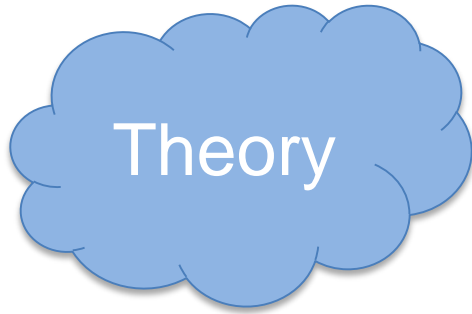


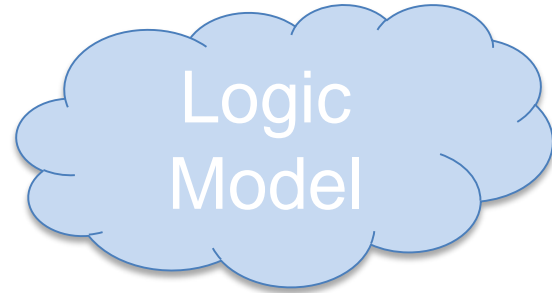
Emerging STEM Evaluation and Research Frameworks

ITEST PI Summit

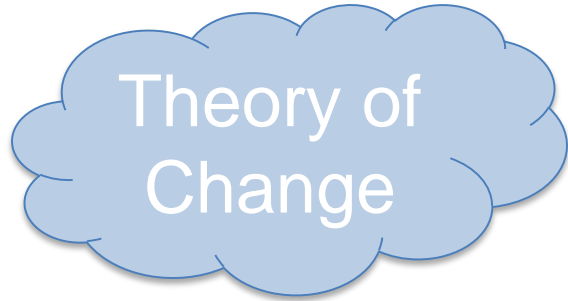
May 15, 2018



Theory



Logic
Model



Theory of
Change



?

Theory

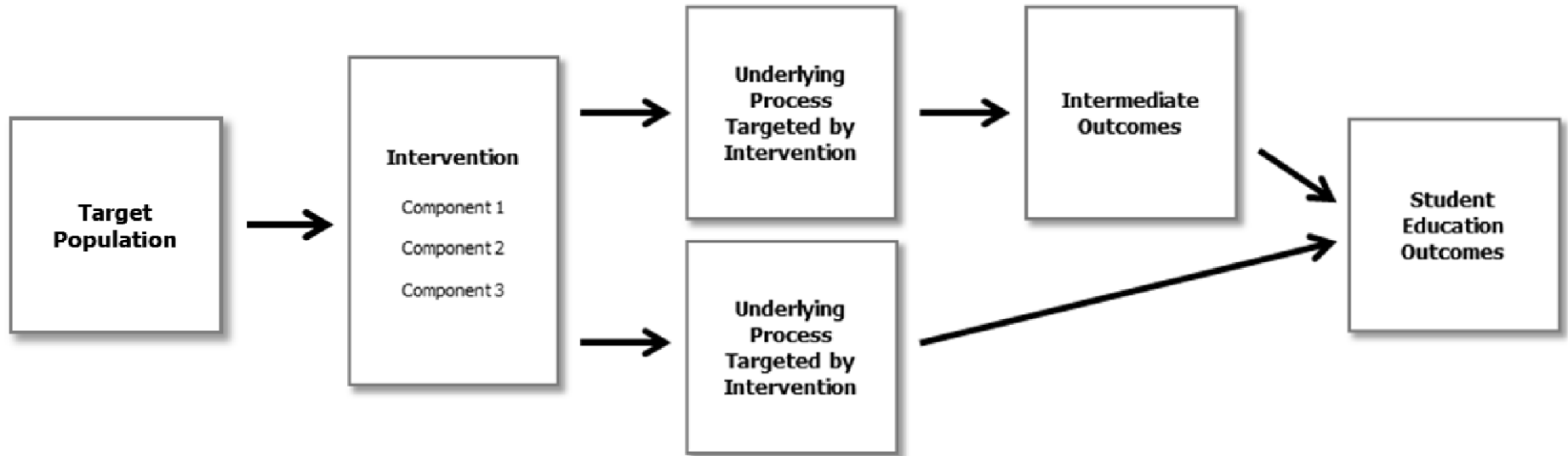
Learning
Activation

STEM
Ecology

STEM
Identity

Socio-
scientific
Investigations

Theory of Change



Logic Model



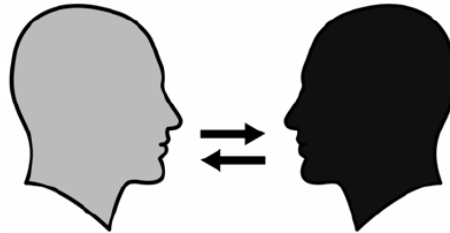
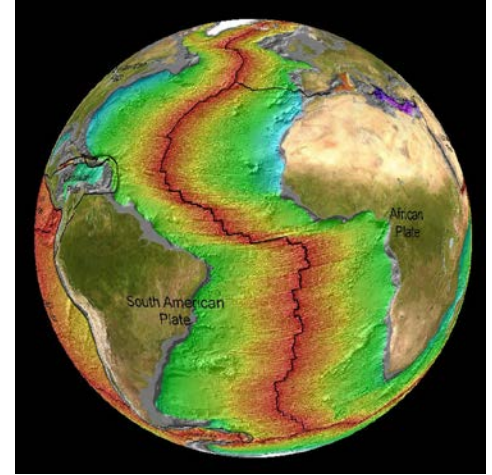


Theory

Theory of
Change

Logic
Model

Theoretical Frameworks



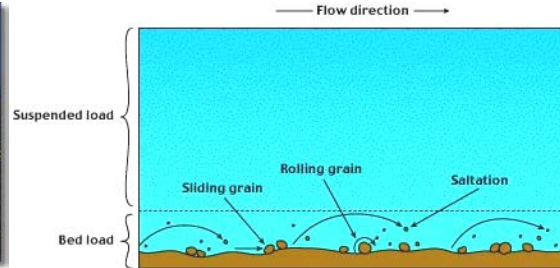
Models & Theories for ESS Research

PREDICTIVE

INPUT:
What does Earth look like?

PROCESS:
What is happening to Earth?

OUTPUT:
How has Earth changed?



RETRODICTIVE

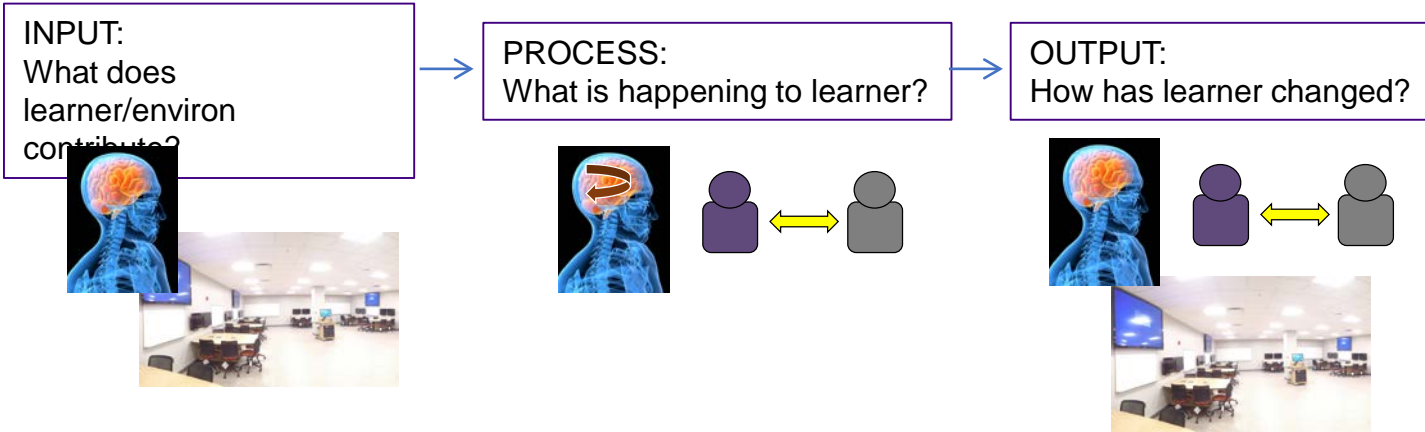
OUTPUT:
What DID Earth look like?

PROCESS:
What HAPPENED to Earth?

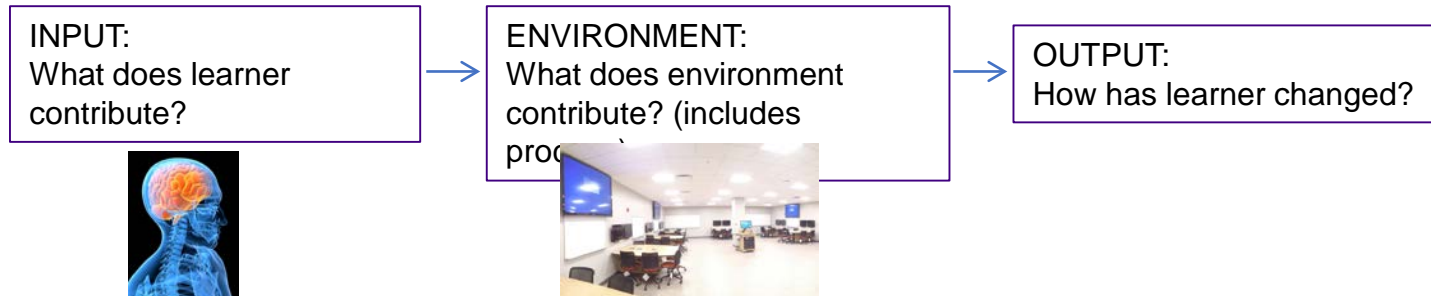
INPUT:
What does Earth look like?

