Think Like an EcoSystem: Cognition + Affect = Effect

Marda Kirn
EcoArts Connections

BECC Conference
November 19, 2013
Conservation of Mass

Solid Mechanics:

\[ \text{mass \#1} \quad \text{Move} \quad \text{mass \#2} \]
\[ \text{Volume \#1} \quad \quad \quad \quad \text{Volume \#2} \]

Fluid Statics:

\[ \text{mass \#1} \quad \text{Move} \quad \text{mass \#2} \]
\[ \rho = \text{Density} \quad \rho = \text{Density} \]
\[ \text{Volume \#1} \quad \text{Volume \#2} \]

Object keeps shape.

Fluid Dynamics:

\[ \text{mass \#1} \quad \text{Move} \quad \text{mass \#2} \]
\[ \text{V = Velocity} \quad \rho t V A \]
\[ \text{A = Area} \quad \text{A = Area} \]
\[ \text{tV}_1 \quad \text{tV}_2 \]

Object changes shape

- \[ (\rho V A)_2 = (\rho V A)_1 \]
- \[ (\rho V A)_2 = (\rho V A)_1 = \text{constant} \]

Slide source: Tim Butler, Director of the Center for Urban Ecology
Butler University, Indianapolis
Levitated Mass by artist Michael Heizer

Slide source: Tim Carter, Butler University
EcoArts 2006
July 6–16

PERFORMANCES  EXHIBITS  TALKS  TOURS

Program Highlights:
- Performances: Colorado Shakespeare Festival "The Tempest" July 6, 13, 14 • Colorado Music Festival: Kronos Quartet July 11, Symphonic Music July 13–14 • Elko & Koma in Denver July 8, in Boulder July 14–15
- Exhibits: Museum of Contemporary Art/Denver Creative Arts That Matter: The Environment, North, South, East, West; 360° of Climate Change • National Center for Atmospheric Research: Climate Discovery
- Tours: Eco-Cycle Recycling Center July 7 • ReSource Building Materials Sales Yard July 8 & 15
- Thorne Ecological Institute: Saberwo Marsh July 7 • Valmont Station Coal-Fired Plant July 7 & 15

www.ecoartsonline.org for a full schedule of events 303.325.5637
climate challenge
EcoArts gathers artists and scientists to spark dialogue on global warming
by Grace Hood
ecoarts
SEPT 14–OCT 6 2007

OVER 25 MAJOR
SCIENCE,
ENVIRONMENTAL,
ARTS, INDIGENOUS,
AND OTHER
ORGANIZATIONS
PRESENTING EXHIBITS,
PERFORMANCES,
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The Big Question

Why is it that so many people know about climate change and sustainable solutions but so few people are doing anything about them?
RESEARCH


Cognition + Affect = Effect
Cognition + Affect = Effect

Mind
Intellect
Facts
Reasoning
Analysis

Heart
Emotions
Feelings
Attitudes
Beliefs
History of Art & History of Science
The Arts & Religion
The Arts & Advertising

CAMEL
PLEASURE
To
BURN

SURGEON GENERAL'S WARNING: Quitting Smoking
Now Greatly Reduces Serious Risks to Your Health.

SINCE 1913
The Arts & Education Entertainment
The Arts
Inspiring Political Change
# The Brain: Two Information Processing Systems*

## Analytic
- Logical
- Deliberative
- Perceives reality in abstract symbols, words, numbers
- Rules and algorithms need to be learned – does not happen automatically

**Examples**
- Numerical statistics in tables, figures, graphs, charts

## Experiential
- Holistic
- Intuitive
- Emotion-driven (fear, dread, anxiety)
- Perceives reality in concrete images and narratives, linked in associations
- Operates automatically and without any training

**Examples**
- Images or stories
- Emotionally charged and vivid

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*“The Psychology of Climate Change Communication,” Center for Research on Environmental Decisions, Earth Institute, Columbia University*
Fixing the Communications Failure*

- Community
- Equality
- Egalitarian and communitarian values
- Suspicious of commerce and industry
- Believe environmental risks should be restricted
- Trust brown-haired bearded male in a denim shirt
- Individualism
- Authority
- Hierarchical values
- Prize personal initiative
- Admire commerce and industry
- Dismiss evidence of environmental risks
- Trust grey-haired male in a suit

Source: Chris Jordan  www.chrisjordan.com
Source: Kim Abeles  www.kimabeles.com
Presidential Commemoration
Smog Plate Series

Informative "table" accompanying each Smog Collector Sculpture (Sixty Days of Smog) while it was on-site gathering smog, and during the extensive tour of the completed works to businesses and organizations throughout southern California.

