CENTER FOR RESEARCH ON LEARNING & TEACHING
UNIVERSITY OF MICHIGAN

Advances in Business and Engineering Education

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Think-Pair-Share

Thinking big picture, what are one or two things you want your students coming out of your program to be able to do?

Think-**Pair-Share**

Partner up with someone near you:

- Compare the goals you have for your students.
- If you are from different schools, how are your goals similar? Different?
- If you are from the same school, brainstorm with your partner what you think faculty from another school might have in common with your goals

Creativity:
Show of Hands

How many of you discussed creativity as one of your goals for students?

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Creativity:
Show of Hands

How many of you believe creativity is a skill that can be learned?

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Research on Creativity

Seda Yilmaz,
Iowa State

Colleen Seifert,
University of
Michigan

Shanna Daly,
University of
Michigan

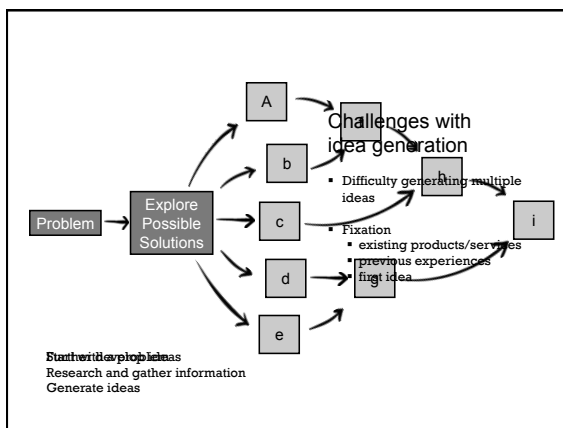Richard Gonzalez
University of
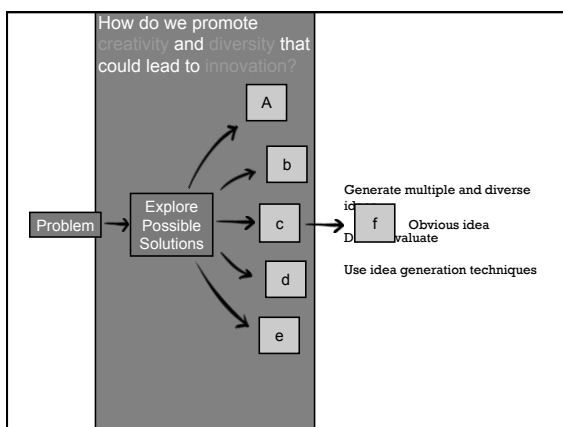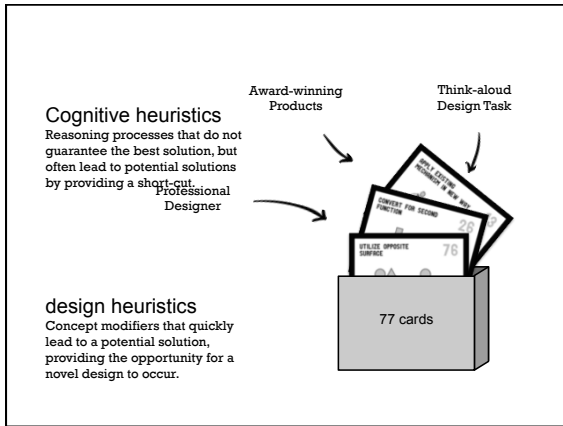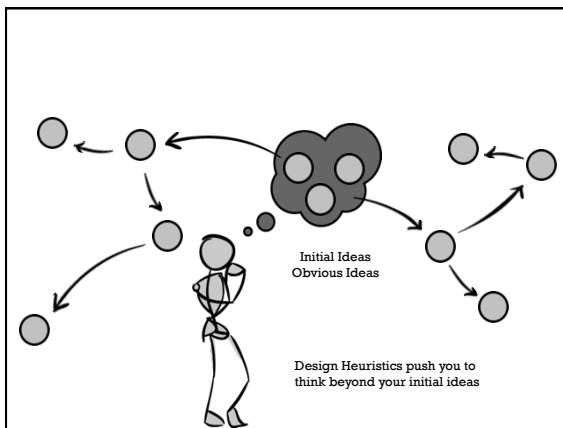Michigan

Experiential Learning

DESIGN HEURISTICS
77 CARDS

Shanna Daly, PhD   Seda Yilmaz, PhD
James Christian, ME   Colleen Seifert, PhD
Richard Gonzalez, PhD

A
b
c
d
e

Problem → Explore Possible Solutions

Challenges with idea generation

- Difficulty generating multiple ideas
- Fixation
  - existing products/services
  - previous experiences
  - first idea

Start with a problem
Further develop ideas
Research and gather information
Generate ideas

How do we promote creativity and diversity that could lead to innovation?