Models & Theories for Education Research

LEARNING THEORIES

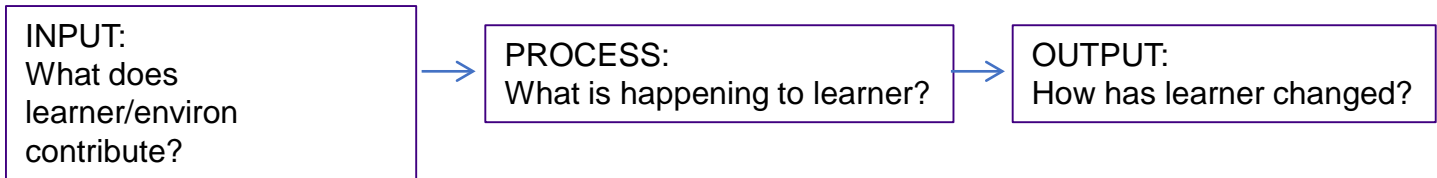


STUDENT DEVELOPMENT THEORIES



Models & Theories for Education Research

LEARNING THEORIES

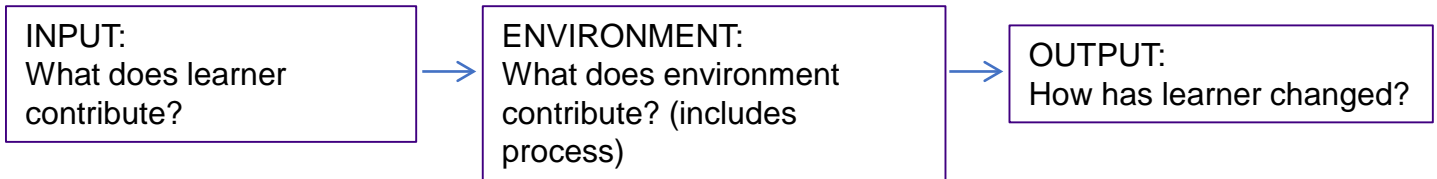


BEHAVIORISM (*Skinner, Bandura, Pavlov*)

COGNITIVE CONSTRUCTIVISM (*Piaget, Bruner*)

SOCIAL CONSTRUCTIVISM (*Vygotsky*)

STUDENT DEVELOPMENT THEORIES



INTELLECTUAL AND ETHICAL DEVELOPMENT (*Perry*)

IDENTITY DEVELOPMENT (*Chickering*)

STUDENT INVOLVEMENT (*Astin*)

Practical Answer

- What is the problem or question?
- Why is your approach to solving the problem or answering the question feasible?

STEM Ecology Framework



Trill & Traphagen, 2015



HOME



SCHOOL



STEM FOCUSED
INSTITUTION



AFTER-SCHOOL /
SUMMER PROGRAM

K-12 Schools

- + Short-term educational activity (i.e. outreach to a K-12 class, support of grade-wide or school-wide event such as career day or science night)
- + Support of teacher instruction
- + Classes & projects (while a student)

Informal Learning Institutions (Museums, Science Centers, Parks)

- + Workshop or course
- + Short-term educational activity
- + Access to specialized resources
- + Mentoring relationships

Home

- + Family trips and activities
- + Interactions with family members or neighbors who are hobbyists

Science Hobby Development

- + Content knowledge
- + Knowledge of tools/equipment
- + Knowledge of social/community practices
- + Outreach knowledge/pedagogy
- + Knowledge of research and research practices
- + Knowledge of relevant environmental concerns

Community Organizations (Boy/Girl Scouts, 4H, Churches, Citizen Advocacy Groups, Retirement Communities)

- + Organization meetings
- + Short-term educational activity

Universities

- + Course or lab
- + Short-term educational activity
- + Access to specialized resources
- + Mentoring relationships

Conferences

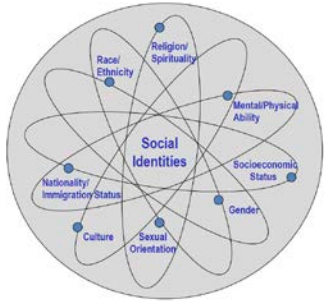
- + Presentations
- + Workshops
- + Mentoring relationships

Hobby Clubs

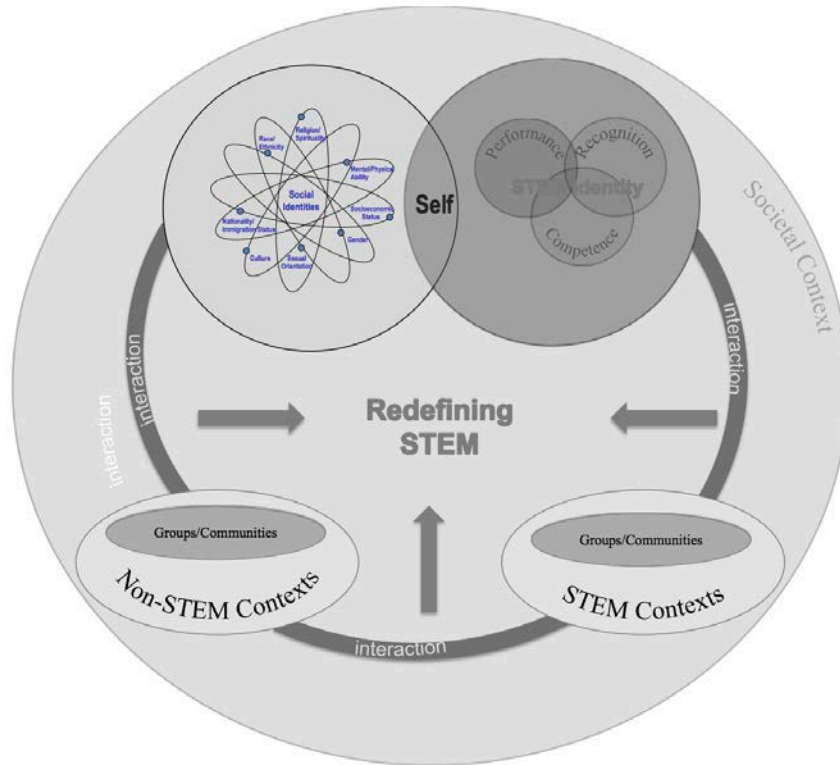
- + Club meetings
- + Mentoring relationships
- + Short-term educational activity (i.e. workshops, birding trips, observing sessions)

Corin et al., 2017

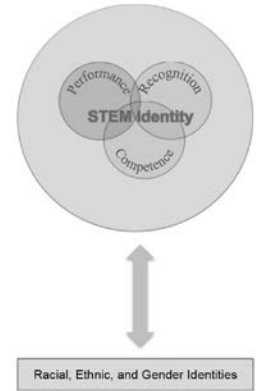
STEM Identity



Model of multiple social identities, Jones & McEwen, 2000



Herrera et al., 2012



Model of science identity, Carolone & Johnson, 2007



Lens on Climate Change Project

CIRES - Cooperative Institute for Research in Environmental Sciences



Award number DLR -1513320

Contact:

Anne.U.Gold@Colorado.edu

<http://cires.colorado.edu/outreach/LOCC>



CTSE

Center for Translational
Science Education

Providing practical solutions to bring benchtop and bedside to desktop

STEM Evaluation and Research Frameworks

David Reider and Berri Jacque

The BIG Goals

- 1. Capture student interest**
- 2. Build career awareness**
- 3. Build critical skills and student perceptions**

Your average science classroom...

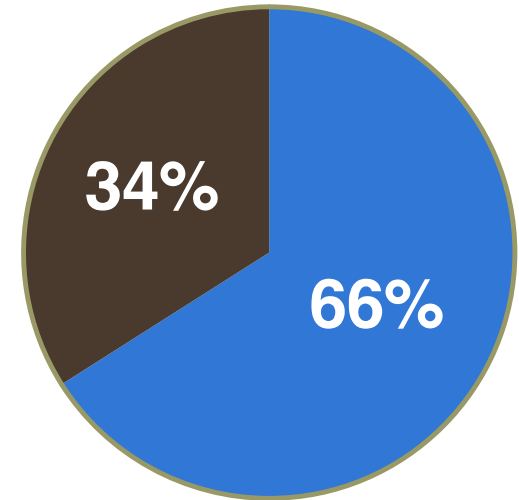


(iStockphoto)

Your average science classroom...



(iStockphoto)



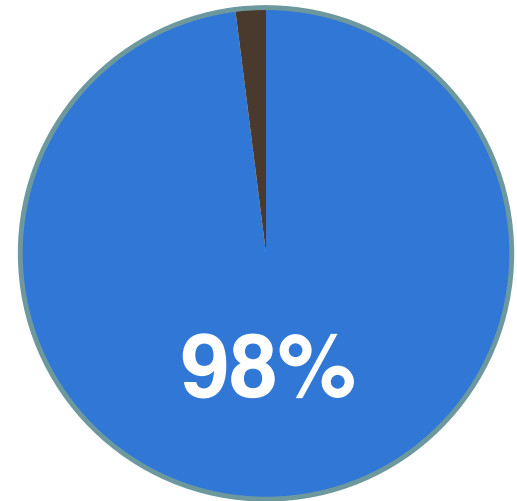
66% of students value learning about science

Data from PISA 2007

How interested are high school students in learning about health?



