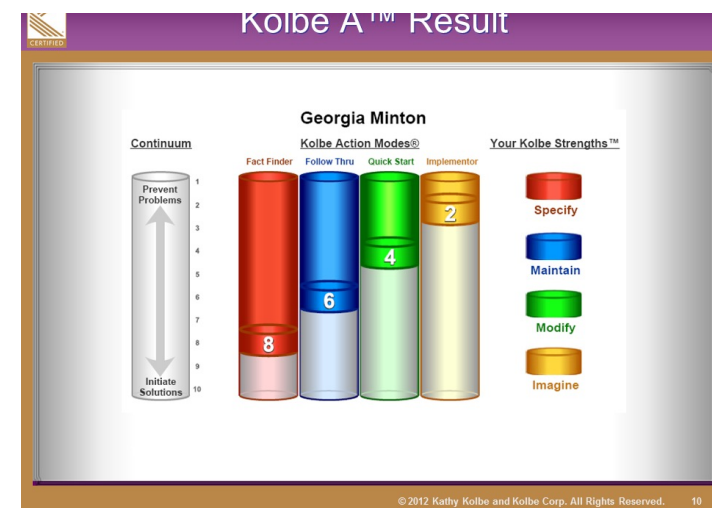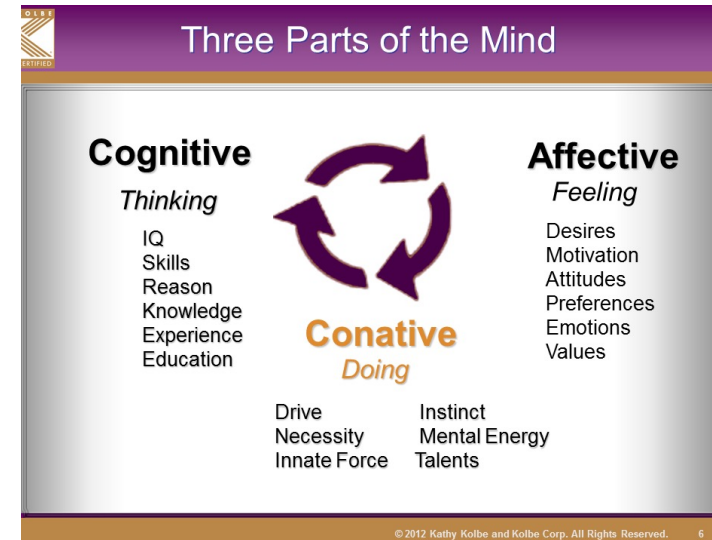
Action Modes®

Fact Finder –

- The instinct to probe
- Gather and share information

Quick Start –

- The instinct to innovate
- Handle risk and uncertainty

Follow Thru –

- The instinct to pattern
- Arrange and design

Implementor –

- The instinct to demonstrate
- Handle space and tangibles

Fact Finder: Your best way of gathering/sharing information

1-3 **Simplify** – For instance, you might:

CounterAct

- Distill information
- Draft abridgements
- Estimate
- Approximate the particulars
- Abbreviate the historical background

- Create metaphors
- See the big picture
- Minimize investigation
- Get right to the point
- Condense the data

4-6 **Explain** – For instance, you might:

ReAct

- Paraphrase reports
- Review the data
- Edit the details
- Work within priorities
- Rewrite and fact-check written material

- Start with the highest probability
- Respond appropriately
- Test analogies
- Clarify specifics
- Use terms properly

7-10 **Specify** – For instance, you might:

Action

- Research in depth
- Establish specific priorities
- Quantify/rank order particulars

- Define terms with exactness
- Determine appropriateness
- Provide historical evidence

Follow Thru: Your best way of organizing

1-3   **Adapt** – For instance, you might:

- Create shortcuts
- Revise approaches
- Thrive on interruptions
- Diversify
- Switch tasks frequently

- Be flexible
- Cut through bureaucracy
- Do several things at once
- Keep everything accessible
- Loosen up rigid processes

4-6   **Maintain** – For instance, you might:

- Package things together that fit
- Adjust procedures
- Monitor policies
- Realign objectives
- Coordinate schedules

- Draft guidelines
- Provide transitions and segues
- Identify inconsistencies
- Meet the need for closure
- Maintain order

7-10   **Systematize** – For instance, you might:

- Create the plan
- Coordinate needs
- Chart and graph logistics

- Categorize differences and similarities
- Bring focus and closure

Quick Start: Methods of dealing with risk and uncertainty

CounterAct

1-3 **Stabilize** – For instance, you might:

- Create undeviating standards
- Decide what will/can stay the same
- Protect the status quo
- Create precedents
- Clarify deadlines

- Stick with what's familiar
- Reduce unexpected events
- Minimize risk factors
- Establish outside limits
- Conform to accredited concepts

ReAct

4-6 **Modify** – For instance, you might:

- Participate in experiments
- Create responses to challenges
- Try out new ideas
- Sustain innovations
- Navigate through uncertainty
- Use metaphors

- Interject spontaneously
- Adjust deadlines
- Reduce risks
- Mediate between the vision and the given

e Action

7-10 **Innovate** – For instance, you might:

- Initiate change
- Improvise solutions
- Experiment
- Promote alternatives

- Brainstorm possibilites
- Originate options
- Generate slogans
- Defy the odds

Implementor: Methods of handling space and tangibles

1-3 **Envision** – For instance, you might:

- Create virtual presentations
- Conceptualize solutions
- Envision circumstances
- Capture the essence
- Portray symbolically
- Find intangible methods
- Jury-rig fixes
- Sketch ideas
- Simulate actual situations
- Concoct out of thin air

4-6 **Restore** – For instance, you might:

- Relocate and refurbish
- Renovate structures
- Test ingredients
- Fix moving parts
- Convert space
- Remove obstacles - real and imagined
- Utilize mechanical equipment
- Interpret sign and body language
- Reinforce tangibles
- Connect concrete paths

7-10 **Demonstrate** – For instance, you might:

- Produce quality solutions
- Build sturdy foundations
- Maximize use of space
- Erect and install mechanical devices
- Create substantive demonstrations

