A close-up photograph of a person's face, with a world map painted on their skin. The person's eye is visible, looking directly at the camera. The background is dark, making the face and the map stand out.

**The Future is Here:** Learning in  
Action – Praxis, A Theory for CTE  
& 21st Century Learning

*How the future works today™*

**JIM BRAZELL**

[jim.brazell@ventureramp.com](mailto:jim.brazell@ventureramp.com)



Story of 3R's

A Learning Theory for CTE-  
STEM & the 21<sup>ST</sup> Century

A Story of Shifting from  
STEM to *TEAMS*

When I say Maui, do you  
think science and technology  
or innovation?

“I do not think Maui is any different than the mainland...post industrialization has placed greater demands on math and education.”

–Rose Yamada, elder

rigor = old  
knowledge--*the*  
*fundamentals.*

# Talk Story

Maui Community College  
April 13-18, 2008



<http://www.flickr.com/photos/fotographis/528878003/sizes/o/>



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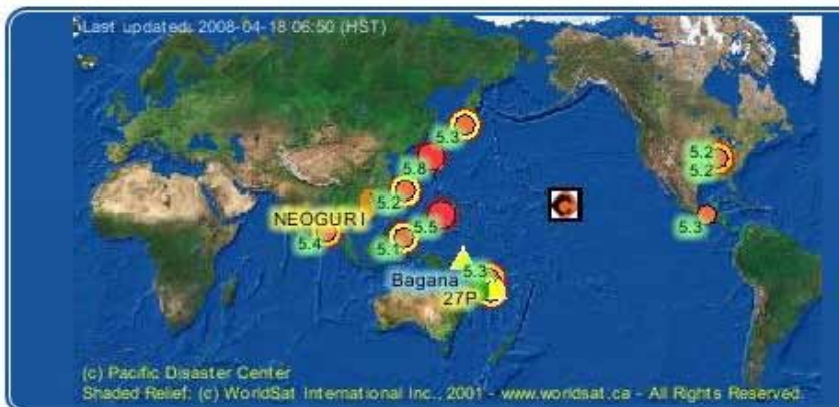
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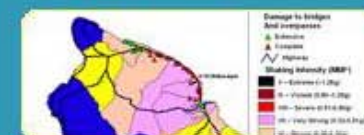
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relevance = currency  
to the *world*—past,  
present and/or  
future.

relationships =

*systems.*





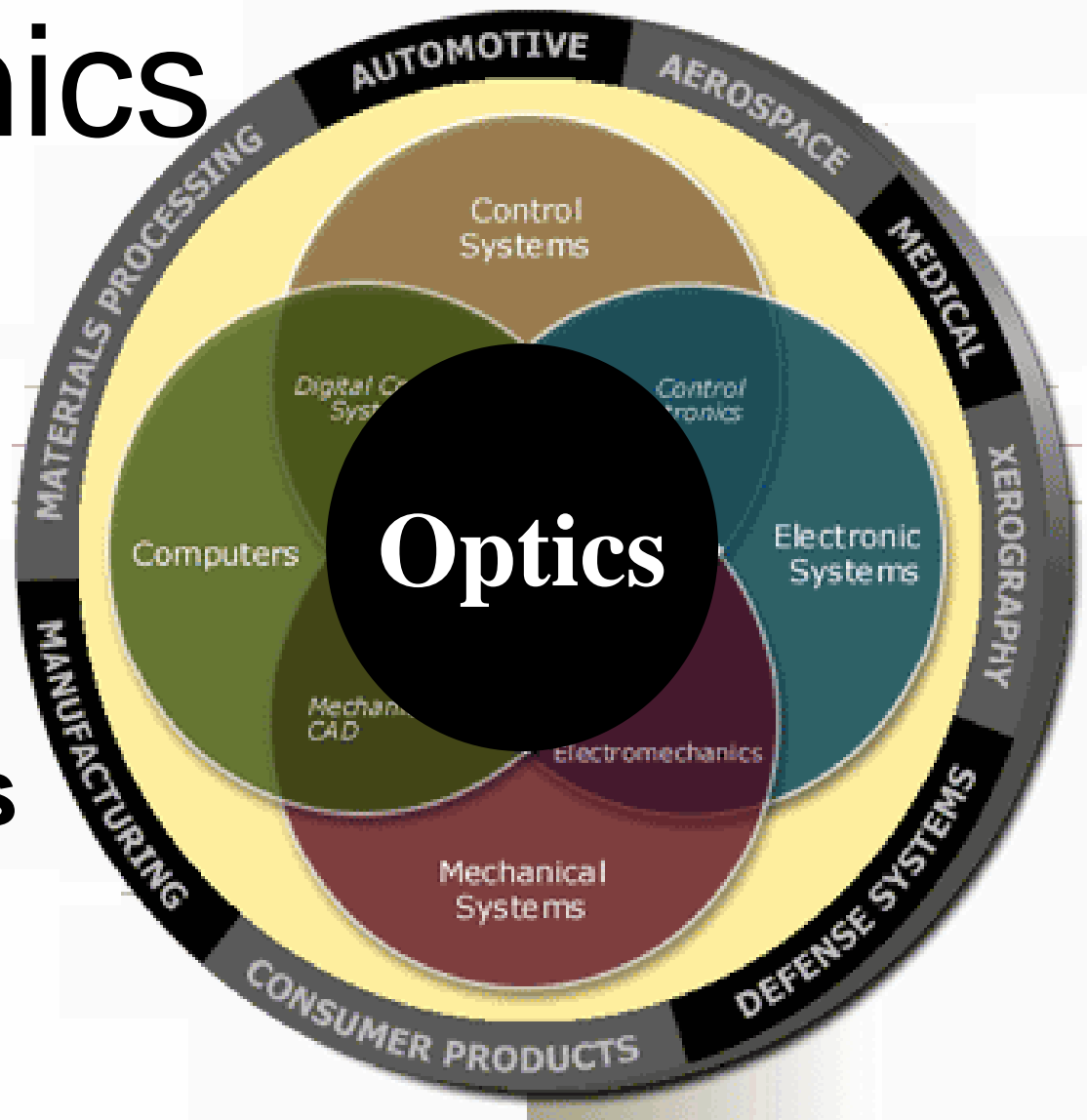


# Mechatronics

The synergistic combination of **mechanical engineering, electronics, control systems and computers.**