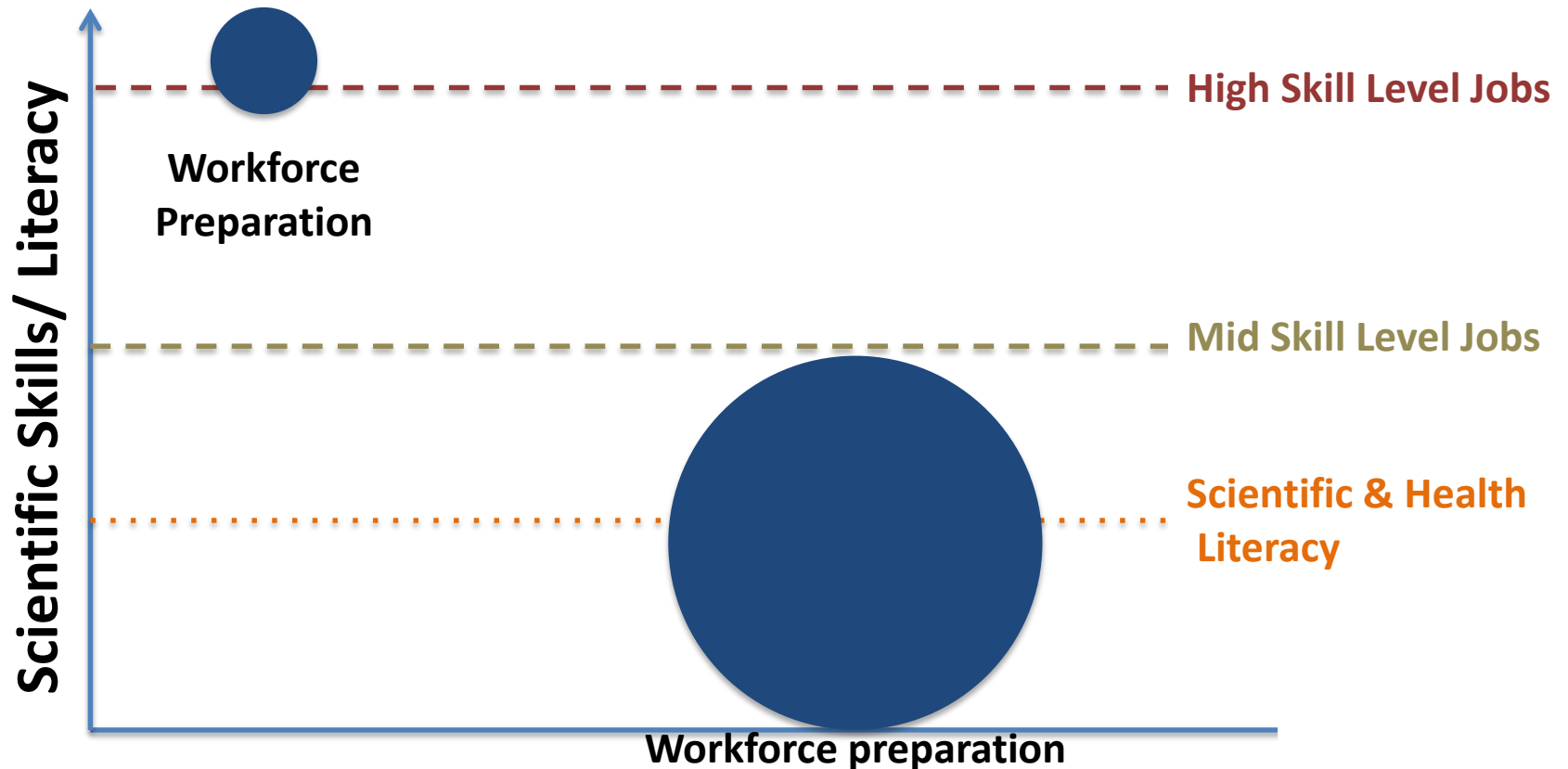
How interested are high school students in learning about health?



98% of students value learning about health

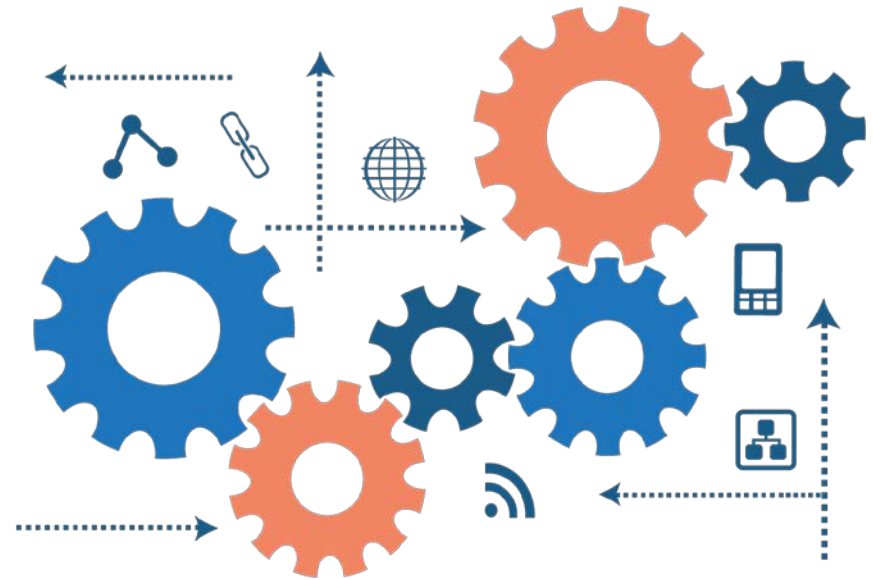
Scientific and health literacy needs are shifting

9 out of 10 bioscience jobs are in health



Our approach

**Integrate STEM literacy
and career awareness**



*Do something real and meaningful from the
perspective of a career role!*

Technology built for multi-role interrupted case studies

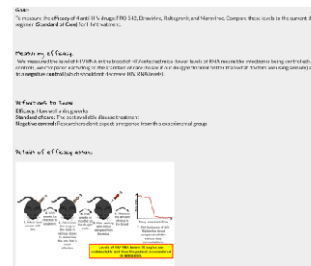
Context - Students work together to design a new drug to combat HIV.

Roles - Students are each given a distinct role as a member of a drug discovery team.

Instructional approach - Interrupted case study

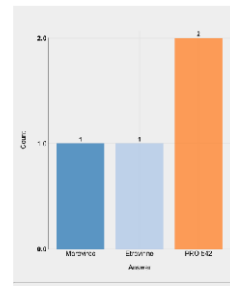
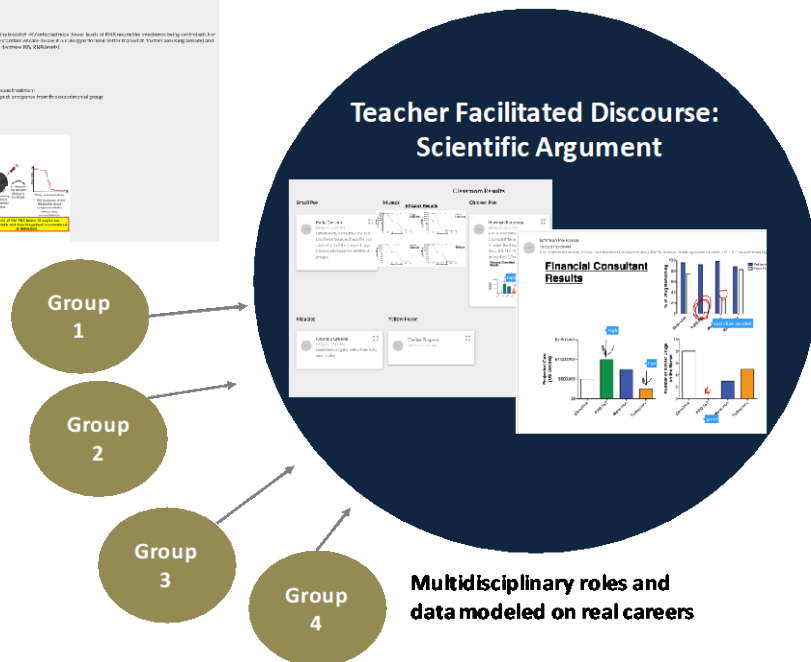
- Team based problem solving
- Deliberation / collaborations
- Data analysis (skill)
- Communication

Each group has a unique **Question** and **Experimental Methods**

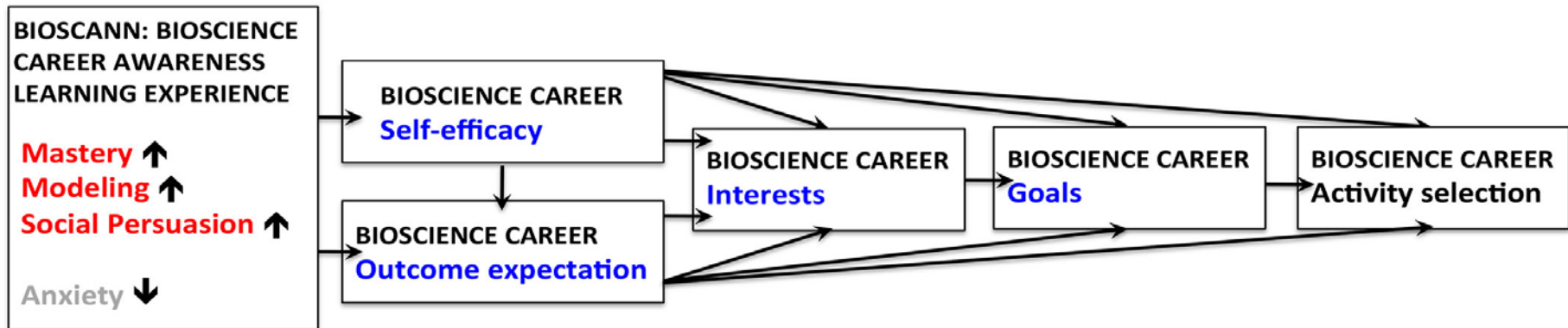


Each group posts and presents their **Data** and **Conclusion(s)** to the class

Groups then reflect and synthesize the data and take a poll to select the next **Question**



Social Cognitive Career Theory (SCCT): a framework for building and measuring STEM career selection



Social Cognitive Career Theory (SCCT) as a framework for building and measuring STEM career selection: This model is adapted from Lent et al., 2013.

Pros and cons of our model

- **Pros:**

- Models collaboration as actual scientists practice
- Engages different skillsets and professional training to model product development
- Presents multiple decision factors that go into product development - science is just one of them
- Models the importance of STEM literacy rather than STEM expertise as critical to participate in tomorrow's economy

- **Cons:**

- Might raise instructor eyebrows with too little hard science content
- Requires a collaborative learning context, not all schools foster this
- Participant populations may/may not relate to disease of study, depending on location - issue of relevance

Socio-Environmental Science Investigations: Pedagogical Frameworks and Design Principles

Alec Bodzin, Lehigh University



2018 ITEST Principal Investigator and Evaluator Summit

DRL-1614216

Socio-Environmental Science Investigations (SESI)

- Inquiry-based investigations
- Map-based mobile data collection
- Analysis with Web-based mapping software
- Local issues
- Field work in the local setting

Pedagogical Frameworks

- **Place-based Education** (Sobel, 2004; Semken, 2005)
 - Focuses on local or regional investigations
 - designed around engaging students in examining local problems
 - Utilizes fieldwork to gather evidence in that local setting
- **Socio-scientific investigations** (Sadler, Barab, & Scott, 2007; Zeidler & Nichols, 2009)
 - Use of evidence-based reasoning
 - Understanding scientific information through an active approach to learning
 - Placing science content within a social context in a way that supplies both motivation to and the ownership of learning by the student

GEOSPATIAL THINKING AND REASONING

Investigative Questions



Geospatial Data Visualizations



Geospatial Data Analysis



Constructing Explanations



Arguments and Claims

Geospatial Science Technological Pedagogical Content Knowledge

- Interactions between geospatial technology and pedagogical content knowledge to produce effective environmental science teaching and student learning.
- Modeling geospatial data exploration and analysis techniques.
- Scaffolding students' geospatial thinking and analysis skills.

