

Sustainable Design as a Sustained Upstream Effort

Promoting Proficiency in the *Problem-Naming* Phase of Design

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There is a fundamental distinction between *conventional design* and *sustainable design*. This distinction poses significant challenges for teaching *design*.

In *conventional design*, we limit the system boundaries - in a conventional discipline-centric curriculum, we allow only those *problems* whose boundaries are consistent with the discipline being taught.

By limiting the scope of inquiry in this way, we can understand the dynamic of the systems we design and can rely on proven models for predicting their behavior. We learn to expect certainty.

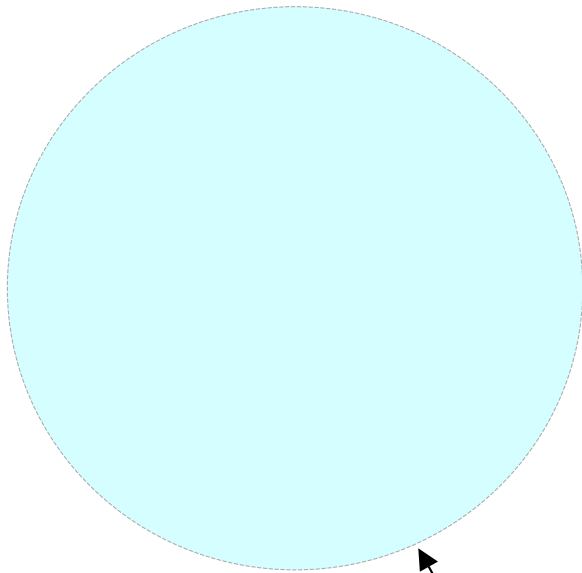
In *sustainable design*, we neither understand where the boundaries of the systems we attempt to design are nor do we have reliable models for predicting their behavior. We must learn to expect uncertainty. This requires strategies very different from those we use in learning *conventional design*.

We carry the discipline-centric behavior we learn in conventional classrooms with us into the workplace - where it determines the dynamic of our collaborative efforts.

*“ ... as engineers ...
we are always given the objectives.
We design something for a reason and
it would be unreasonable for us in the real world
to not expect to have those requirements
at the beginning of the project.”*