A
b
c
d
e

Problem → Explore Possible Solutions

Generate multiple and diverse ideas
f   Obvious idea
Develop/Evaluate

Use idea generation techniques

Cognitive heuristics
Reasoning processes that do not guarantee the best solution, but often lead to potential solutions by providing a short-cut.

Award-winning Products

Think-aloud Design Task

Professional Designer

design heuristics
Concept modifiers that quickly lead to a potential solution, providing the opportunity for a novel design to occur.

77 cards

Initial Ideas
Obvious Ideas

Design Heuristics push you to think beyond your initial ideas

APPLY EXISTING MECHANISM IN NEW WAY 13

Consider whether existing products or their components can fulfill the desired function. This can facilitate reuse of existing products, make the design process more efficient, and expand the pool of options.

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APPLY EXISTING MECHANISM IN NEW WAY

13
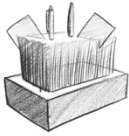
PRATONZOLO
Max Battaglia
This desk organizer uses brush bristles to hold pens, pencils, and business cards.

WANTUZ
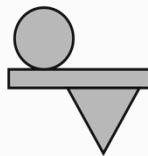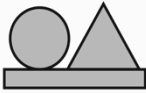*Reha Erdogan*
Hand vacuum cups are used to transport large sheets of glass. Here, they are used to hold the seat and back of this chair in place.

UTILIZE OPPOSITE SURFACE

76

Create a distinction between exterior and interior, front and back, or bottom and top. Make use of both surfaces for complimentary or different functions. This can increase efficiency in the use of surfaces and materials, or facilitate a new way to achieve a function.

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UTILIZE OPPOSITE SURFACE

76

980 TATOU
Annika Luber
The laces wrap around the bottom of this shoe and connect with the sole.

FARALLON CHAIR
fuseproject
The back side of this chair has a pocket for storage.

CONVERT FOR SECOND FUNCTION 26

Create multiple stable states of the product, where each state defines a separate function. Transitions between these states can be achieved through rearranging, reorienting, and attaching or detaching components. This can allow multiple functions to be incorporated into one product.

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CONVERT FOR SECOND FUNCTION 26

GRAVITY BALANS
Peter Opsvik
This recliner has multiple stable stages, allowing the user to kneel upright, or recline by leaning back and finding a balance point.

AKIRA TABLES
Coalesse Vecta
This table features a folding top that can flip up or down, making it useful as a room divider.

CONCEPT GENERATION WITH DESIGN HEURISTICS

Read through your set of Design Heuristic Cards.
Be sure to look at both sides!
_____

Use your set of cards to come up with ideas.
Come up with as many ideas as you can.

Do not worry about manufacturing details and materials.

Draw each concept

Design Heuristics activity

Device to overcome height-constraining disabilities

Many full-grown adults are constrained to a sitting position or have limited vertical reach, including paraplegics (people with paralyzed legs), the elderly, stroke victims, people recovering from leg or back injuries, people who have muscle or nerve disabling disorders, or little people. Limited vertical height can make many day-to-day tasks (such as reaching an overhead cabinet or changing a light bulb) a significant challenge. Your task is to design devices that would help people to overcome these height-constraining disabilities.

QUESTIONS?

The cards?

The process?

How does using Design Heuristics differ from your normal mode of generating ideas?

Any other observations?

TO HAVE YOUR OWN SET OF 77 CARDS: DESIGN HEURISTICS FOR INSPIRING IDEAS

www.DesignHeuristics.com

The Leadership Crisis Challenge (LCC):
 Forging Courage,
Judgment, and Integrity

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Goals

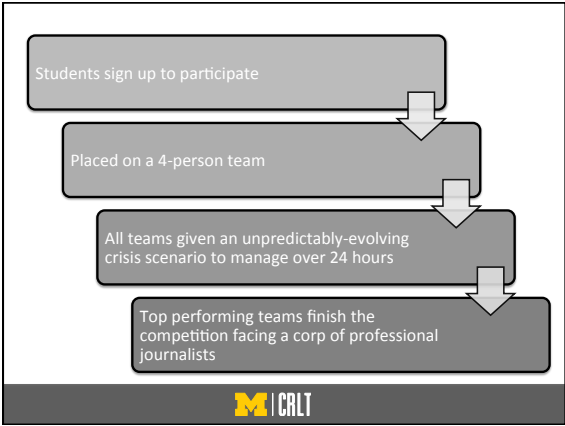NAVIGATING AMBIGUITY

EXERCISING GOOD JUDGMENT

PERFORMING UNDER PRESSURE

ADAPTING THROUGH TURBULENCE

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Leadership Crisis Challenge

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Students sign up to participate