Earth and Environmental Science Content

- Human-Environment Interactions: Know and apply geographic information about relationships between nature and society.
- Physical Geography: Know and apply geographic information about processes shaping the structure of the Earth's surface, physical landscapes, natural hazards, weather, climate, and atmospheric processes.

Social Studies Content

- Human-Environment Interaction: Place, Regions, and Culture
- Human Population: Spatial Patterns and Movements

Geospatial Science and Analysis Skills

- Use GIS to manage, display, query, and analyze geospatial data.
- Use geospatial analysis to process geospatial data for the purpose of making calculations and inferences about space, geospatial patterns, and geospatial relationships.
- Use geospatial data analysis in which geospatial relationships such as distance, direction, and topologic relationships (e.g. adjacency, connectivity, and overlap) are particularly relevant.
- Use inductive and deductive reasoning to analyze, synthesize, compare, and interpret information.
- Use logic and reasoning to identify strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.

Design Principles

- Use motivating contexts and personally relevant and meaningful examples to engage learners.
- Design image representations that illustrate visual aspects of Earth and environmental scientific knowledge.
- Design Web GIS data to make geospatial relations readily apparent.
- Scaffold students (Jonassen, 1999; Quintana et al., 2004) to analyze geospatial relations.
- Develop curriculum materials to better accommodate the learning needs of all students, while also expanding the geospatial science pedagogical content knowledge in teachers.

Professional Development

- Design partnership model
 - Pedagogical expertise of teachers to adapt curriculum
- Active learning experiences
- Collaboration with peers
- Opportunities to reflect on teaching practices

Adapting and Implementing a Geospatial High School Course in Career and Technical Education Clusters in Urban Settings (SPREAD)

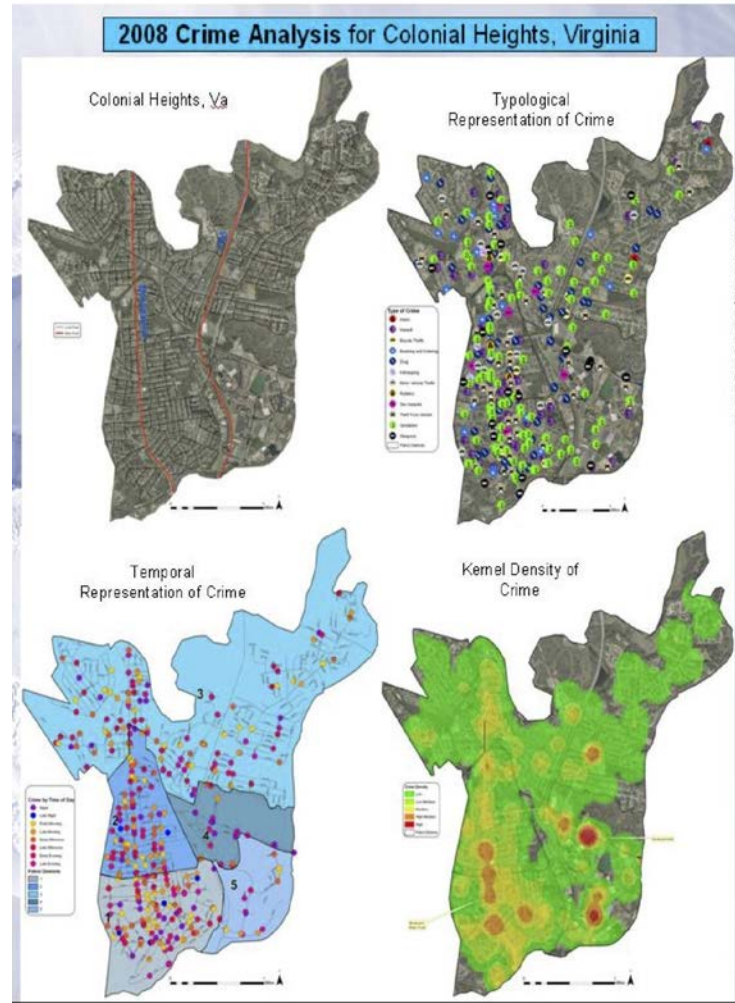


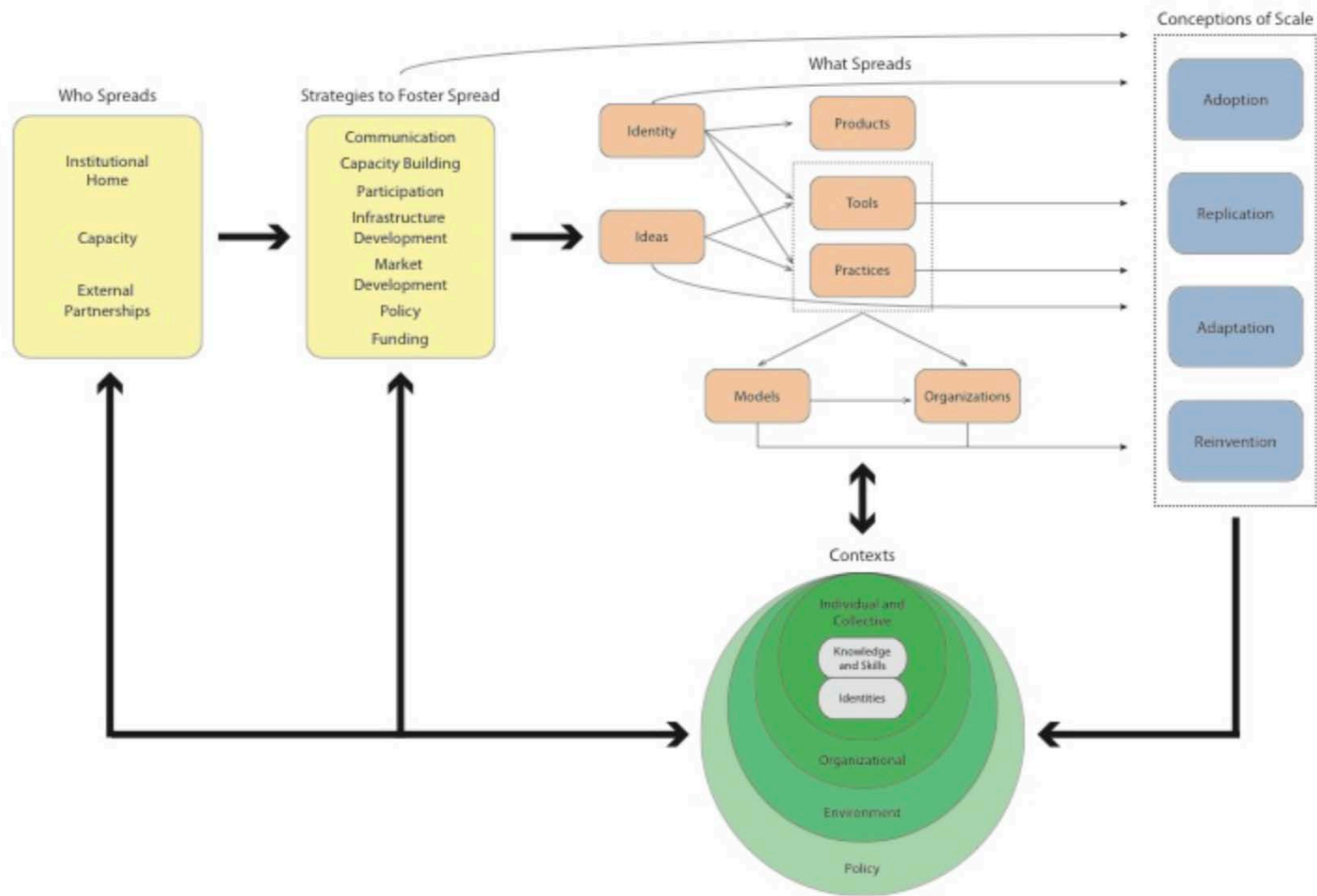
Steven McGee, The Learning Partnership
David Uttal, Northwestern University
Bob Kolvoord, James Madison University
Carolyn Jourdan, Chicago Public Schools