CounterAct

ReAct

Initiate

Complementary Leadership Strengths

CLAIRE DANCZ
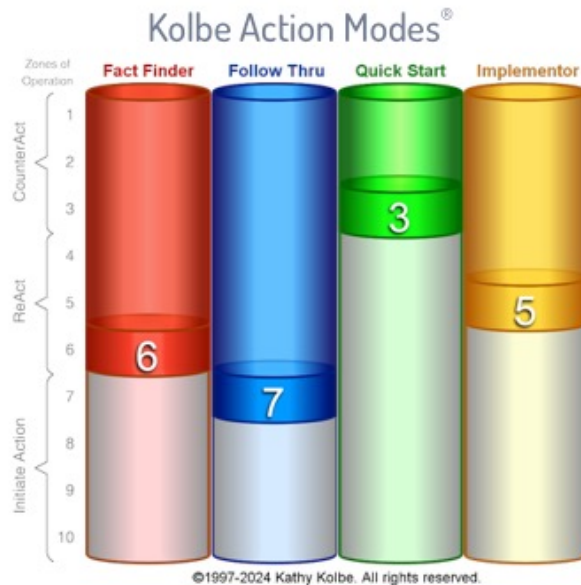
Complementary Leadership Strengths
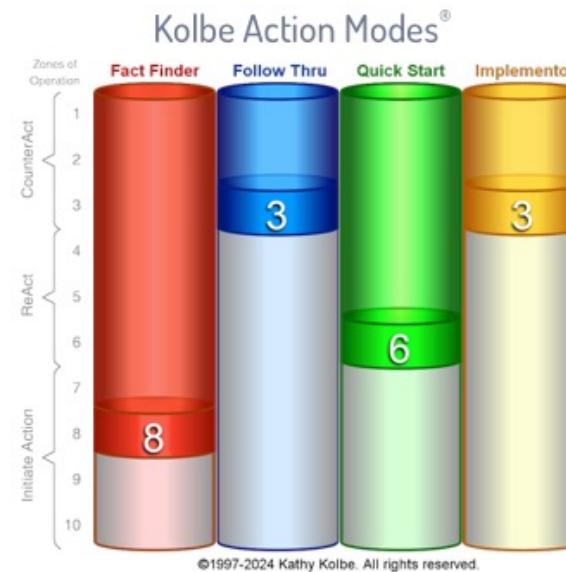
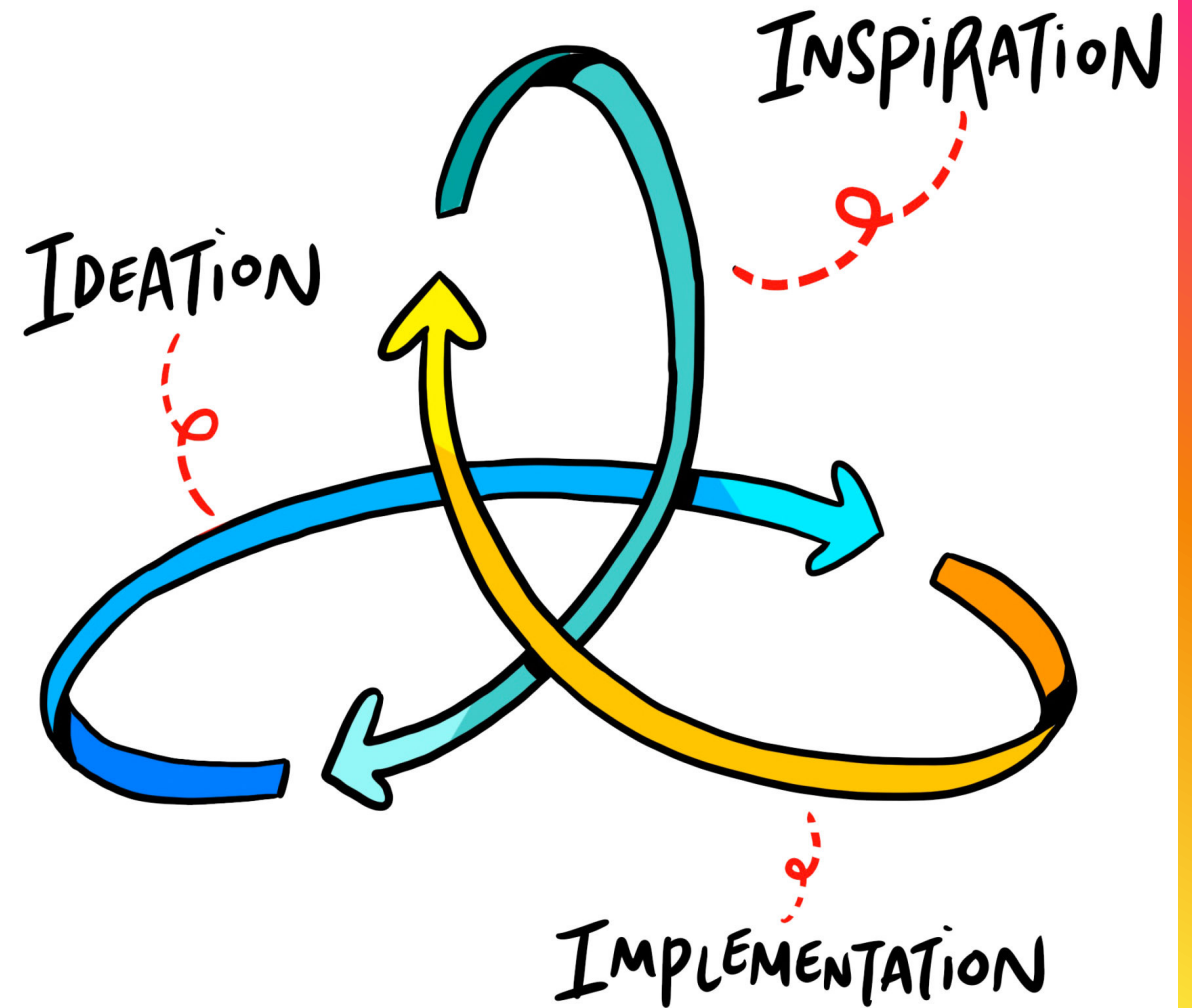# Complementary Team Strengths
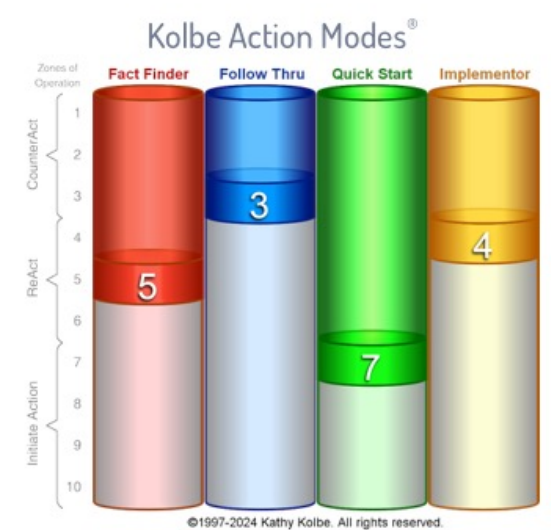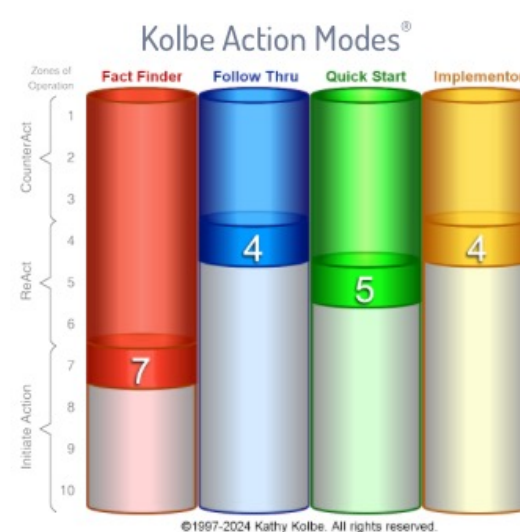