**Mechanical, Aerospace, and Nuclear Engineering Departments at RPI**

All Contents Copyright(C) 2001 Mechatronics Lab at RPI

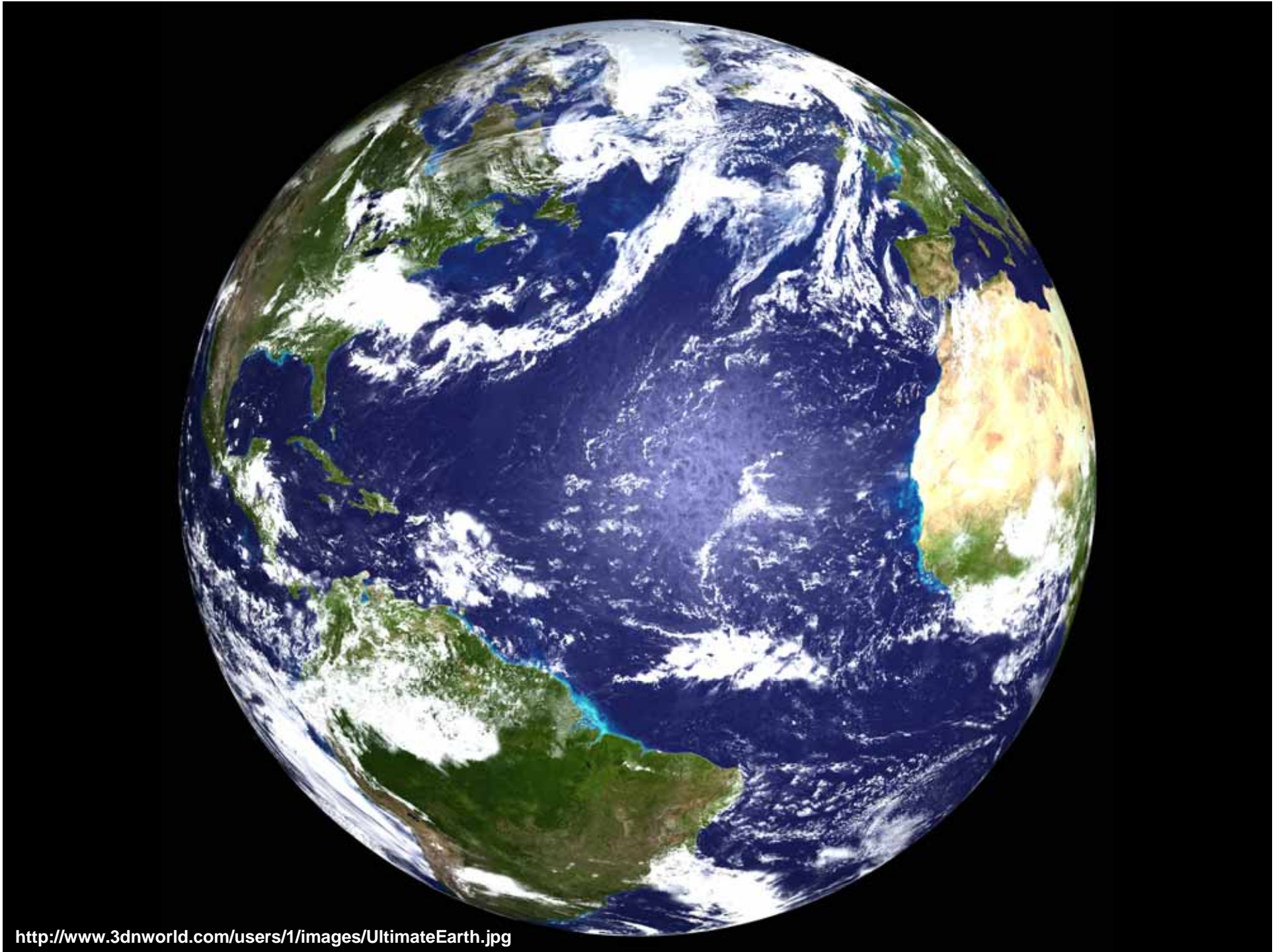




## Opto- Mechatronics Technician

# Hawiiian Translation

“Ahupua'a”