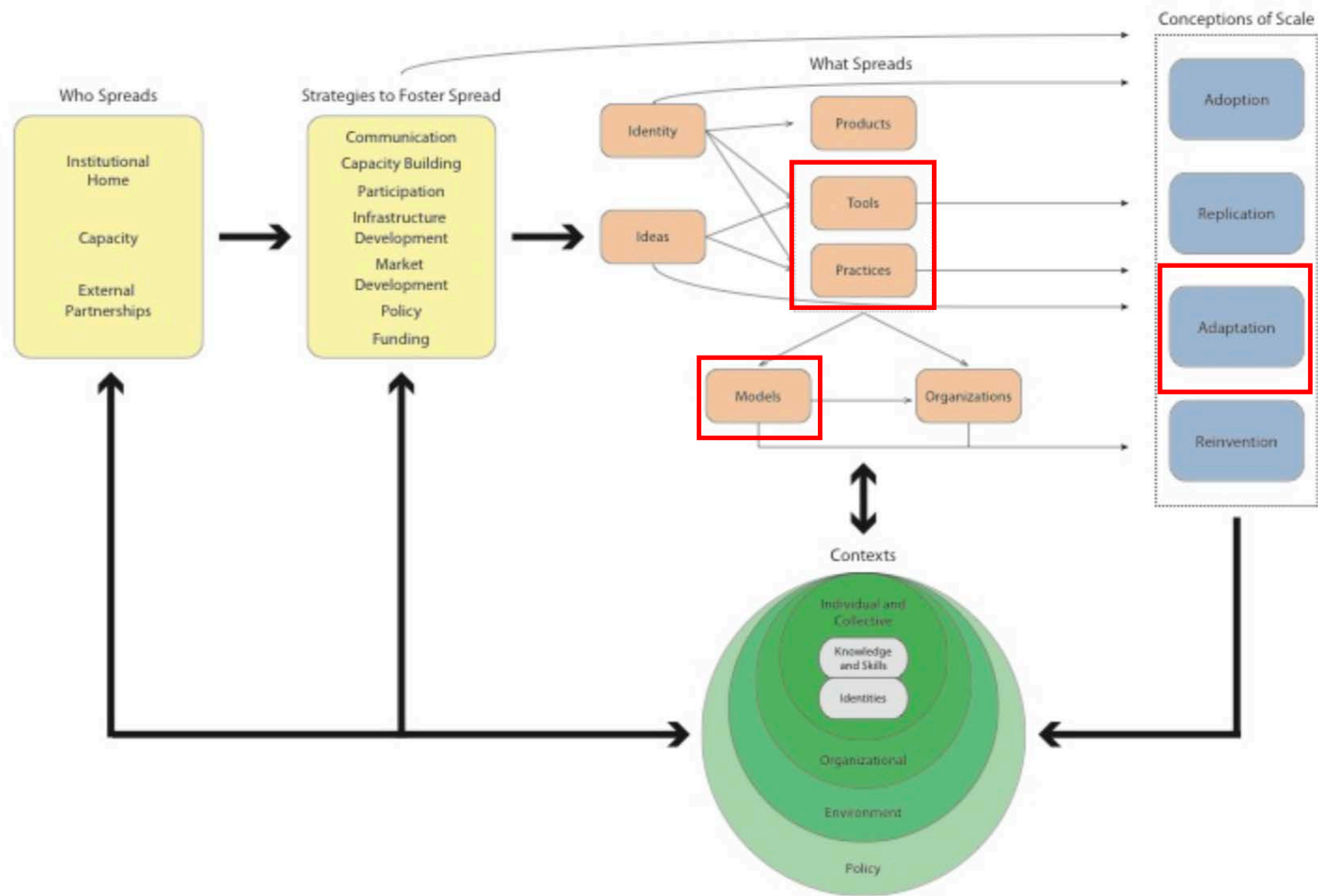


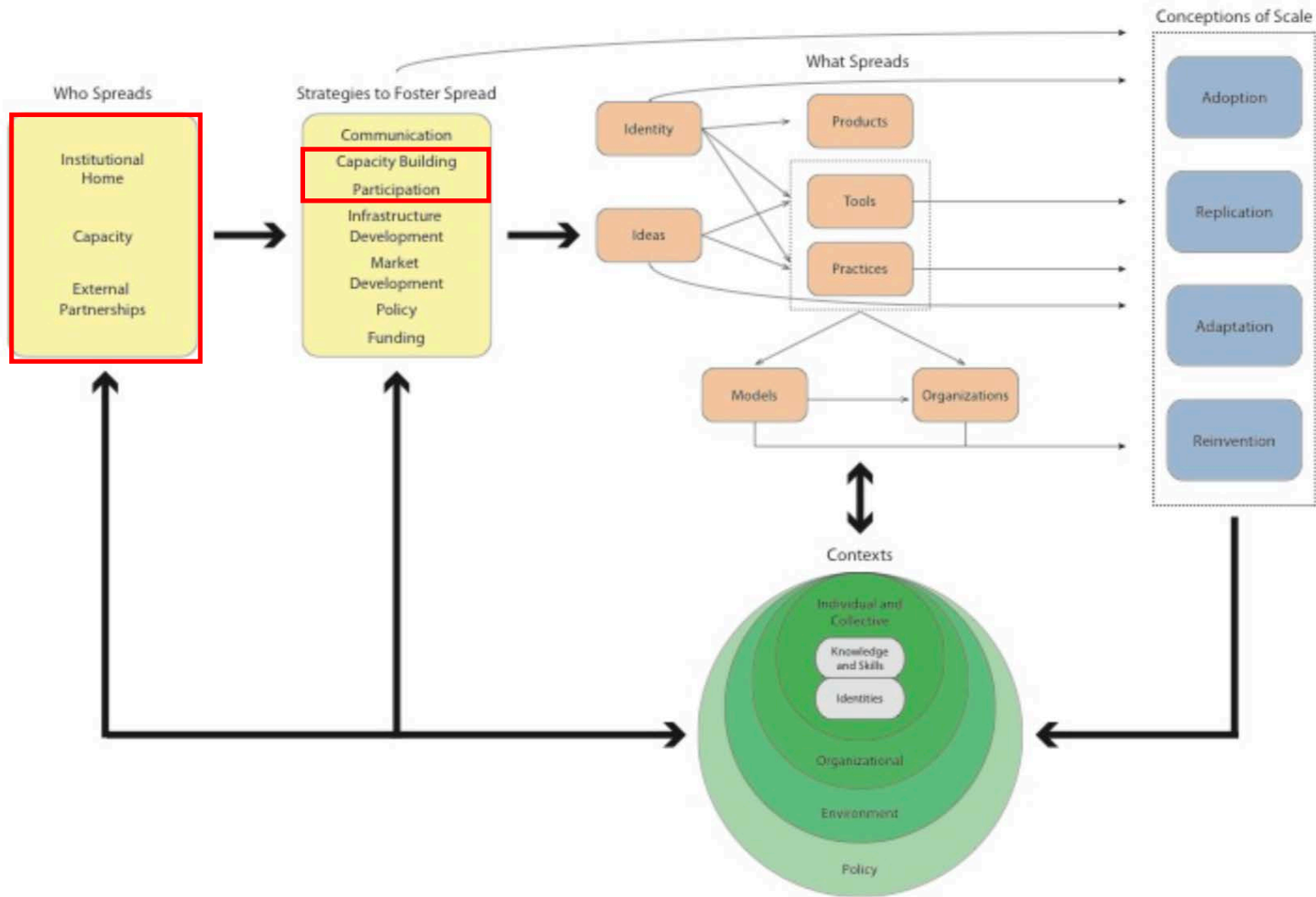
Northwestern

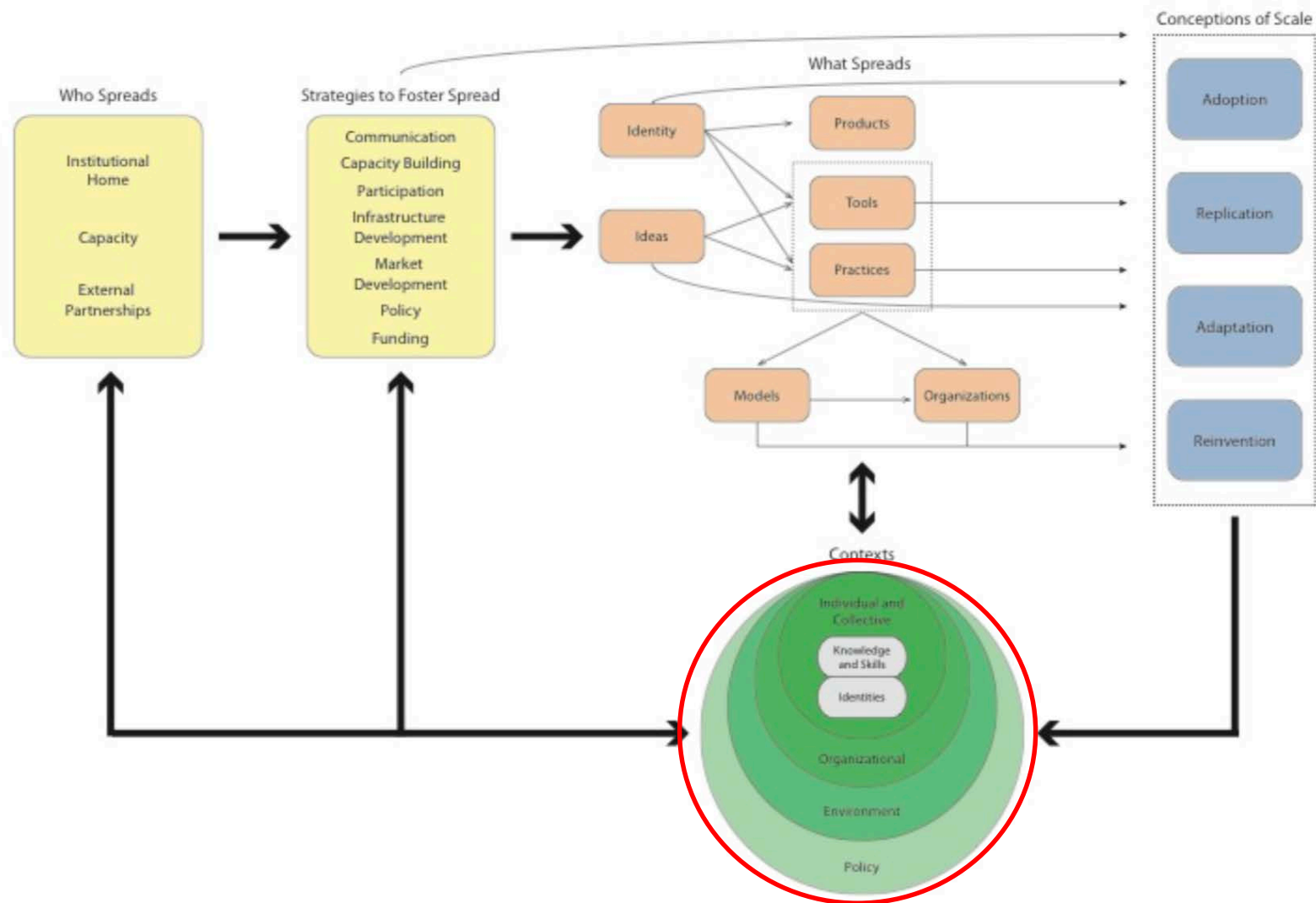
Geospatial Semester Curriculum











Collaborative Research: Connected STEM Promoting STEM Education through Connected Devices and Building Automation

Michael D. Johnson
Emel Cevik
Jenn Whitfield
Jay Porter
Joe Morgan
Mathew Kuttolamadom
Bugrahan Yalvac



Dwight Look College of

ENGINEERING
TEXAS A&M UNIVERSITY



**ENGINEERING TECHNOLOGY
& INDUSTRIAL DISTRIBUTION**
TEXAS A & M UNIVERSITY

Populations

Teachers

→ Camp Students

Students → Traditional Class Students

→ Dual Credit Students

Parents



Dwight Look College of

ENGINEERING
TEXAS A&M UNIVERSITY

June 1, 2018

2



**ENGINEERING TECHNOLOGY
& INDUSTRIAL DISTRIBUTION**
TEXAS A & M UNIVERSITY

Method - Teachers

Intervention

1

Summer Workshop



Implementation of Exercises in the Classroom

2

3

Data

Draw an Engineer Test [3]

Draw an engineer

Draw an engineer in the space provided. Then answer the questions below about your picture. Add to your picture as you answer the questions.