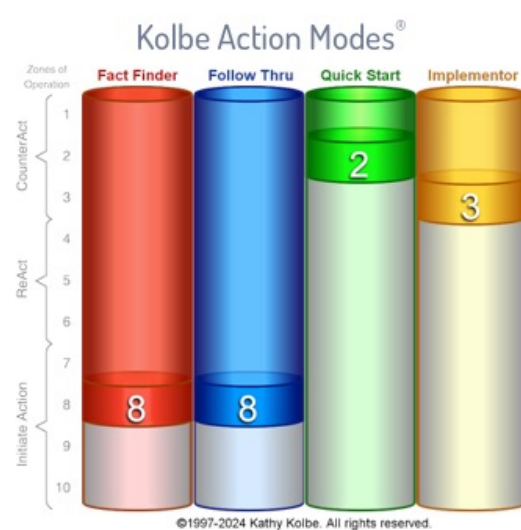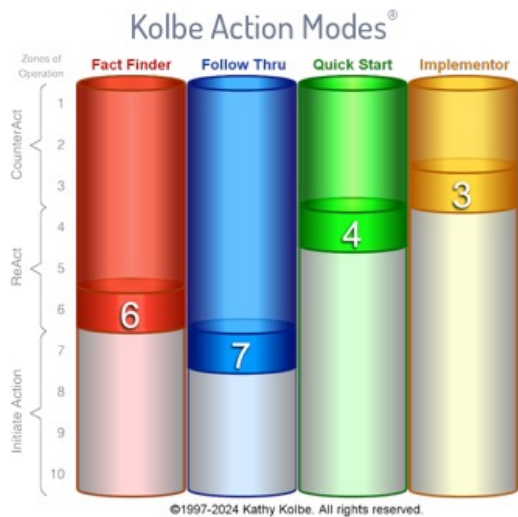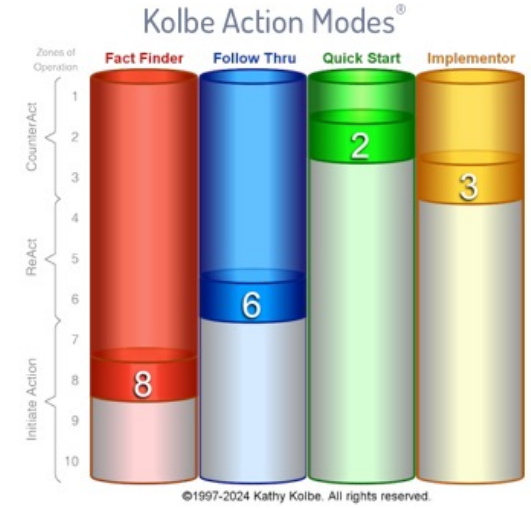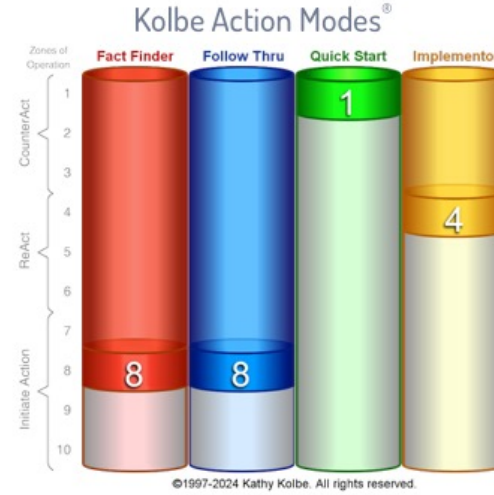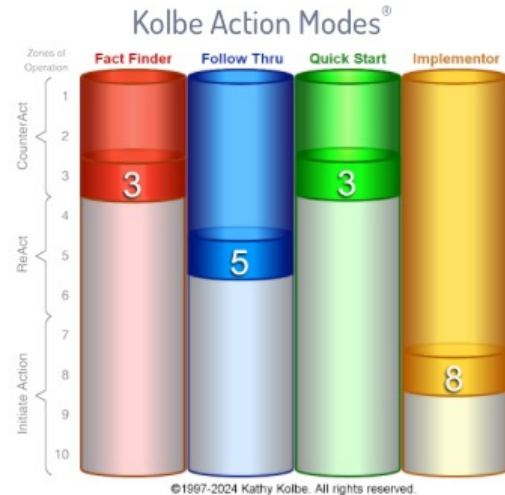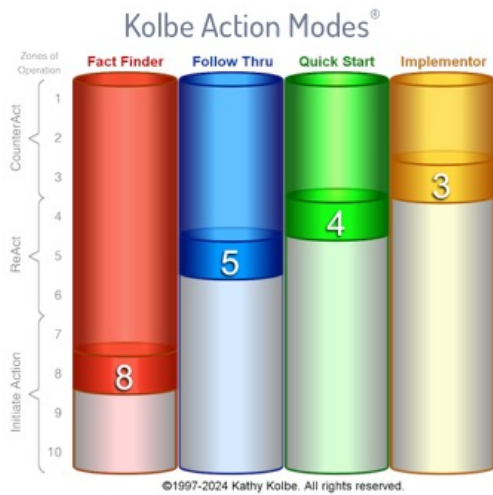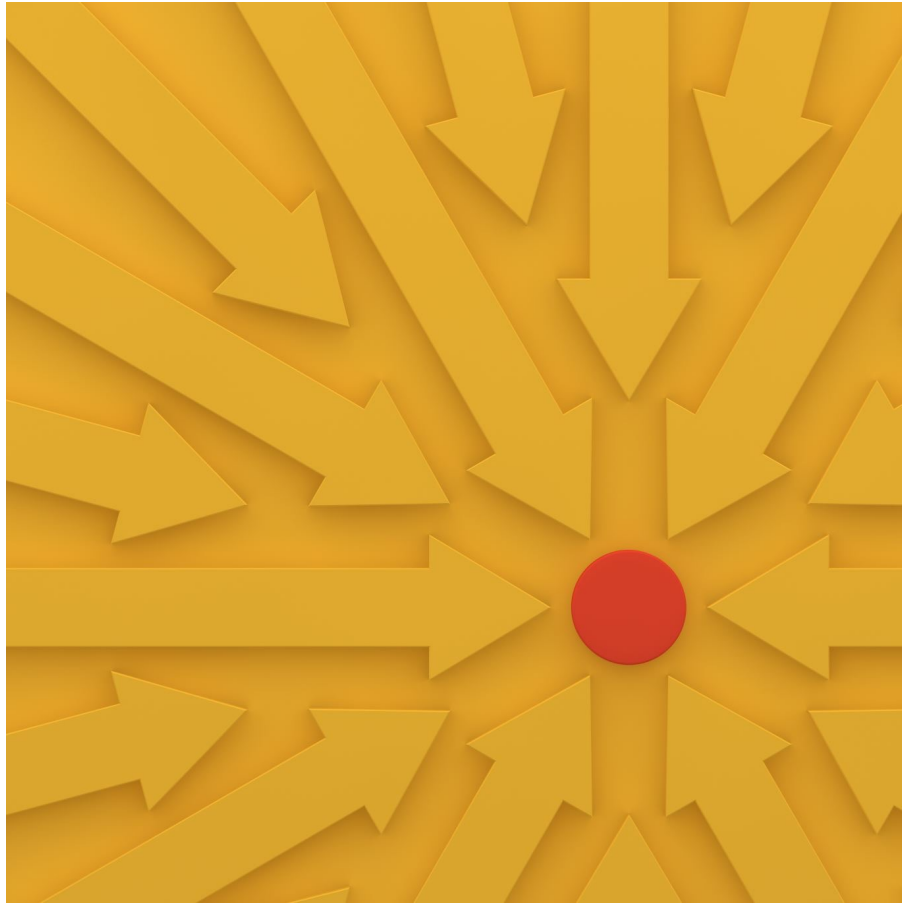
What questions do you have?