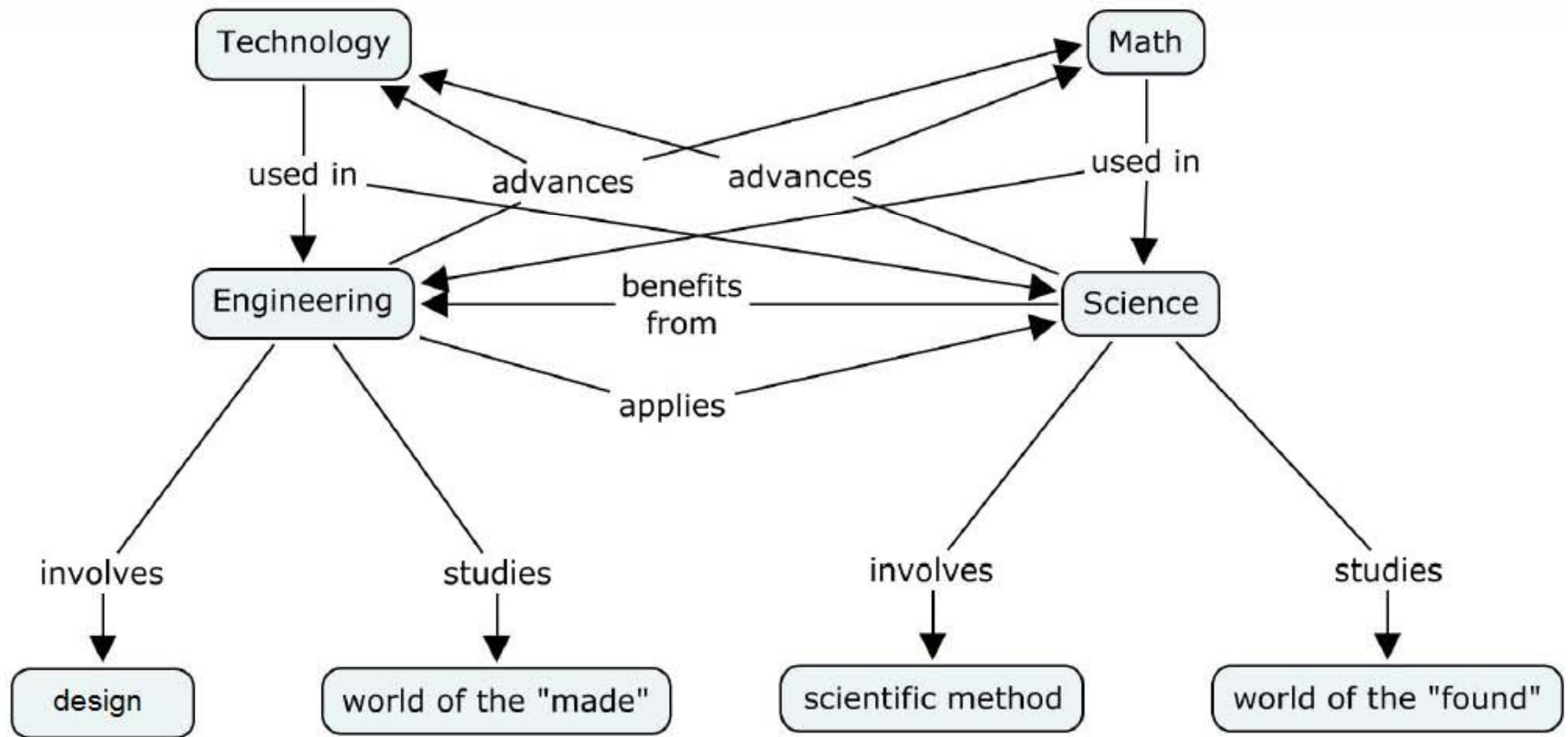
<http://www.3dnworld.com/users/1/images/UltimateEarth.jpg>

**“Ahupua’a”**

**Integrated, wholistic  
system**

“I am looking at the intersection of these technologies—where they overlap.” --Mark Hoffman, ECET Program Coordinator, MCC





Dr. David Thornburg, Center for Professional Development. Adapted by Jim Brazell, VentureRAMP, Inc.

relationships =

*systems.*

rigor = old  
knowledge--*the*  
*fundamentals.*

# Hawiiian Translation

“Ho’ohanalima”

“Ho’ohanalima”

**Learning by doing**



**Environmental impact study during the reconstruction of Koie'ie Fishpond located in north Kihei– Kihei Charter School**