Name _____

- Describe what the engineer is your picture is doing.
- What tools does the engineer in your picture use?
- What does the engineer in your picture do as a typical day?
- What skills does the engineer in your picture have?
- If you know the name of the engineer, what is it? If not, what do you think it is?

Design, Engineering, and Technology [1]

Please consider the definition and examples given in the previous page when answering the following questions regarding Design Engineering Technology.

Section 1

Four answer the following questions writing the most appropriate answer.

1. How familiar are you with Design Engineering Technology or related? (1-5)

2. How do you feel about working in Design Engineering Technology or related? (1-5)

3. How do you feel about working in Design Engineering Technology or related? (1-5)

4. How do you feel about working in Design Engineering Technology or related? (1-5)

5. How do you feel about working in Design Engineering Technology or related? (1-5)

6. How do you feel about working in Design Engineering Technology or related? (1-5)

7. How do you feel about working in Design Engineering Technology or related? (1-5)

8. How do you feel about working in Design Engineering Technology or related? (1-5)

9. How do you feel about working in Design Engineering Technology or related? (1-5)

10. How do you feel about working in Design Engineering Technology or related? (1-5)

11. How do you feel about working in Design Engineering Technology or related? (1-5)

12. How do you feel about working in Design Engineering Technology or related? (1-5)

13. How do you feel about working in Design Engineering Technology or related? (1-5)

14. How do you feel about working in Design Engineering Technology or related? (1-5)

15. How do you feel about working in Design Engineering Technology or related? (1-5)

16. How do you feel about working in Design Engineering Technology or related? (1-5)

17. How do you feel about working in Design Engineering Technology or related? (1-5)

18. How do you feel about working in Design Engineering Technology or related? (1-5)

19. How do you feel about working in Design Engineering Technology or related? (1-5)

20. How do you feel about working in Design Engineering Technology or related? (1-5)

Teacher Efficacy and Attitudes Toward STEM [5]

STEM

- Perception
- Efficacy

MISO **GOVALLIANCE**

TECHNOLOGY TEACHING EFFICACY AND BELIEFS

Directions: Please respond to these questions regarding your beliefs about your own teaching.

	Strongly Disagree	Disagree	Neutral/Agree	Agree	Strongly Agree
1. I am consistently improving my technology teaching practice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I know the steps involved in teaching technology effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I am confident that I can explain to students why technology is important.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I am confident that I can teach technology effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I am confident that I can answer student questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Method – Students (non Dual)

Camp/Class

Intervention

1



2

Draw an Engineer Test [3]

Draw an engineer in the space provided. Then answer the questions below about your picture. Add to your picture as you answer the questions.

Name _____

- Describe what the engineer in your picture is doing.
- What tools does the engineer in your picture use?
- What jobs does the engineer in your picture do?
- What skills does the engineer in your picture have?
- Is your knowledge of engineers correct? How do you know? How could you find out more?

Student Efficacy and Attitudes Toward STEM [6]

STEM

- Perception
- Efficacy

MISO **GOVALL**

TECHNOLOGY TEACHING EFFICACY AND BELIEFS

Directions: Please indicate the degree to which you agree or disagree with each of the following statements. Please indicate the degree to which you agree or disagree.

For each of the following statements, please indicate the degree to which you agree or disagree.

Even though water statements are very similar, please answer each statement. There are no "right" or "wrong" answers. The only correct responses are those that are true for you. Whenever possible, be as honest as you can be.

Technology Teaching Efficacy and Beliefs

Directions: Please respond to these questions regarding your beliefs about your own teaching.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. I am currently enjoying my technology teaching position.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I know the steps involved in teaching technology effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I am confident that I can explain to students why technology requirements are important.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I am confident that I can teach technology effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I am confident that I can answer students' questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I understand technology concepts well enough to be effective in teaching technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I believe I should serve as a role model for students regarding technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I am confident that I can answer students' technology questions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. When a student has difficulty understanding a technology concept, I am confident that I know how to help the student understand it better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I am confident that I can answer students' questions about technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I know what to do to increase student interest in technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Data



Dwight Look College of

ENGINEERING
TEXAS A&M UNIVERSITY

June 1, 2018

4



ENGINEERING TECHNOLOGY & INDUSTRIAL DISTRIBUTION
TEXAS A&M UNIVERSITY

Method – Dual Students

Intervention

1

Dual Credit Course
with Local
Community College
(Blinn College)

2

18 Month Follow-up

3

Data

Work-based
Learning
Survey [2]

STUDENT PERCEPTIONS OF WORK-BASED LEARNING

SECTION 1 BACKGROUND DATA

Please fill in the circle next to the appropriate response. You do not have to answer every question. If you do not know, please check the "Other" response.

What is your gender?

1. Male 2. Female 3. Other (please list) _____

4. What is your current grade point average (GPA)?

1. Above 3.0 2. 2.5 - 3.0 3. 2.0 - 2.5 4. Below 2.0 5. Don't know

5. What job would you like to have in 10 years? (Please write in the space provided.)

6. How often do you work in a job?

1. 10 or more hours per week 2. 5 to 9 hours per week 3. 1 to 4 hours per week 4. Less than 1 hour per week 5. Don't know

7. When do you work, and what is your job?

1. (Please list employer) _____
2. (Please list job title) _____

8. Did you have a job before you started your work-based learning program?

1. Yes 2. No 3. Don't know

9. How did you find your job?

1. Through a friend 2. Through a family member 3. Through a teacher 4. Through a newspaper 5. Other

10. Do you intend to continue your work-based learning program?

1. Yes 2. No 3. Don't know

Current
College/Job
Follow-up
Data

STEM

- Awareness
- Career Goals



Dwight Look College of

ENGINEERING
TEXAS A & M UNIVERSITY

June 1, 2018



**ENGINEERING TECHNOLOGY
& INDUSTRIAL DISTRIBUTION**
TEXAS A & M UNIVERSITY

Method – Parents

Intervention

1

Camp or Classroom
Intervention –
Presentation or
Family STEM Night

2

Data

Pre/Post
Student
Perception

STEM
Awareness
[4]

STEM
• Awareness

3. Please use the following scale to describe your own (Circle Family, TDC/CMC) and your child's confidence in understanding the following topics.

Not at all confident 1 2 3 4 5 Confident Very Confident

Rating Before	Topic	Rating After
	Your knowledge of various engineering or computer design uses.	
	Your understanding of engineering design process.	
	Your awareness of engineering careers.	
	Your understanding of benefits of STEM.	

4. Please use the following scale to describe your child's (you - father/mother/other design activities) and your child's confidence in understanding the following topics.

Not at all confident 1 2 3 4 5 Confident Very Confident

Rating Before	Topic	Rating After
	Your child's knowledge of various engineering or computer design uses.	
	Your child's understanding of engineering design process.	
	Your child's awareness of engineering careers.	
	Your child's understanding of benefits of STEM.	

7. How would you rate the following? Check one.

Clear and good for your child.

Limited or less than good.

Mixed or interesting.

Definitely needs something.

8. Comments or suggestions:

9. Please answer all questions below on the following 5-point Likert Scale.
6 = Strongly Disagree 5 = Disagree 4 = Neutral 3 = Agree 2 = Strongly Agree

Rating	Statement
	1. I have not experienced any of these experiences, and I am not planning to.
	2. I have not experienced any of these experiences, but I am planning to.
	3. I have not experienced any of these experiences, but I am planning to.
	4. I have not experienced any of these experiences, but I am planning to.
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References

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Dwight Look College of

ENGINEERING
TEXAS A&M UNIVERSITY

June 1, 2018

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**ENGINEERING TECHNOLOGY
& INDUSTRIAL DISTRIBUTION**
TEXAS A & M UNIVERSITY



Science Learning Activation: Positioning Youth for Success

ITEST PI Summit: May 14-15, 2018

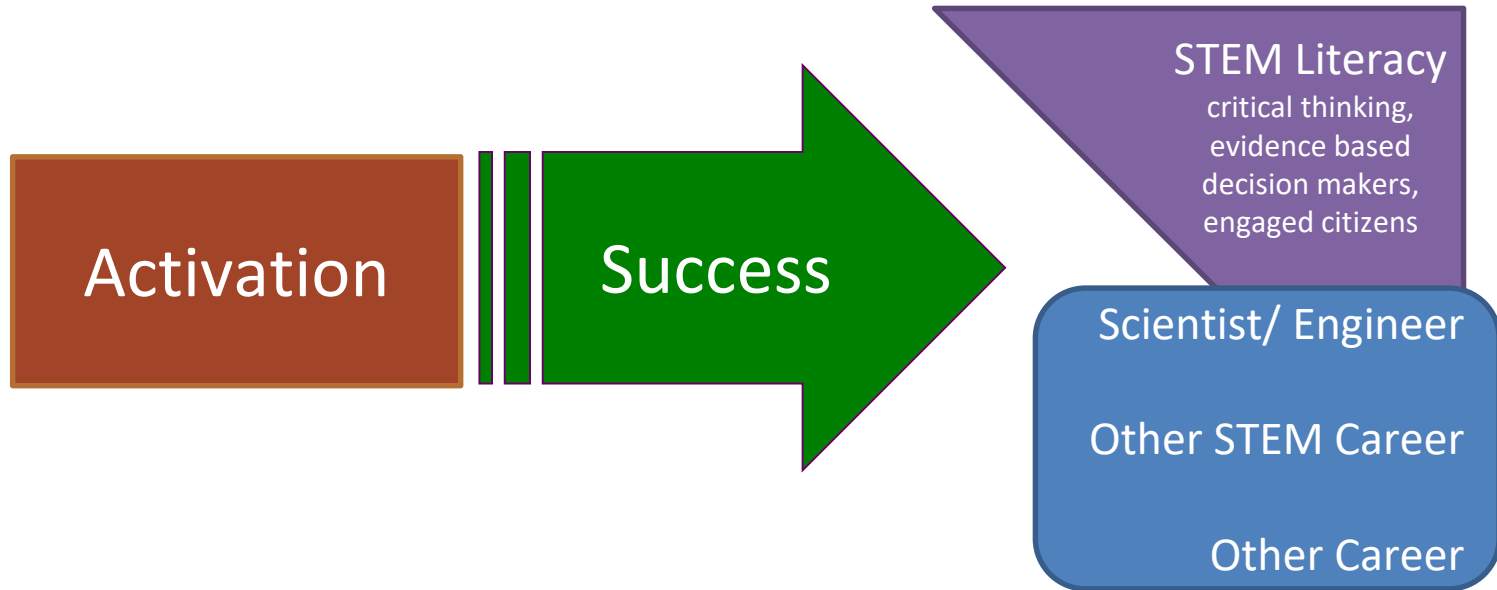
Guiding Question

What positions youth
for success in science learning?