"Creativity" in CCE

+ Quantity of ideas

+ Suspension of judgement

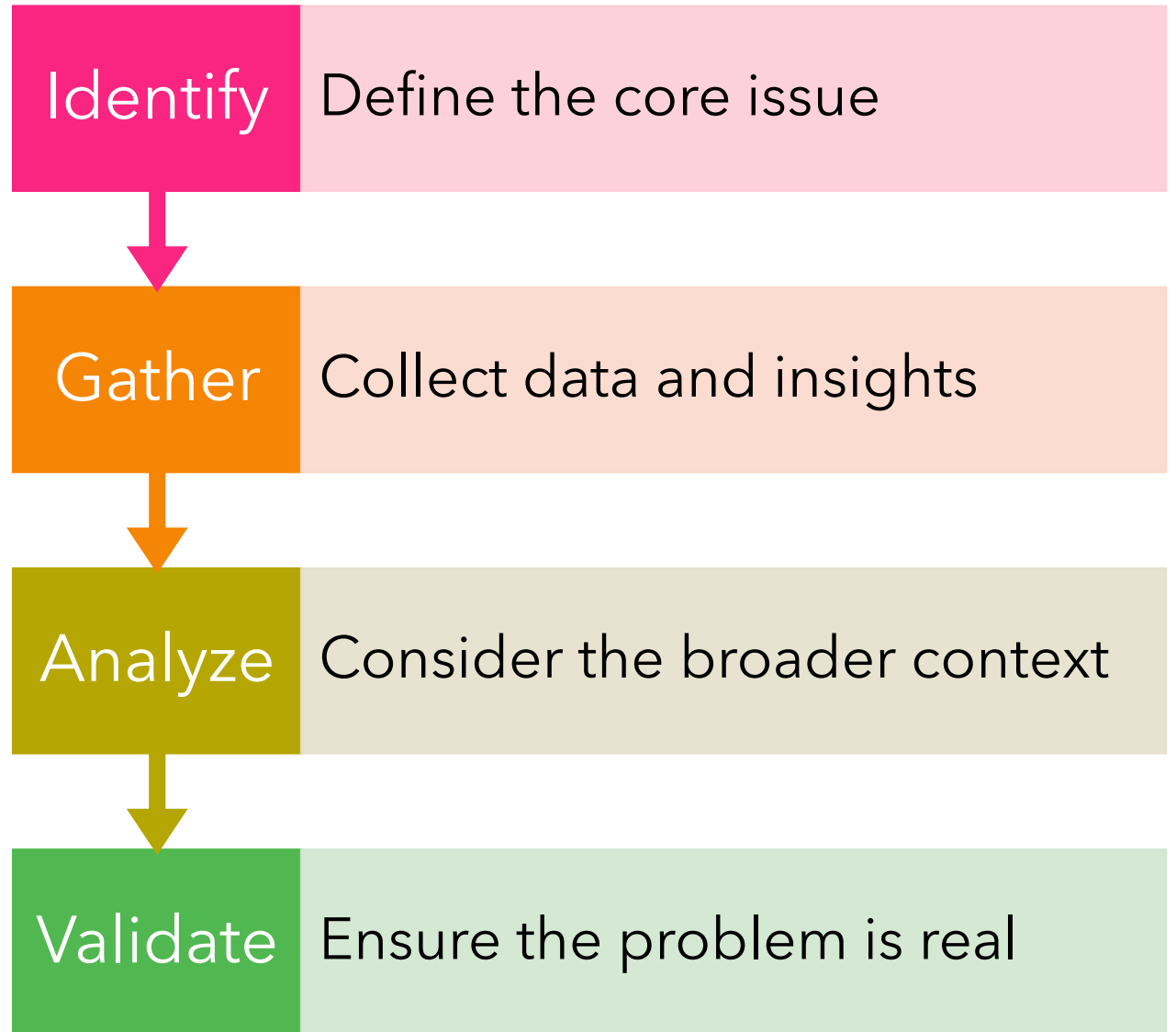+ Willingness to experiment

+ Failure to worry about similar ideas

Critical Thinking

4 Phases of CCE Project Development

1
Diagnosis

Identify	Define the core issue
Gather	Collect data and insights
Analyze	Consider the broader context
Validate	Ensure the problem is real

2
Decomposition

Break Down the Problem — Smaller sub-problems

Prioritize Sub-Problems — Focus on impact

Assign Responsibilities — Ensure understanding of roles

Create a Timeline — Milestones and progress
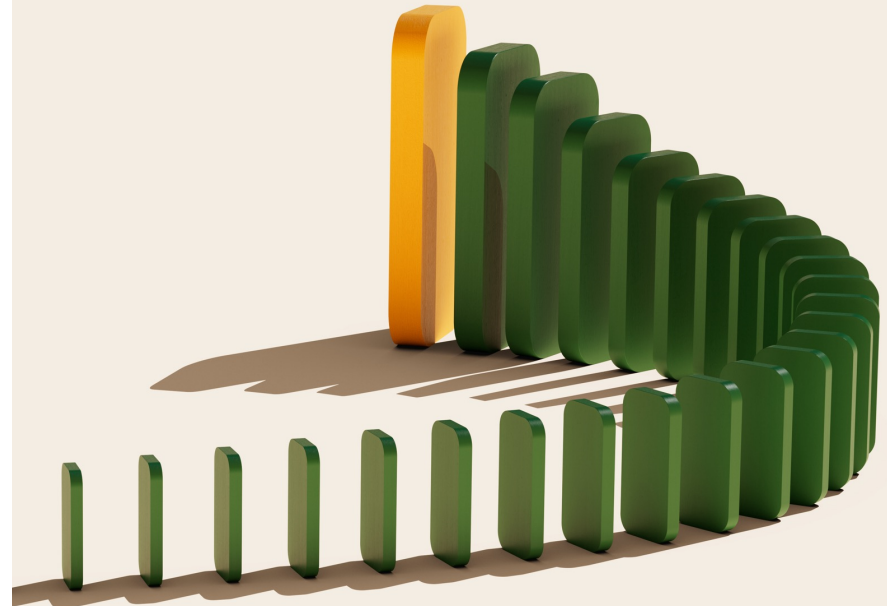
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Reframing
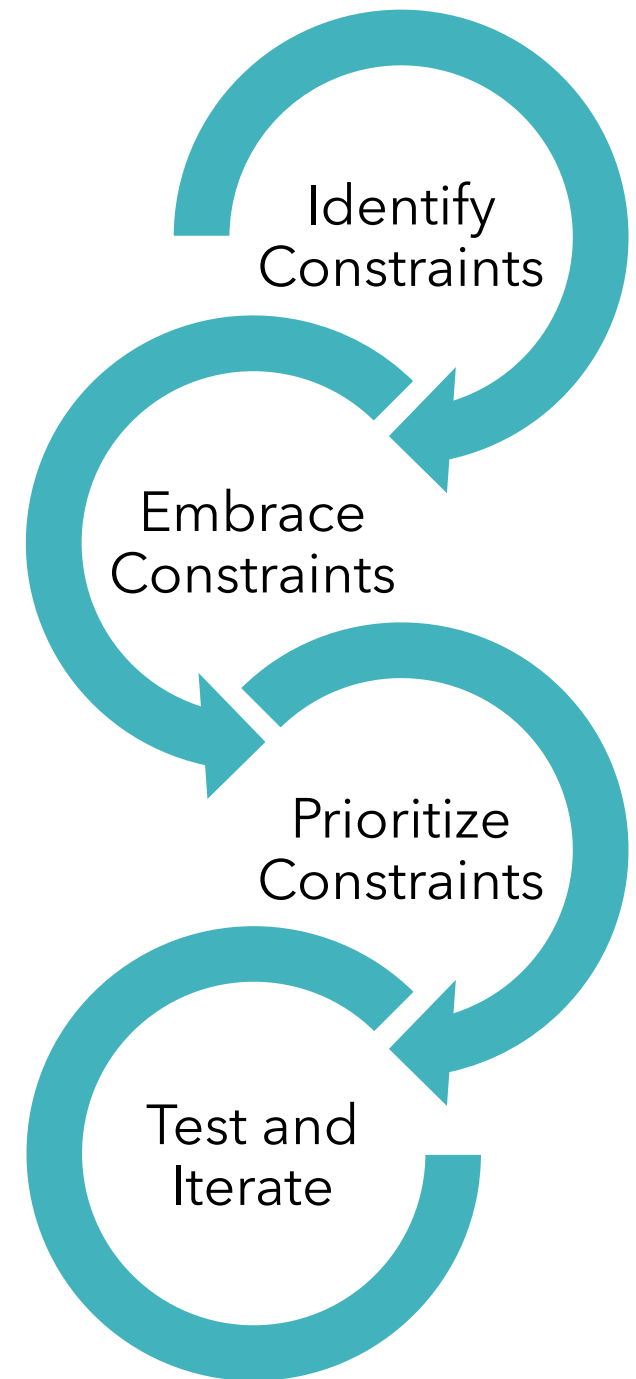
Challenge
Assumptions