Placed on a 4-person team

All teams given an unpredictably-evolving crisis scenario to manage over 24 hours

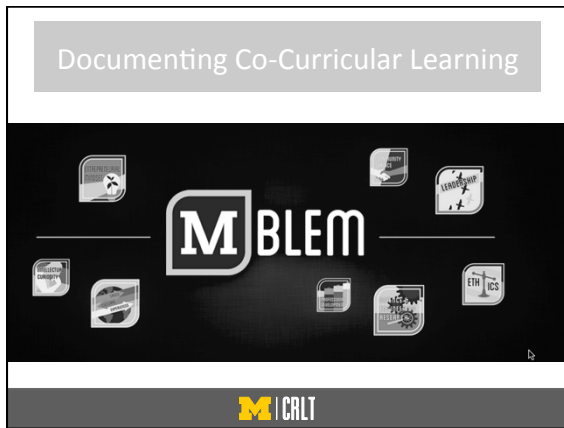Top performing teams finish the competition facing a corp of professional journalists

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…the [LCC] not only allowed me to apply lessons learned from my accounting, strategy, and management courses, but also taught me about making challenging, high-level decisions as a team, given limited time and incomplete information."
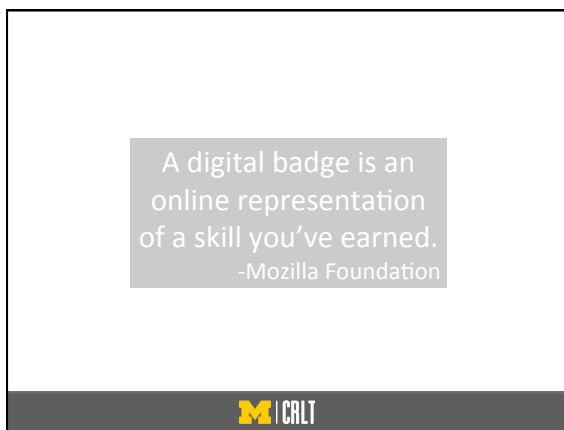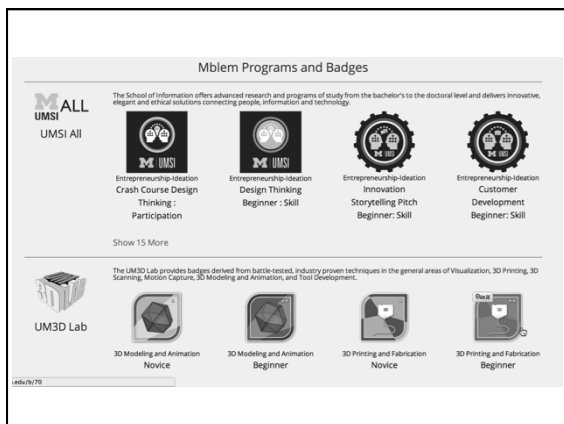
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The LCC "really for forced students to draw upon skills that they may never have realized they possessed."

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Documenting Co-Curricular Learning

MBLEM

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A digital badge is an
online representation
of a skill you've earned.
-Mozilla Foundation

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Mblem Programs and Badges

M ALL
UMSI
UMSI All

The School of Information offers advanced research and programs of study from the bachelor's to the doctoral level and delivers innovative, elegant and ethical solutions connecting people, information and technology.

Entrepreneurship-Ideation
Crash Course Design
Thinking :
Participation

Entrepreneurship-Ideation
Design Thinking
Beginner : Skill

Entrepreneurship-Ideation
Innovation
Storytelling Pitch
Beginner: Skill

Entrepreneurship-Ideation
Customer
Development
Beginner: Skill

Show 15 More

UM3D Lab

The UM3D Lab provides badges derived from battle-tested, industry proven techniques in the general areas of Visualization, 3D Printing, 3D Scanning, Motion Capture, 3D Modeling and Animation, and Tool Development.

3D Modeling and Animation
Novice

3D Modeling and Animation
Beginner

3D Printing and Fabrication
Novice

3D Printing and Fabrication
Beginner

What skills are your students learning outside of the classroom?

Partner up and generate a list of 3 skills your students learn in their co-curricular activities.

For each skill, note
- Why it would be important for students to show that they have mastered that skill
- What evidence could a badge link to in order to demonstrate the student's mastery?

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Questions?

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