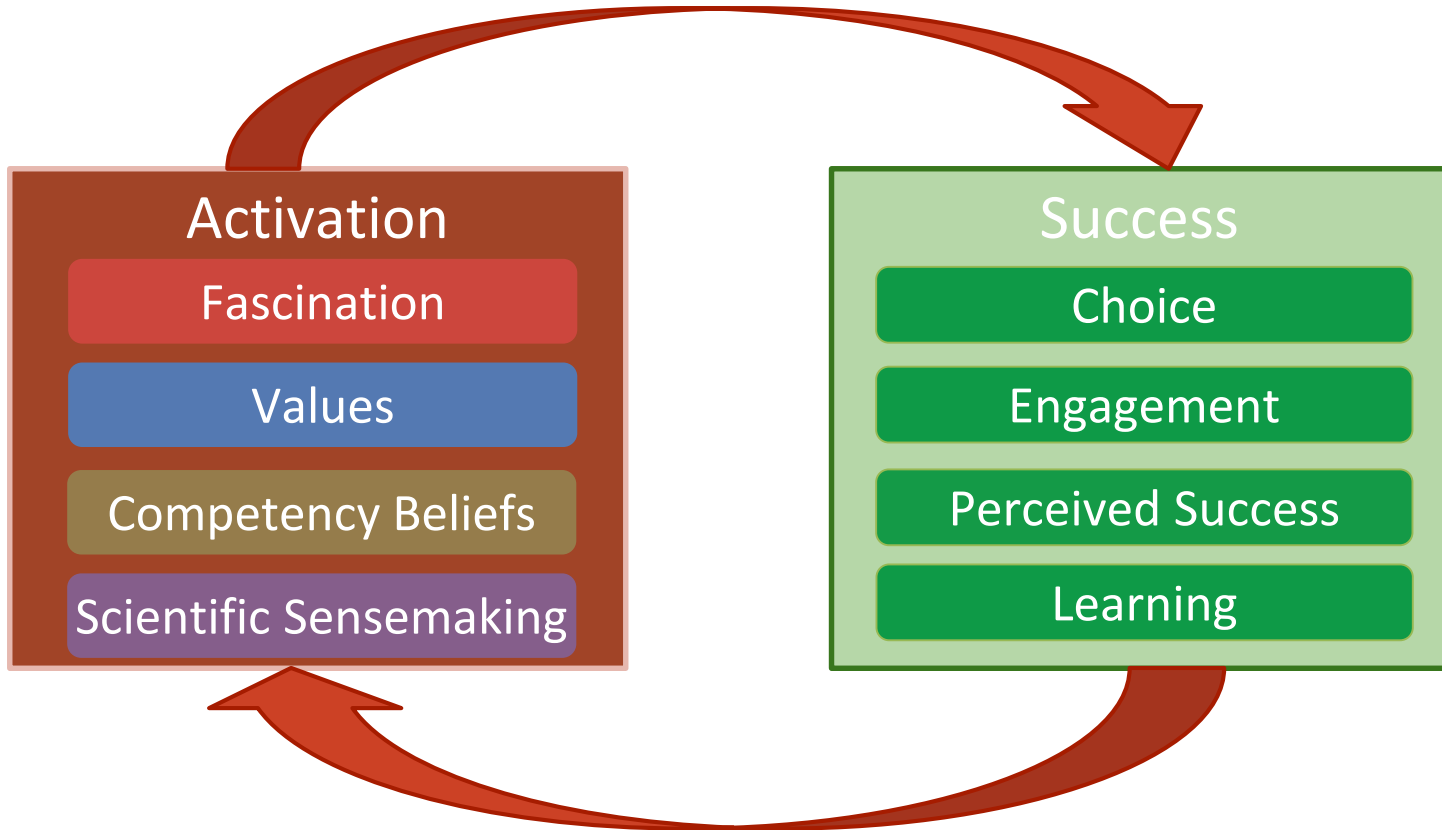
Theory of Activation

Science learning activation =

A composition of *dispositions, skills, and knowledge* that enables success in proximal science learning experiences.



Theory of Activation



Science Activation Dimensions

Fascination

A person's emotional and cognitive attachment with science topics and tasks.

Values

The degree to which a person values science, including the knowledge learned in science, the ways of reasoning used in science, and the role that science plays in families and communities.

Competency Beliefs

The extent to which a person believes that s/he is good at science.

Scientific Sensemaking

The degree of engagement with science-related content as an activity of constructing explanations across representations, using methods generally aligned with the practices of science (questions, experiment, evidence, explanation, and nature of science).

Success Dimensions

Choice

Choosing to participate in the next science learning opportunity (e.g. camp, museum visit, watching a science program).

Engagement

Includes affective, behavioral, and cognitive components (e.g. excited about materials, doing the science activities at hand, and thinking about science ideas).

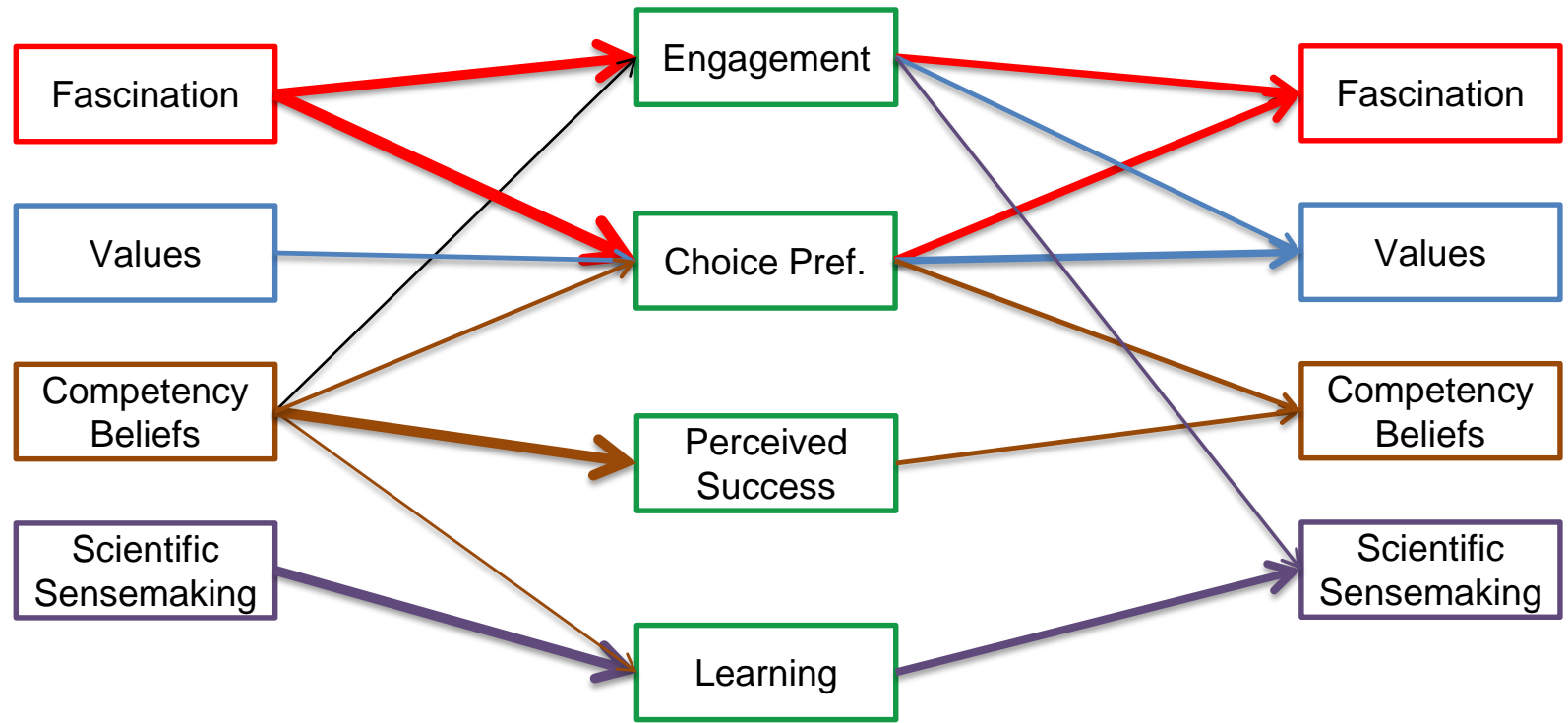
Perceived Success

Feeling successful in completing science learning tasks in absolute and relative terms.

Learning

Achieving the learning goals for a particular science experience.

Interactive Cycle



Thanks!



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THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

Emerging STEM Evaluation and Research Frameworks: Student Innovation Experiences Related to STEM Self-Efficacy and Research Confidence

Melissa K. Demetrikopoulos, Ph.D.
External Evaluator
Chair, Program Development and Evaluation
Institute for Biomedical Philosophy