Think
Creatively

Define
Success

Leverage
Analogies

4

Constraint Design

Identify Constraints

Embrace Constraints

Prioritize Constraints

Test and Iterate

Breaking down problems and asking better questions is the cornerstone of higher education

TLDR: critical thinking

2022-2023

Community Escape Room Design & Build

University Of Kentucky

Grants

Bachelor Of Science In Geology

to Kevin Fitzpatrick

Given at the University this sixteen day of May, 1979

President Of The University — Chairman Of The Board

Wake Forest University

Grants A

Doctor Of Philosophy In Geodesic Geometry

to Kevin Fitzpatrick

with all the right, honors and privileges thereunto pertaining to the University Given at the University this sixteen day of December, 1990

President Of The University — Chairman Of The Board

Magma
Granite
Quartz
Limestone
Plymouth
Dwayne Johnson

Famous ___ ___ ___ ___ ___
          4   7   2   1   5

Experiential Learning Through Escape Room Design-Build

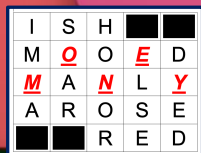## Claire L. A. Dancz and Susan McKenzie Reeves, Clemson University
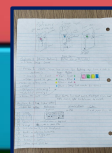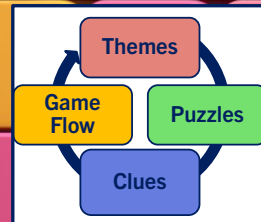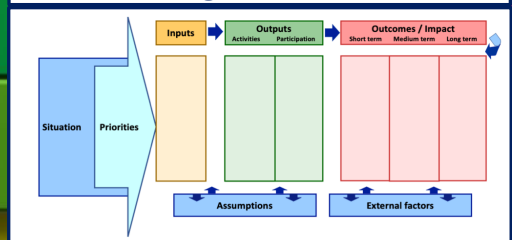
Abstract

The Conation and Creativity in Engineering course focuses on the identification and celebration of individuals' innate ways of problem solving (conation) and their process of engaging in creativity in engineering. Our signature course project, Community Escape Room Collaboration, addresses unmet human needs of creative expression and renewed community sprit through the collaborative development of a local escape room created by students and hosted by a local community partner. Please stop by this poster for an active demonstration of conation and creativity by participating in our tabletop escape room puzzle challenge and reflect on experiential learning through escape room design-build.

Core Concepts

- Critical Thinking
- Teamwork
- Active Listening
- User-centered Design
- Defining Problems
- Collaboration
- Emotional Intelligence
- Technical Skills
- Project Management

Themes — Game Flow — Puzzles — Clues

Logic Models!
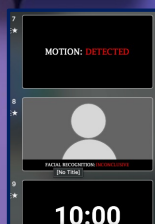

Escape Room Design-Build
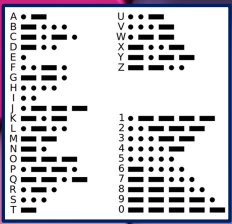
Universal Design for Learning Guidelines

Provide Multiple Means of **Engagement**
Purposeful, motivated learners

Provide Multiple Means of **Representation**
Resourceful, knowledgeable learners

Provide Multiple Means of **Action & Expression**
Strategic, goal-directed learners

AMERICAN SIGN LANGUAGE ALPHABET

Kolbe Action Modes©

Kolbe Strengths™

Student Feedback

Students in Conation and Creativity in Engineering (CCE) course reported that this collaborative escape room design-build project provided opportunities for creative expression and renewed community spirit. Stop by to talk experiential learning through this escape room design-build!

2023-2024

Community Partnership Project:

Dog-Go

Example: Diagnosing the Problem

Dog adoptability is impacted by their perceived happiness

Example: Diagnosing the Problem

Dog adoptability is impacted by their perceived happiness

+

Dog happiness is driven by many factors, including exercise

Example: Diagnosing the Problem

Dog adoptability is impacted by their perceived happiness

+

Dog happiness is driven by many factors, including exercise

+

Dog treadmills are an alternative approach to exercise

Example: Diagnosing the Problem

Dog adoptability is impacted by their perceived happiness

+

Dog happiness is driven by many factors, including exercise

+

Dog treadmills are an alternative approach to exercise

=

Treadmills can help promote healthy behaviors that lead to increased socialization and adoption

Dear Pickens County Animal Shelter,

Thank you for your participation in our Conation and Creativity in Engineering research project. We are excited to start this project with you and hope this is beneficial for both sides!

We have provided you with a packet of information. Included in this packet are instructions for data collection, a liability form, and items we would like to donate, including collars, harnesses, and leashes.

If you have any questions or concerns, please contact:

Sydney Phipps (Clemson student)
(843) 437-2386
sjs6@g.clemson.edu

Parker Harrington (Clemson student)
(864) 494-1902
plharri@g.clemson.edu

Claire Dancz (Clemson instructor)
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(864) 656-2721
susan@clemson.edu

Dog Physical Requirements

Make sure all dogs that use the treadmill:
- Have been fed **at least 1 Hour BEFORE** using the treadmill. This minimizes risk of accidents while in use.
- Drink plenty of water before and after use.
- Do not get overheated/stressed.
- Seems fit and in good enough health to use the treadmill.