# Makena Hawaiian Green Sea Turtle Fibropapiloma Virus Study– Kihei Charter School





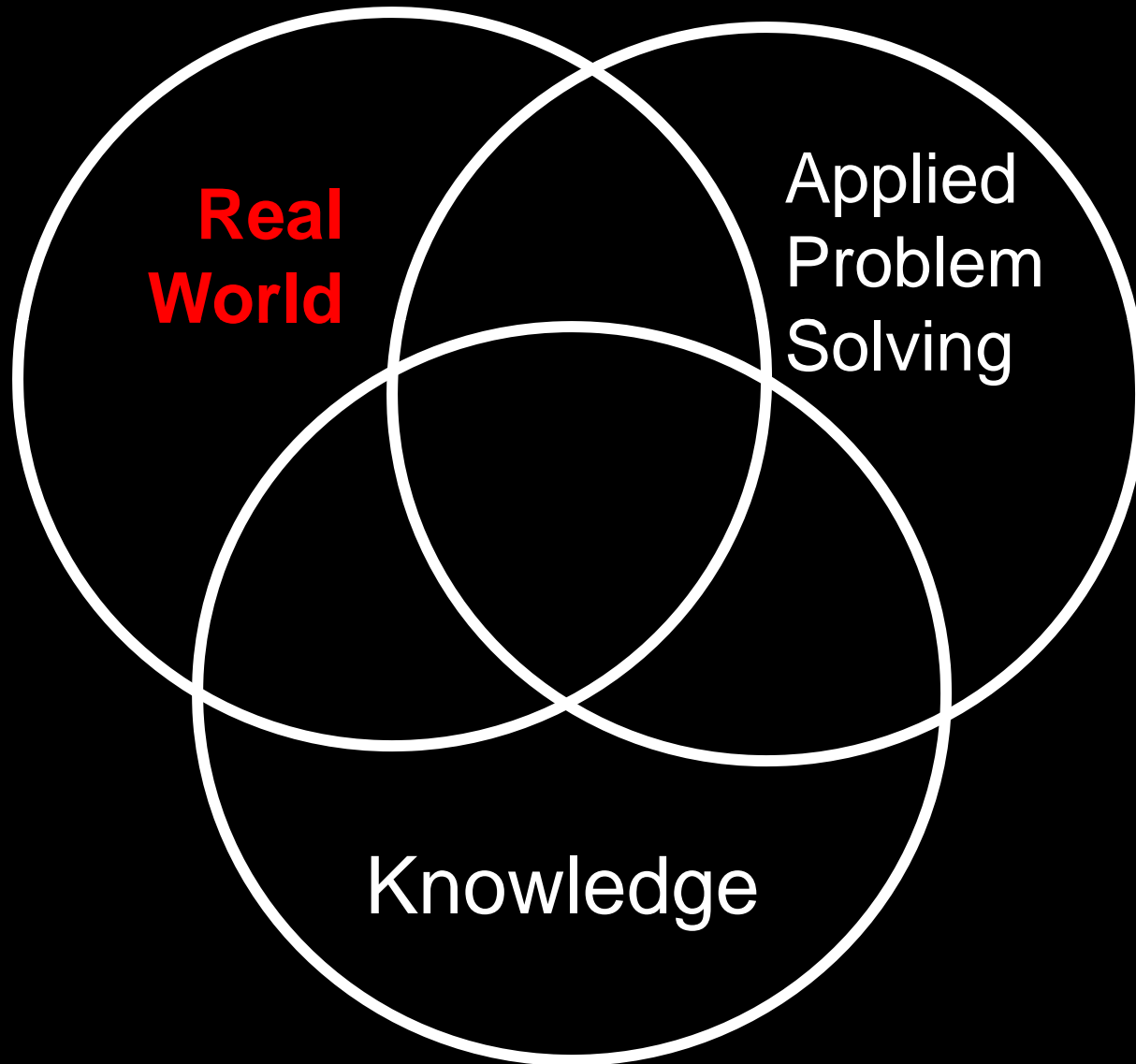
**Opihi Population Health Assessment Research Study– Kihei Charter School**



**Waipulani  
Longitudinal Algae  
Research Project –  
Kihei Charter School**

# Transdisciplinarity

Unification, theory action and the world.



relevance = currency  
to the *world*—past,  
present and/or  
future.

# Talk Story

Maui Community College  
April 13-18, 2008



<http://www.flickr.com/photos/fotographis/528878003/sizes/o/>

**Our product line is inventions.”**  
–Dan O’Connel, CEO



**HNU·SOLAR**  
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Story of 3R's

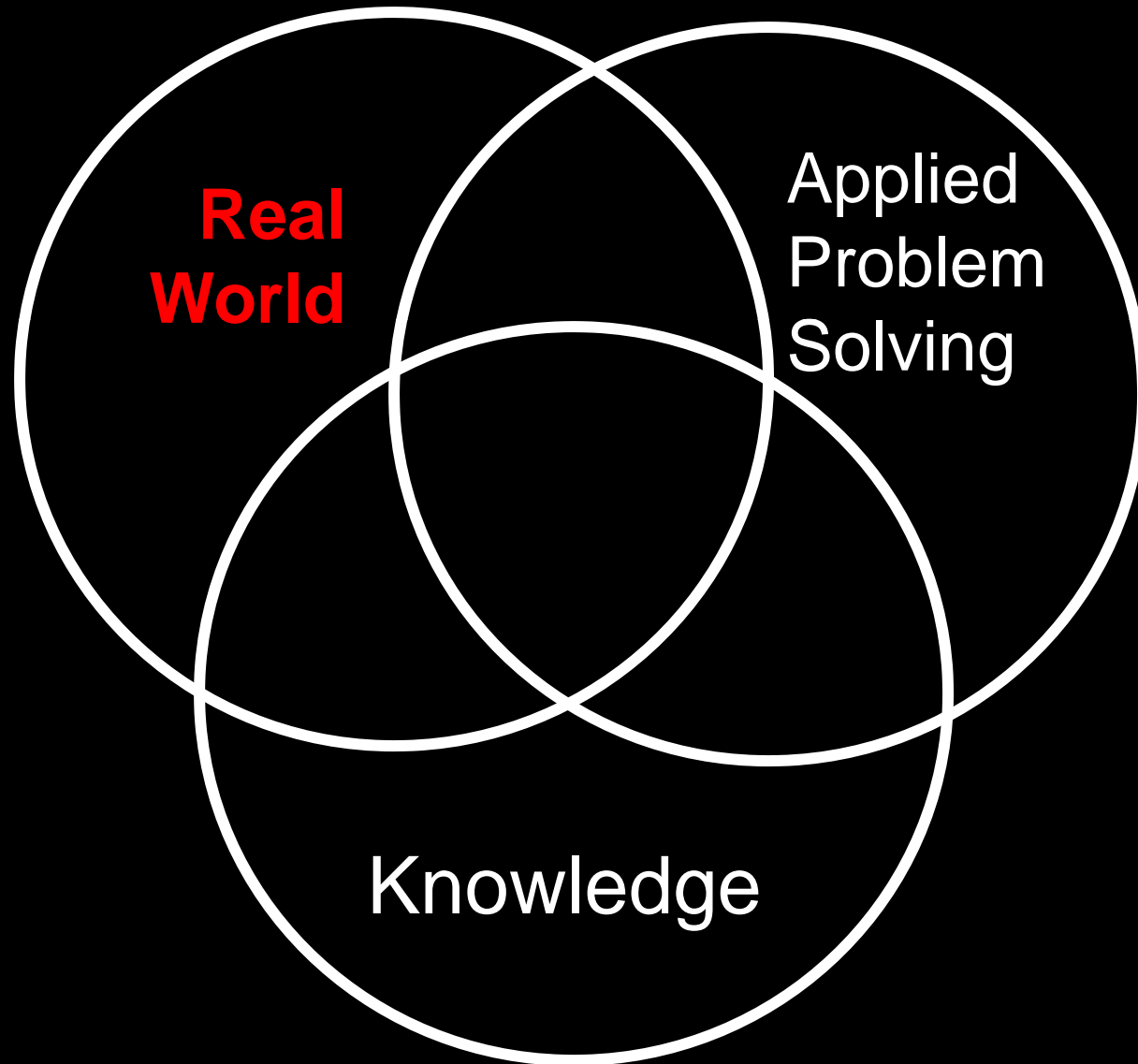
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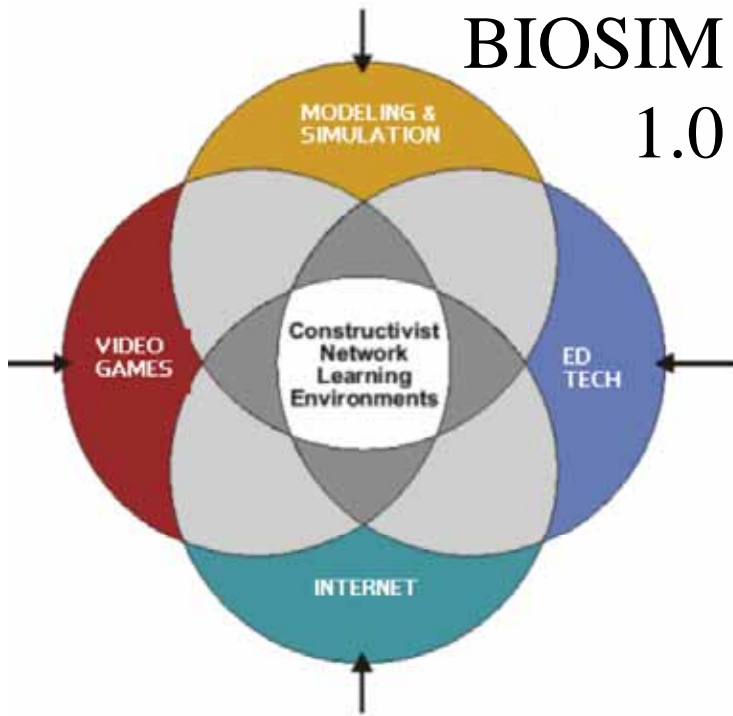
1