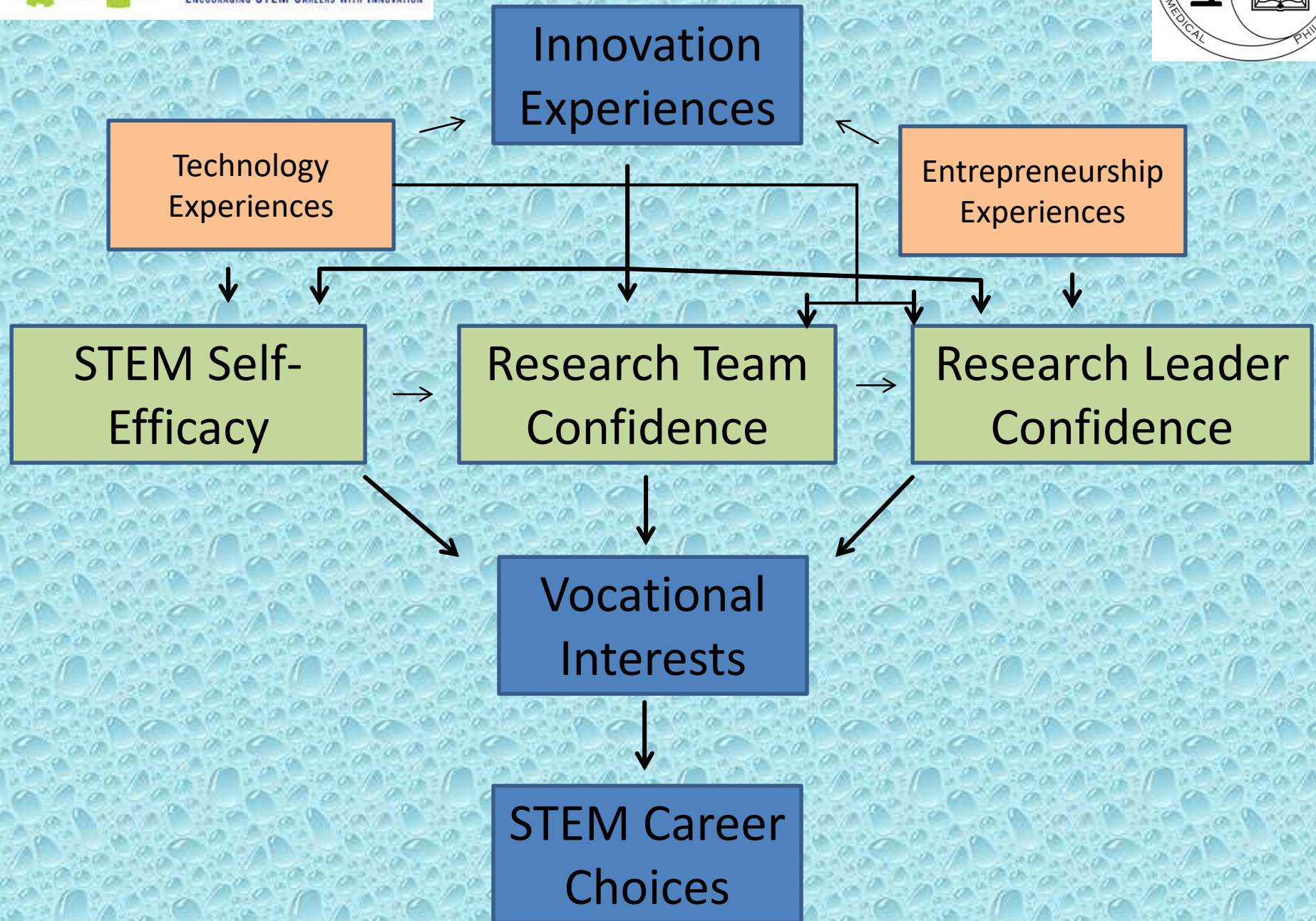


iSTEM - Innovative Science, Technology, Engineering and Mathematics Strategy Project:
Encouraging STEM Careers through Innovation
Cynthia E. Trawick, Ed.D. Principal Investigator,
Willie S. Rockward, Ph.D. & Tiffany R. Bussey, D.B.A. Co-Directors
Jamie P. Clayton, M.Ed. Program Manager
Morehouse College
Atlanta GA



Funded through the National Science Foundation ITEST grant (DRL-1512957)







Innovation Experiences

Technology Experiences

Entrepreneurship Experiences

STEM Self-Efficacy

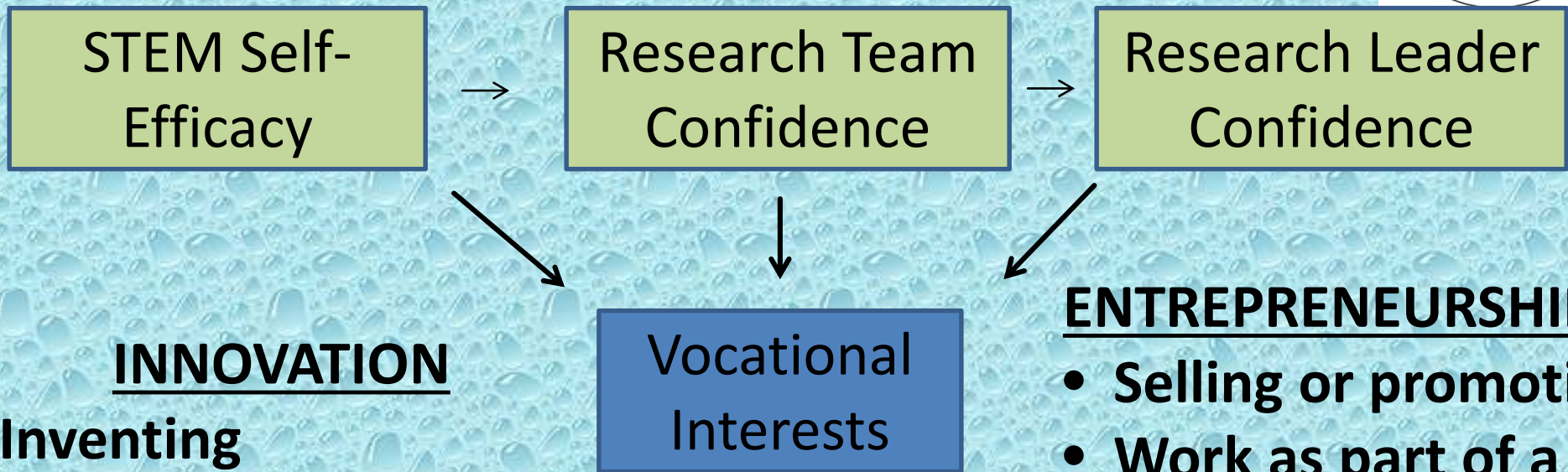
Research Team Confidence

Research Leader Confidence

- Overall STEM Self-Efficacy
- Science Self-Efficacy
- Math Self-Efficacy
- Technology Self-Efficacy
- Problem Solving Self-Efficacy
- Innovation Self-Efficacy

- Cooperate as a team member
- Easily take orders and follow instructions
- Ability to function on a team
- Can provide strong support for other members
- Know how to be a good team member
- Know what it takes to be a good leader
- Help team accomplish goals
- Ability to influence a team
- Know how to encourage good team performance
- Allow other team members to contribute





INNOVATION

- Inventing
- Designing
- Building or Constructing
- Problem solving
- Creating
- Innovating
- Change the World
- Try new things

ENTREPRENEURSHIP

- Selling or promoting
- Work as part of a team
- Leading a team

TECHNOLOGY

- Programming
- Using technology:
 - as part of a school assignment
 - as part of a job
 - for fun



Vocational
Interests



STEM Career
Choices

I Would like to be a scientist

I Could be a scientist

Scientist is a good career choice

I Would like to be an engineer

I Could be an engineer

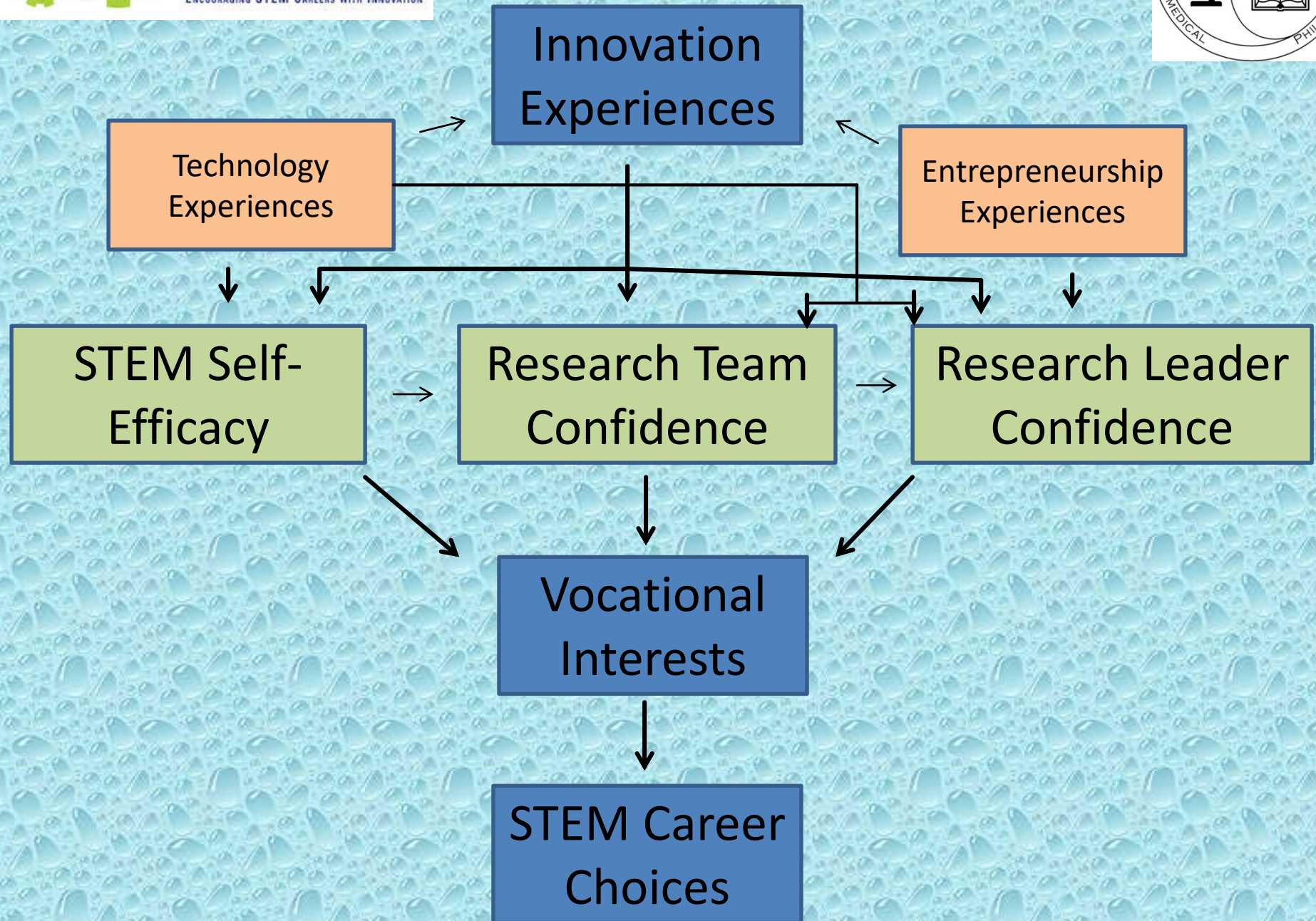
Engineer is a good career choice

I Would like to be a mathematician

I Could be a mathematician

Mathematician is a good career choice





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Questions



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