Dog Safety Information

- Never leave a dog unattended on the treadmill.
- Do not make a dog run if they do not want to. Dogs will show that they are interested in running or walking.
- Ensure the red "Safety Key" is attached to the computer screen and clipped to the dog's vest or being held during operation. The key is required to start the machine. PULL the Key to immediately stop the machine.

Dog Treadmill Introduction

- Some dogs may be nervous of the treadmill at first. Take these steps to introduce it to them:
  - Walk the dog with a leash onto the treadmill in the lowest inclined position and allow them to smell it. Reward them with a small treat

Data Collection

1. Please fill out the attached sheet for every dog exercised on the treadmill.
   a. List quantitative properties like minutes exercised.
   b. List qualitative properties like dogs' happiness and behavior.
2. Press the **START/STOP** button to start the treadmill.
3. Once the treadmill is on, the "**+**" button will increase speed by 0.1MPH.
4. Set the treadmill to desired speed. Treadmill will stay at the desired speed in traditional mode.
5. Let the dog run/walk for the specified amount of time.
6. "**-**" will decrease treadmill speed by 0.1MPH. Press "**-**" to slow down treadmill before stopping.
7. Press START/STOP to stop the treadmill.

If you have any questions or concerns, please contact:

Sydney Phipps (Clemson student)
(843) 437-2386
sjs6@g.clemson.edu

Parker Harrington (Clemson student)
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plharri@g.clemson.edu

Machine Use/Adjustment

The Treadmill is an electric motor driven belt treadmill (similar to the one humans use to exercise). This means that at times the machine may need adjustments or upkeep.
- **The Belt-** The belt is the part of the treadmill that the dog walks on. This can be tightened and adjusted if needed, however it will come in working order. If the belt starts to creep to the left or right, make a rubbing noise, or look too loose, please reference (INSERT SECTION NAME HERE) to adjust the belt.
- **The Computer-** The computer has **4 Buttons** and a **Safety Key** shown below.

Start/Stop Buttons start and stop machine.
Speed +/- Button increases or decreases the speed in "Manual" mode by 0.1 MPH increments.
Mode Button will allow you to select preset programs (PI - P3) when the machine is STOPPED. When the machine is in MOTION, pressing the button will select the "time, speed, calories and distance".
Safety Key has to be attached to the computer screen to turn the treadmill on. PULL the Key to immediately stop the machine.
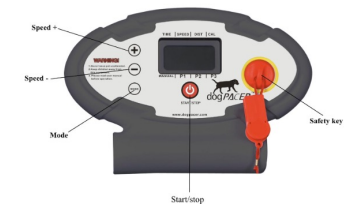
General Use/Safety Information:

1. Use the treadmill only as directions say.
2. Place the treadmill on a flat surface with 8 feet behind it and 2 feet on both sides.
3. To protect floor or carpet from damage, place a mat under the treadmill.
4. Do not let more than one dog on the treadmill at a time.
5. Use treadmills indoors, away from moisture or dust. Do not place the treadmill anywhere near where water can get onto it.
6. Keep children away from the treadmill.
7. If you need an extension cord for the treadmill, use only a 3-conduct, 14-gauge (12mm) cord that is 6.5 ft long or less.
8. Do not try to move the walking belt (the surface the dogs walk on) if the treadmill is off.
9. When increasing treadmill speed, do it slowly to avoid speed jumps.
10. Do not change the incline by placing objects (example: wooden blocks) under the treadmill.
11. Always unplug the power cord immediately after use.
12. Always unplug the treadmill power cord before maintenance or cleaning.
13. If the power cord is damaged, it must be replaced; do not use if power cord is damaged.
14. The treadmill won't start unless the power is on and the safety key is in the slot
15. Never put a dog on the treadmill while the belt is already moving.

PROJECT TRACKING TEMPLATE

				PROJECTS				COST / HOURS		
AT RISK	STATUS	PRIORITY	DEADLINE	TASK	DESCRIPTION	ASSIGNED TO	% DONE	FIXED COST	ESTIMATED HOURS	ACTUAL HOURS
☐	Complete	Medium	11/30/2023	Deliver Treadmill To Pickens County		SP, KW	100%		1.00	1
	Complete	High	11/30/2023	Training	Train onsite staff how to use treamill	SP	100%			
☐	Complete	Medium	01/24/2024	Deliver Treadmill To PAWS	*Note PAWS had very difficult schedule	SP	100%		1	2.5
☐	Complete	High	01/24/2024	Training	Train onsite staff how to use treamill	SP	100%			
☐	Not Started	High	02/02/2024	Meeting with Pickens County	Gather data from last ~2 months	SP/PH	25%			
☐				Task 1	Determine their opinion on the value of the treadmill. Did it make a difference?					
☐										
☐	Not Started	High	TBD	Plan Volunteer Visit with PAWS	Interact with PAWS and Canine Behavioral Coordinator, Natasha Frye, see first hand Shelter's use.	SP/More?	0%			
☐	Not Started	Medium	02/06/2024	Who?	Determine when/who would like to meet. Link	SP	0%			
☐										

DOG - GO!

Dog Name: Birdie
1yr Spayed Female 40lbs

Intake Date: 9/30/23 - Stray Caught in trap.

Adoption Date: 12/23/23

Notes Upon Intake: Very nervous, scared of humans - has come around to humans

DOG - GO!

Exercise Date	Time Duration	Notes Before Exercise	Notes After Exercise
12/4/23	5 min	Spins circles in kennel Still nervous but manageable	Less spinning in the kennel
12/7/23	3 min on 4	Excited - little nervous coming up front	More relaxed but happy to go back to her kennel

Dog Name: Rex - 4yrs - Owner Surrendered
57 lbs - Neutered

Intake Date: 11-3-23

Adoption Date: Transfered to Rescue - 1/30/24

Notes Upon Intake: Terrified of being in a new place with new handlers. Has become more comfortable

DOG - GO!

Exercise Date	Time Duration	Notes Before Exercise	Notes After Exercise
12/4/23	5 min	Excited, rowdy	More calm

Dog Name: Bruce - 3yrs - Neutered

Intake Date: 10/2/23 Stray

Adoption Date: 12/28/23

Notes Upon Intake: Hyper, not good on leash, little to no basic commands

DOG - GO!