# Transdisciplinarity

Unification of theory, action and the world.



# BIOSIM 1.0



[www.andrew.cmu.edu](http://www.andrew.cmu.edu)

Yang Cai, Ingo Snel, Betty Chenga, Suman Bharathi, Clementine Klein d, Judith Klein-Seetharaman; Carnegie Mellon University, University of Frankfurt, Research Institute, University of Pittsburgh School of Medicine.

# Education shift

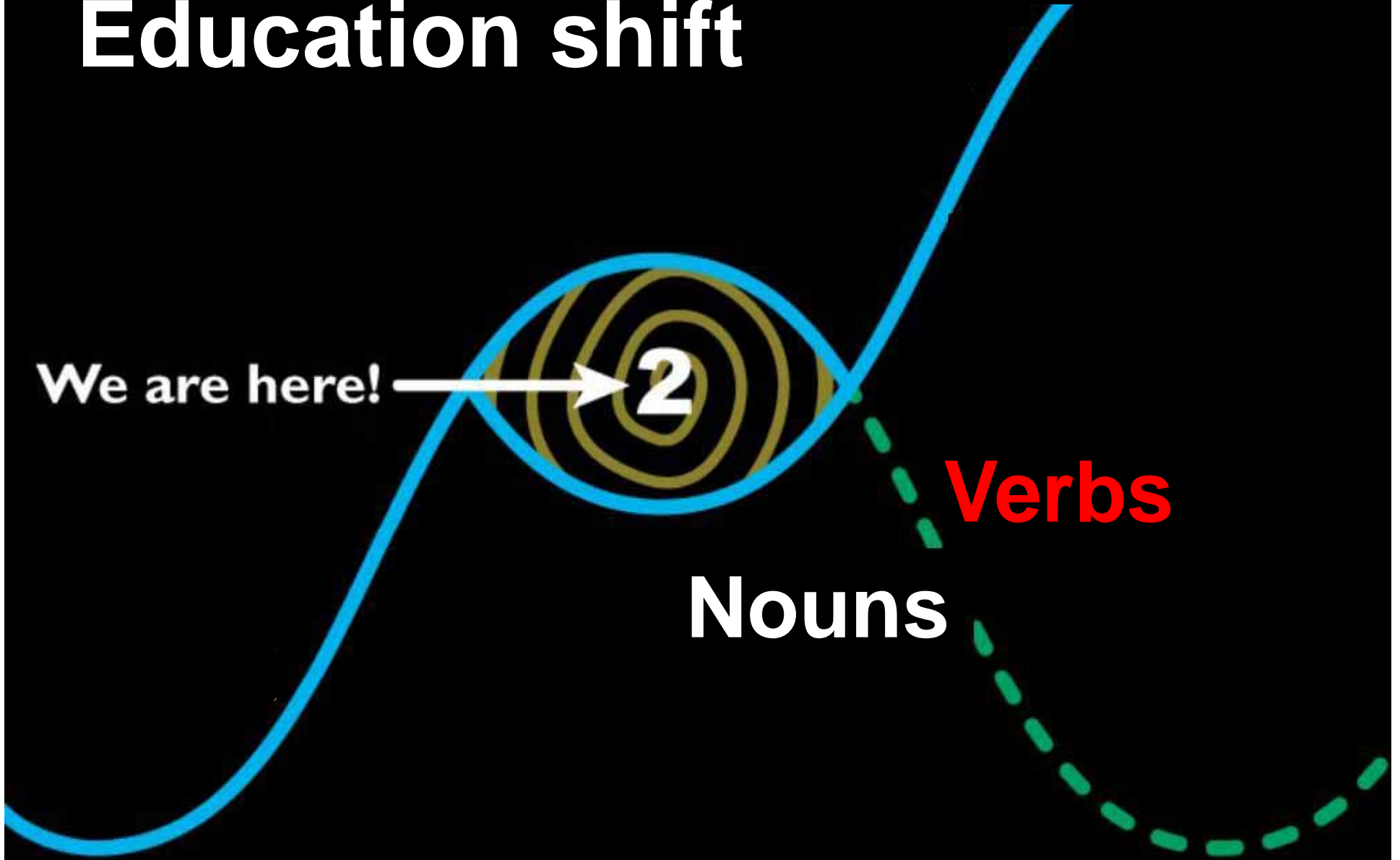
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**2**