**On-site Smog Collector Sculpture Project.** In 1991, the California Bureau of Automotive Repair, Department of Consumer Affairs sponsored on-site Smog Collector Sculptures by Abeles as a unique campaign to inform citizens about the Smog Check Program and facts about smog. Midway through the project, February 1992, the media’s support for the campaign was said to be unprecedented, reaching 30 million people and a total dollar equivalent media value of close to $3 million. The completed sculptures toured to forty corporations and agencies during 1992, primarily to encourage participation in rideshare programs and use of mass transit. In 1992, Abeles received a Clean Air Award from the South Coast Air Quality Management District (AQMD) for this project.

The Smog Collector Sculptures were created from recycled automobile mufflers and catalytic converters, each holding a cut stencil image on plexiglass. Placed in the environment, visitors to the sites saw the accumulation of particulate matter deposited by the polluted air onto the stencils. For each sculpture, Abeles created an accompanying informative "table" using visuals and text in English and Spanish to describe solutions for cleaner air. The table displays were an effort to empower the audience with facts and phone numbers for further information. After eight weeks, the stencils were removed from each sculpture, revealing the images made of smog: lungs, heart, cityscape, artery system, tree, automobile engine, and a wheel of walking legs.

**Smog Collectors Sculpture (Sixty Days of Smog), 1991-92.** Welded vehicle exhaust systems, bilingual text, images made of particulate matter (smog) on plexiglass gathered at California State University, Fullerton. Funded by the California Bureau of Automotive Repair, Department of Consumer Affairs.
The Storm

Source: John Flax, Theater Grottesco  www.theatergrottesco.org
“FLOW” and the “Raindrop” App
WATERSHEDS: HUCs, sewersheds

FLOW PATHS: streams, ditches, sanitary / combined / storm sewer
The Arts & Health
xCLINIC – Environmental Health Clinic & Lab

Source: Natalie Jeremijenko  www.environmentalhealthclinic.net
**AGBAG FEATURES**

**HOW IT WORKS TO PROVIDE AN INTENSIFIED AND BIODIVERSIFIED GROWING ENVIRONMENT**

**SYSTEM CHARACTERISTICS:**
- System minimized root space and maximizes leaf area index via
- Root to shoot ratio characterization of plants (e.g., vines)
- Perrenial (storing nutrients over winter) --> imp to building interacting pollinators/birds and biodiversification
- Scaled to be manageable by one or two people: strategy of scaling thru aggregation of small action vs scaling thru tractor/heavy equipment scaling; because urban systems have large number of i-people, whereas rural context defined by low human to plant ratio
- Scaled to work within safety margins of legacy buildings and building codes
- Modular / inexpensive / aggregatable / networked agriculture system
- Using urban structures to access solar resources; (that would not be accessible in 2-d agriculture / community garden); exploits 3-d space filling algorithms; and existing structural investment; coupling
- Changes the scale (by approx 3 orders of magnitude) of what is possible in urban agricultural context

**GENERAL SYSTEM NOTES:**
- Tyvek / air permeable water proof and high tensile
- Puncture resistant
- Upcycled material (theoretically)
- Single HDPE material, no leaching, no binders
- Using counter balancing for safe non destructive fastening that can be added to any railing, double hung window, parapet or existing structure
- Load bearing on railings (mass is less than a person)
- White titatium dioxide acts photocatalyzes the breakdown of common urban air pollutants NOx SOx

**AIR SOIL LAYER**
- The tyvek material provides moisture barrier for loss of water thru air soil layer ... retains moisture and simulates supports green mulching, provides habitat for snails and other leaffilter inhabitors
- Luxrury snail housing for snails; soil indicators; vertical grazing
- Easy access for incorporating food scraps and cellulotic waste
- Can also support modest vermiculture

**RHIZOMIC SPHERE/ROOT LAYER**
- Because of breathable fabric oxygenated soil is spread around the bag surface rather than just on top in traditional planter agbag has more root space for close companionship
- Show air permeability oxygenated depth from the surface of the bag: ~1-2
- Variable soil conditions

**MEMBRANE BT WATER RESEVOIR AND SOIL**
- To control soil moisture and wetting rate
- 2 x parameters of control
- Attenuates wicking connection to soil thru surface area
- Controlling polymer moisture release rate to soil
- Can design different soil conditions (wetland/marsh agriculture to highly drained ...)

**SUB IRRIGATION SYSTEM**
- Stimulates moisture seepage from large soil banks; damp/wet/dry cycle and associated plant stress)
- Soft and expandable water reservoir
- Maximizes space use
- Releases dissolved nutrients to plants; 777 NPK (current) i.e. plants are not nutrient limited despite constrained rootspace
Case Study:
NOAA Science On a Sphere® (SOS)
Thank You!

Artists
Kim Abeles
John Flax, Theater Grottesco
Natalie Jeremijenko, xCLINIC
Chris Jordan
Mary Miss

People/Entities
Tim Carter, Center for Urban Ecology, Butler University
Shilpi Gupta, NOAA