Exercise Date	Time Duration	Notes Before Exercise	Notes After Exercise
12/4/23	5 min	Excited.	Calm, better behaved on leash
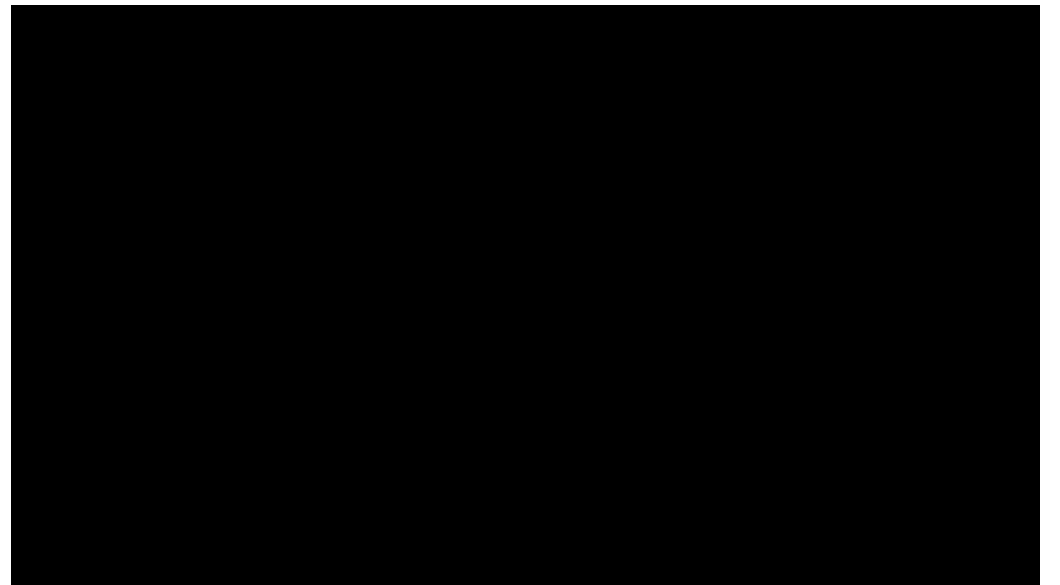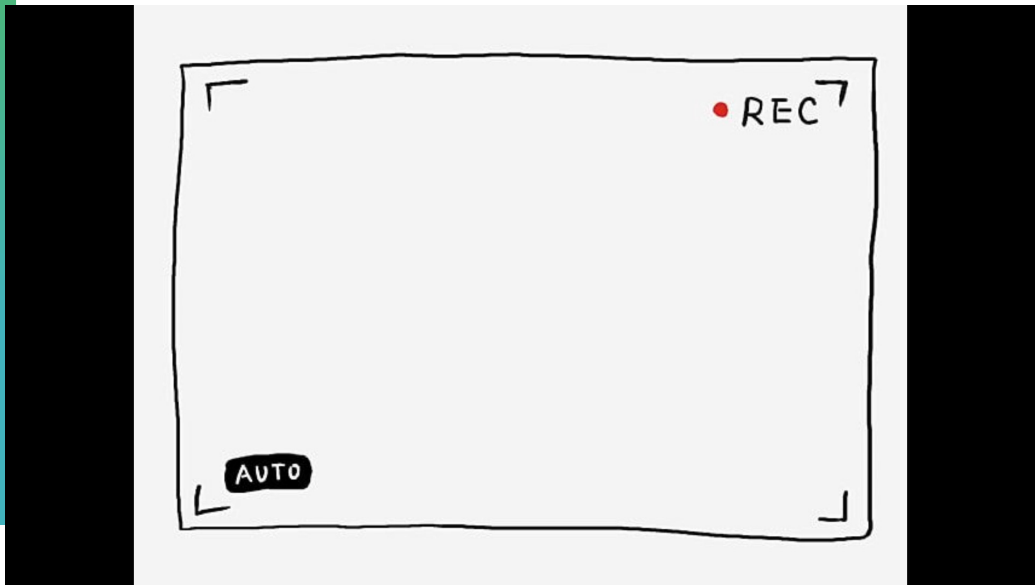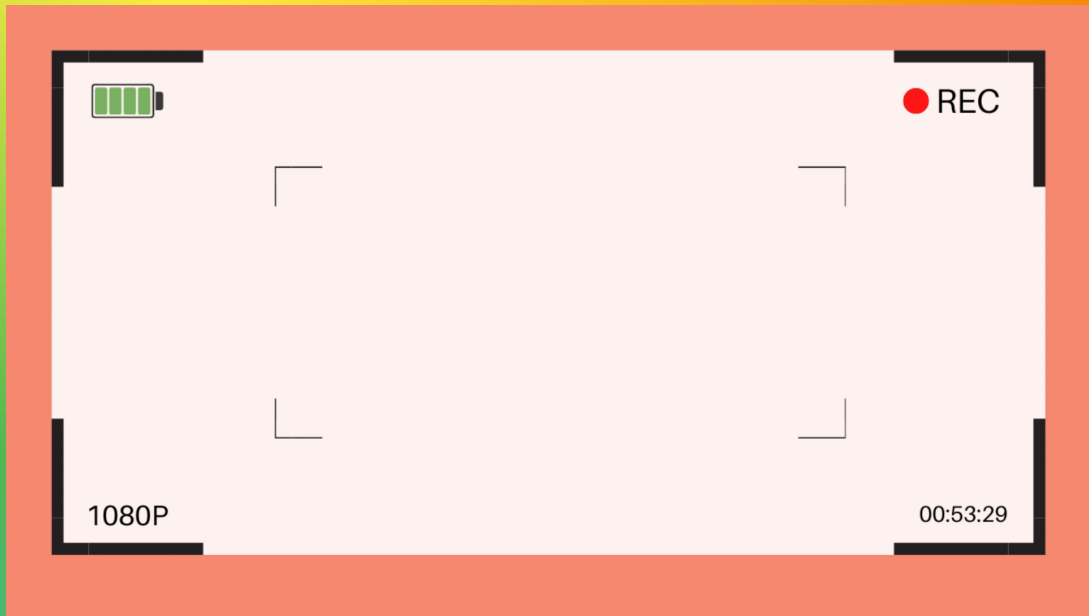
Dog-Go: Community Partnership for Dog Adoptability in the Tri-County Area

Presented by: Jacob Bittinger, Angelina Cotto, Parker Harrington, Katherine Jackson, Karlee Kesler, Alayshia Mack, Sydney Phipps, and Hannah Veracka
Mentored by: Susan McKenzie Reeves and Dr. Claire Dancz

Abstract

This Creative Inquiry course unites a variety of majors to collaborate on **student-led community service activities** as part of the mission of Clemson University to transform lives statewide and beyond through educational outreach. Our focus this year has been to **study dog adaptation to treadmills as an alternative exercise method**. We collaborated with our community partners, Anderson PAWS and Pickens County Animal Shelter, to implement an **alternative exercise program** using a motorized treadmill with dogs at their respective shelter. We collected data on dog adaptation to this exercise approach and identified four use cases for which dog treadmills meet the varying needs of dogs in both shelters. This project has the potential to **impact several hundred community dogs in our tri-county area**.

Motivation & Rationale

The motivation for this project is to positively impact dog adoption within the tri-county area. Previous research suggests that a **dog adoptability is impacted by their perceived happiness**[1]. Dog **happiness is driven by many factors, including exercise**[1]. Shelters provide common exercise opportunities in the form of structured and unstructured outdoor play, with some shelters also equipped with indoor accommodations for exercise. **Dog treadmills are an alternative approach to exercise** that allows for supervised exercise in a weather-independent indoor environment. Treadmills also allow for one-on-one interaction with each dog and can help **promote healthy behaviors that lead to increased socialization and adoption.** Our community partners welcomed this alternative exercise approaches and were eager to work with us to to implement and study it.

Dog-Go Design Objectives

We established specific criteria for the Dog-Go design. Criteria included:

- Portability for relocation within the shelter
- Minimum of 36 inches long for medium-large dogs
- Ability to hold a minimum of 50 lbs
- Motorized with speed control and safety shut off

The research team selected the Dog Pacer Treadmill based on the criteria (**Figure 1**).

Figure 1. Dog Pacer Treadmill

Research Question

In what ways do dogs adapt to alternative exercise via a dog treadmill (Dog-Go)?