**Verbs**

**Nouns**



# Whyville.net

a Pasadena Company



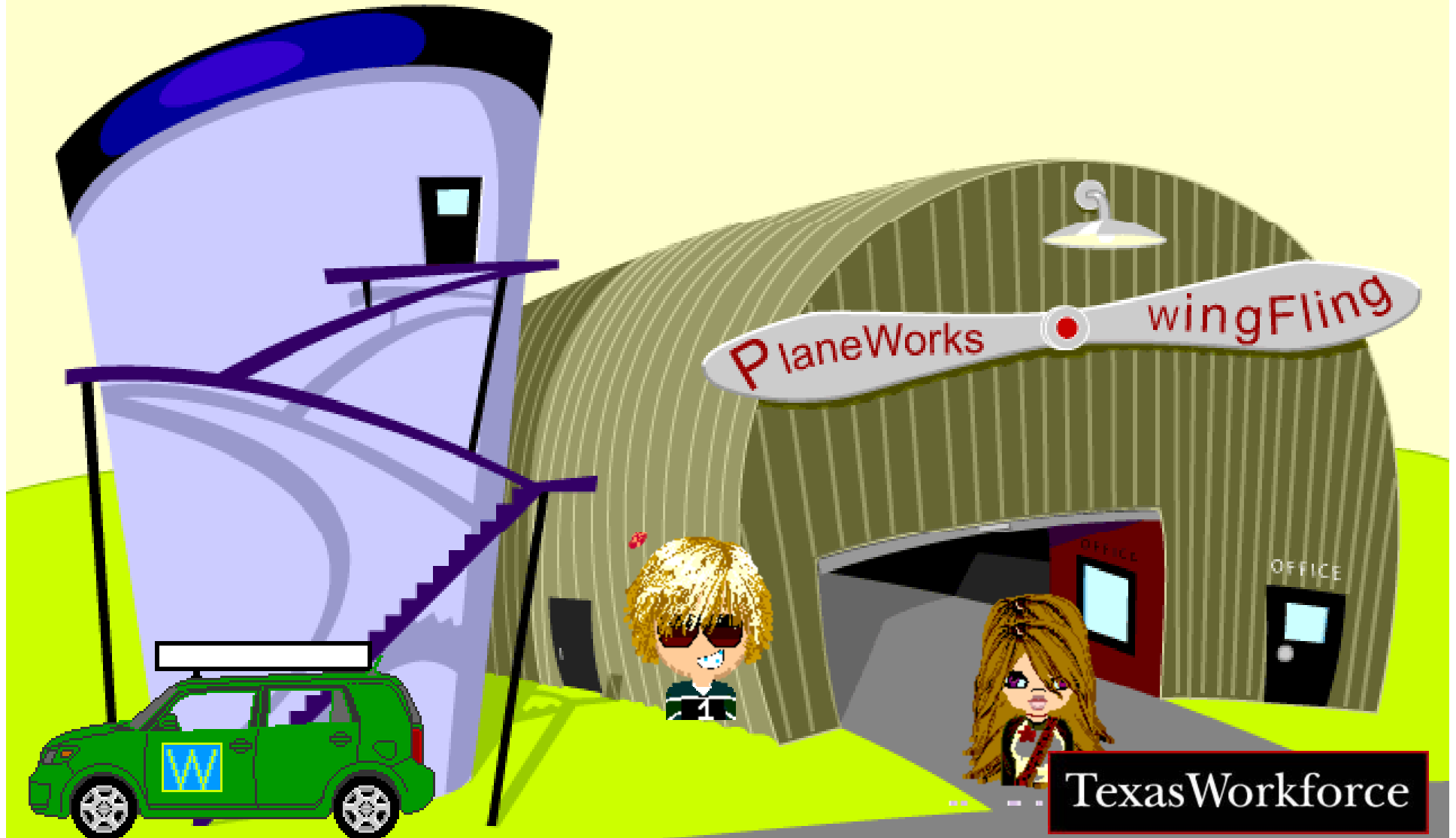
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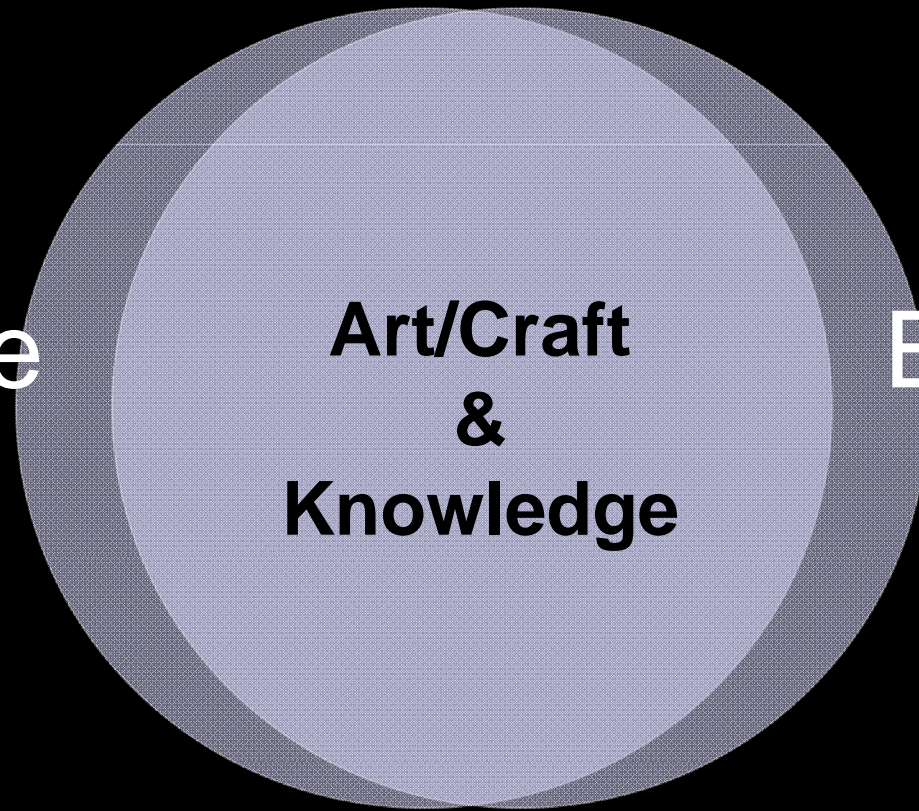


# Mind Body Unification

Techné

Art/Craft  
&  
Knowledge

Episteme



# Education shift

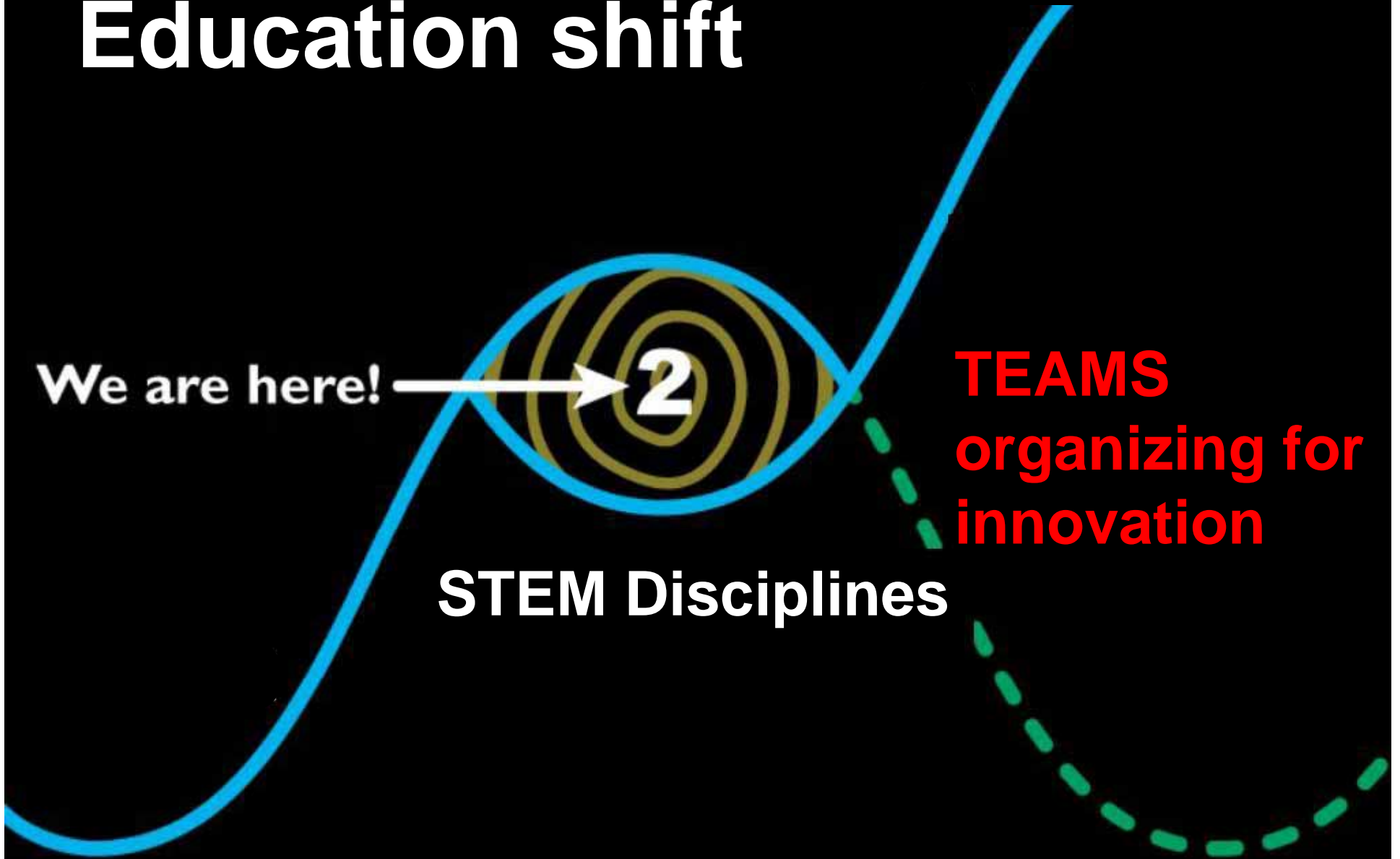
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**2**