Methods

We partnered with two animal shelters, Anderson PAWS and Pickens County Animal Shelter, to conduct this project. One Dog-Go treadmill was provided to each facility. When we delivered Dog-Go, we trained shelter employees on the treadmill use and data collection. A member of each facility implemented this alternative exercise program for >6 weeks, providing us with a data set of the dog names, exercise duration, and notes before and after exercise, inclusive of dogs' responses to and perceptions of the treadmill.

Results & Discussion

Case 1: Selective Dogs
Defined by:
- Selective dogs who do not get along with all other dogs
- Higher on the euthanasia list

Results:
- *Dog-Go has allowed selective dogs to burn energy prior to being introduced to other dogs, enabling more successful introductions*
- *Two selective dogs have been saved from euthanasia so far*

Case 2: Non-Leash Trained Dogs
Defined by:
- Dogs that are either reluctant or do not know how to leash walk

Results:
- *Dog-Go has allowed dogs to practice leash use in a calm and controlled environment*
- *One non-leased trained dog is now leashed trained*

Case 3: High-Energy Dogs
Defined by:
- Need to exercise regularly
- Bad weather can inhibit outside exercise time
- Indoor runs are not as stimulating

Results:
- *Dog-Go has enabled a more consistent exercise for high-energy dogs*

Case 4: Timid Dogs
Defined by:
- Dogs do not like being around most volunteers

Results:
- *Dog-Go has supported relationship building with timid dogs*
- *Success rate of 25% moving dogs from timid to comfortable*

Dog-Go In Action

We invite you to experience Dog-Go in action with our **adoptable shelter friends**: Bodie, LL, Lorraine and Ben (**Figure 2**).

Bodie

LL

Lorraine

Ben

Figure 2. Adoptable Dogs using Dog-Go (Click on the dog to see them in action!)

Conclusion & Future Work

Based on feedback from our community partners, Anderson PAWS and Pickens County Animal Shelter, we are exploring further exercise options with a dog-driven treadmill. Our new criteria list is:

- Portability for relocation within the shelter
- Minimum of 36 inches long for medium-large dogs
- Ability to hold a minimum of 50 lbs
- ***Manual control to allow dog-driven pacing***

Future work will include the implementation of a manual treadmill alongside our motorized treadmill. We will study the advantages and disadvantages of these treadmill options with our community partners and determine their potential for sustainable dog exercise alternatives.
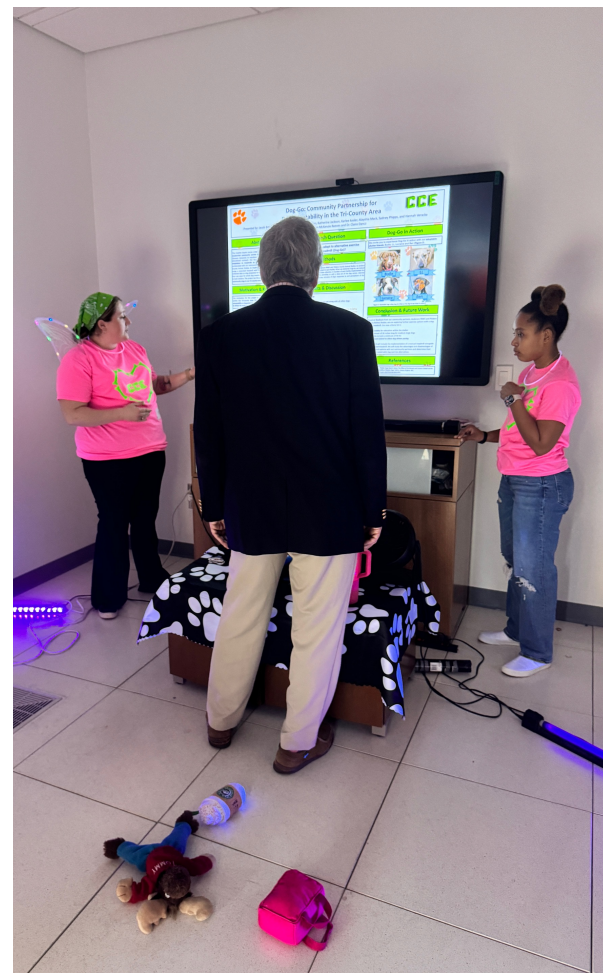
References

1. Clark, Hannah G., "Shelter Dogs Need A Home: The Effect of Enrichment and Human Contact on the Welfare and Adoptability of Shelter Dogs" (2021). *Honors Projects*. 842. https://scholarworks.gvsu.edu/honorsprojects/842

DOG - GO!

FoCI 2024

Student Feedback

I found a great sense of accomplishment through my leadership role with the Dog-Go project. Since I was able to follow the project from its start in Fall 2023 till now, the opportunity I had to help lead the group for different tasks was very rewarding. Scheduling and working with others helped advance my ability to communicate and time manage. Claire and Susan made the CI fun too since they supported students to explore their creative outputs.

I had the pleasure of working on the Dog-Go Project since the fall of 2023. This project has involved multiple visits to local animal shelters which has been a very enriching and rewarding experience. The skills I have learned from my mentors and the friends I have made in this class will forever be a positive impact on my life.

I have really enjoyed being able to experience a wide variety of creative projects throughout my four semesters in this class and I look forward to continuing this next fall.

Your Turn

At Your Table (5 mins)

1. Revisit the Clemson Elevate strategic plan
2. Brainstorm <u>AS MANY</u> community project ideas as possible
   - Suspend your judgement on all ideas
   - Push yourself to experiment with different combinations
   - Forget about similarities and focus on quantity

bit.ly/cuelevate

Competition Prep (5 mins)

Validate the Problem:
- Critical Thinking Aspect: Assess the significance of the problem. Ensure that the problem justifies the effort and resources required to solve it.

Break Down the Problem:
- Critical Thinking Aspect: Apply analytical skills to break down complex problems into manageable parts. Identify interrelationships among sub-problems.

Define Success Differently:
- Critical Thinking Aspect: Reevaluate criteria for success. Consider whether different success metrics might lead to better solutions.

Embrace Constraints:
- Critical Thinking Aspect: View constraints as opportunities for creativity. Use constraints to focus and enhance problem-solving efforts.

Idea Share Out
(aka Prize Time)

Motivating Student Effort

I Care

Are the goals relevant & meaningful?

I Can

Do I believe I can perform a task and reach a desired outcome?

I Matter

Does my contribution to this effort matter?

Connecting Motivation (below) to Transparency (TILT) and Value (AAC&U)

Intrinsic Motivator	Components	Student Questions Addressed
Purpose "I Care"	Why	What skills or knowledge will I gain? How will I be able to use this? Are the examples relevant?
Task "I Can"	What	Is there clarity about what to do? What needs to be submitted?
	How	Is there a recommended process? Is the process intentionally unclear? What roadblocks or mistakes can you avoid?
	When	When is this due? Spacing? Can I do this in one sitting?
	Where and Resources	Where can I do this work? Do I need the internet or library? Where do I submit this work?
	With Whom	Do I need to work alone?
Criteria "I Matter"	Checklist	What are the parts? How do I know I am on the right track?
	Rubric or Examples	How will I know what's expected? What matters most? How will I know I'm doing good work? What's good or bad in these examples?