**TEAMS  
organizing for  
innovation**

**STEM Disciplines**



2

# Education shift

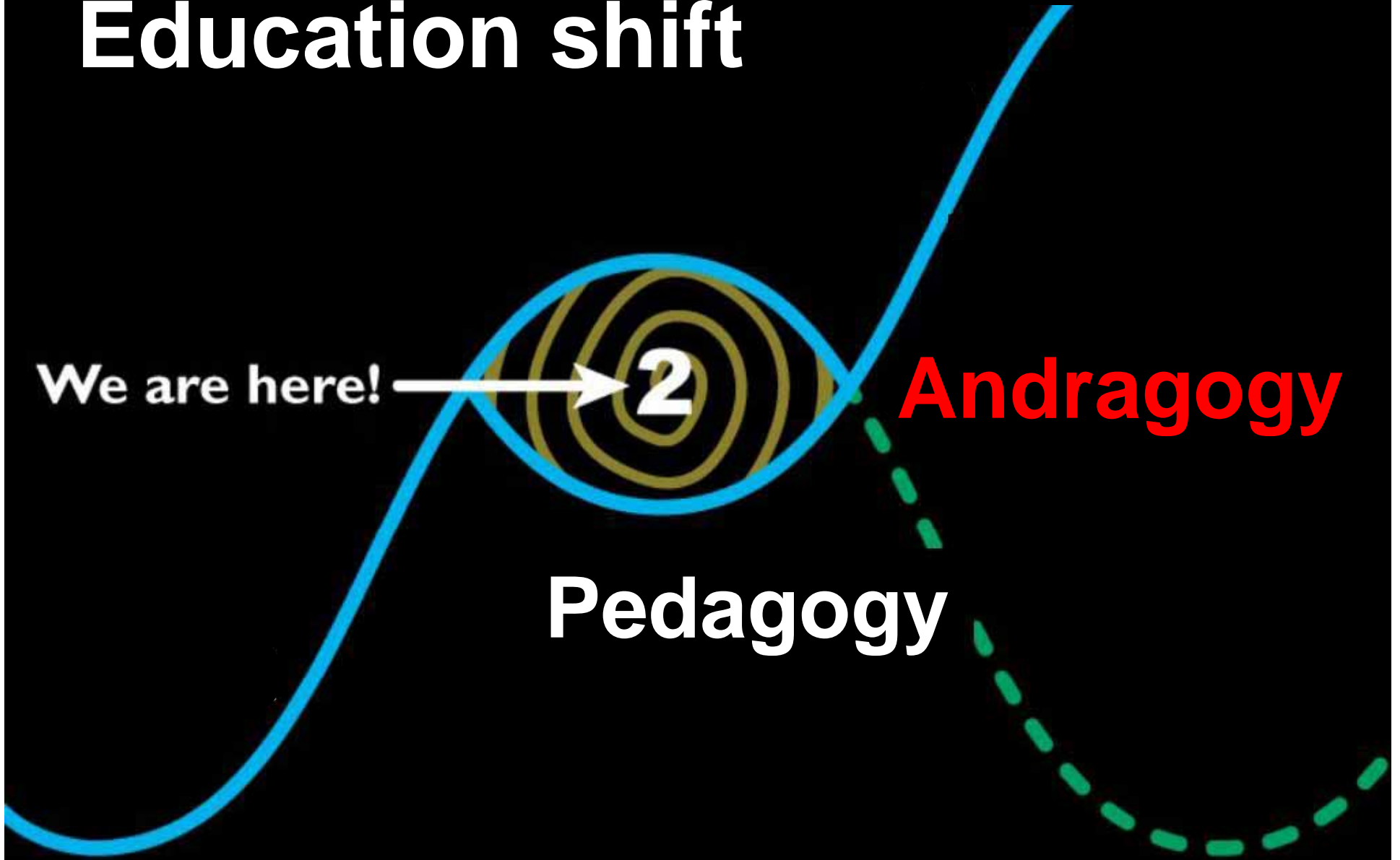
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**2**

**Andragogy**

**Pedagogy**



Knowles' theory can be stated with six assumptions of adult learning:

1. **Adults** need to know the reason for learning something (Need to Know)
2. Experience (including error) provides the basis for learning activities (Foundation).
3. **Adults** need to be responsible for their decisions on education; involvement in the planning and evaluation of their instruction (Self-concept).

Knowles' theory can be stated with six assumptions of adult learning:

1. **CTE students** need to know the reason for learning something (Need to Know)
2. For **CTE students** experience (including error) provides the basis for learning activities (Foundation).
3. **CTE students** are responsible for their decisions on education and involved in the planning and evaluation of their instruction (Self-concept).

Knowles' theory can be stated with six assumptions of adult learning:

4. **CTE students** are most interested in learning subjects having immediate relevance to their work and/or personal lives (Readiness).

5. **CTE learning** is problem-centered rather than content-oriented (Orientation).

6. **CTE students** respond better to internal versus external motivators (Motivation).

# Education shift

We are here!



**2**

**Andragogy**

**Pedagogy**