Senior – M&AE

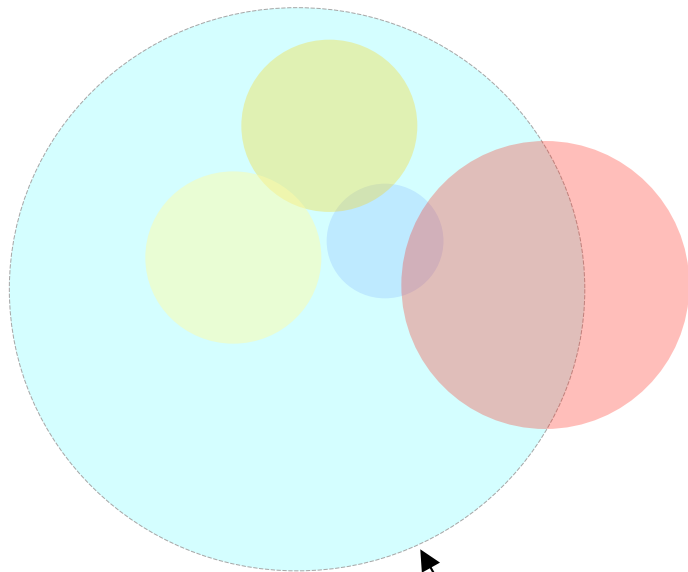
The Yes-man Model



a problematic situation

The Yes-man Model

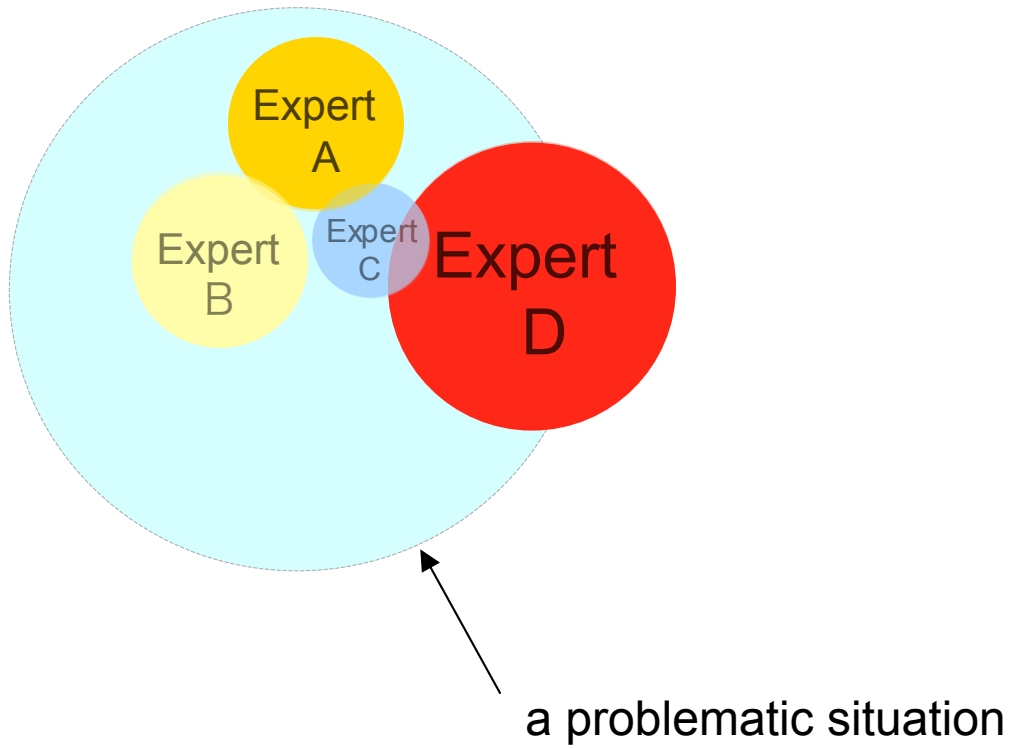
See



a problematic situation

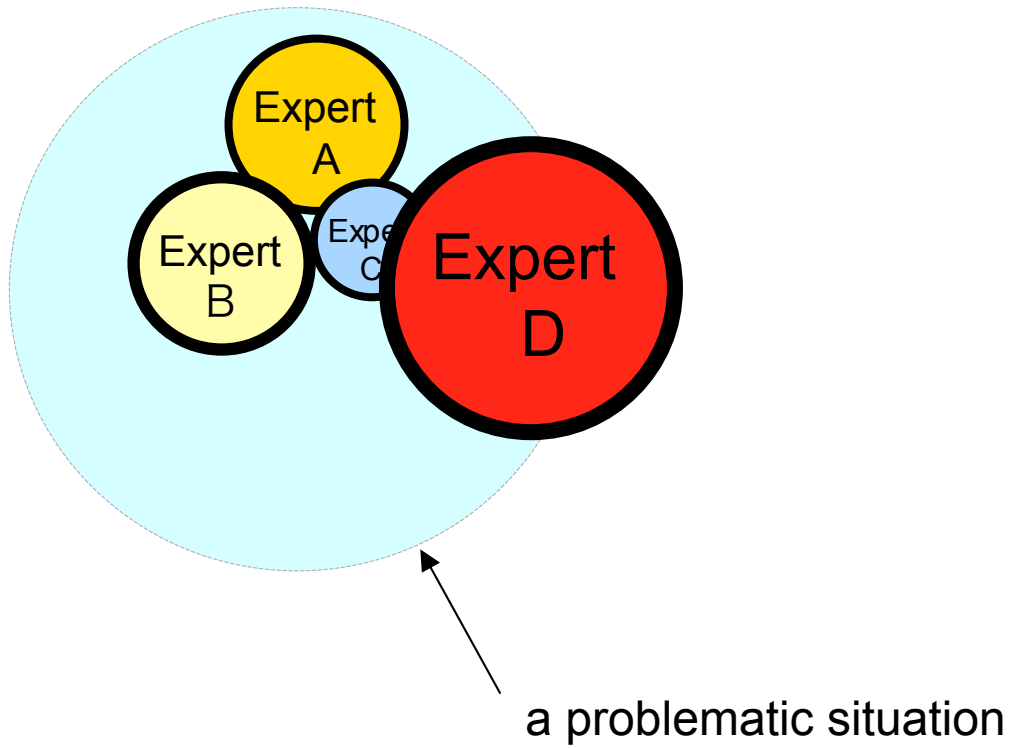
The Yes-man Model

See Seize



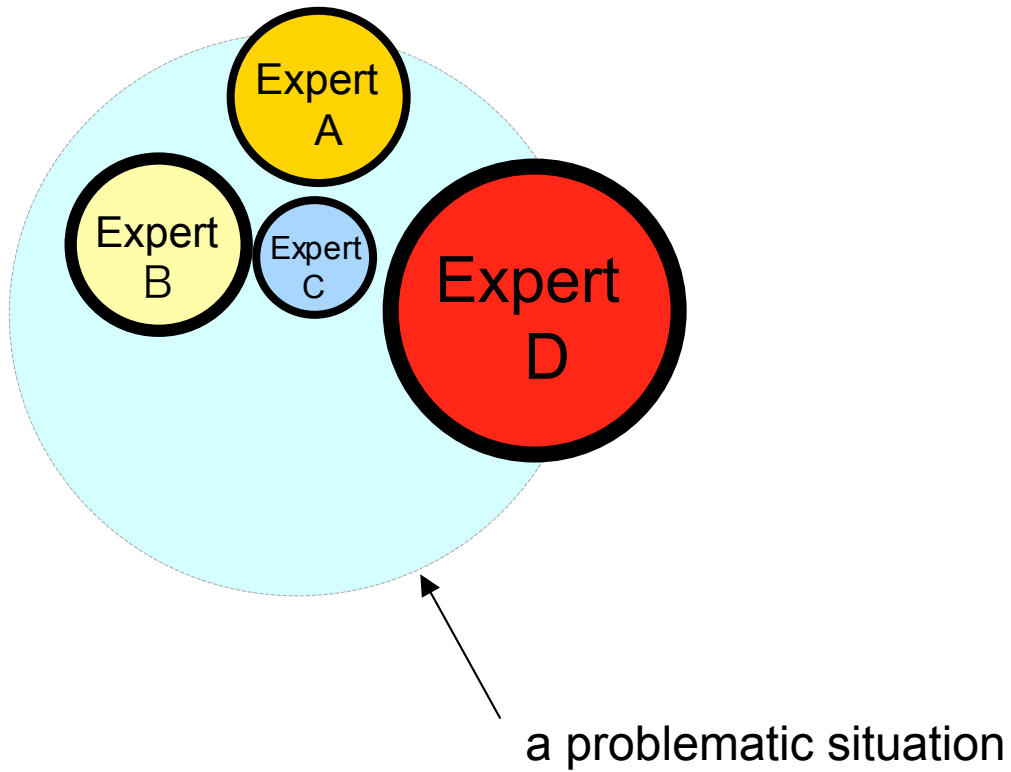
The Yes-man Model

See Seize Secure

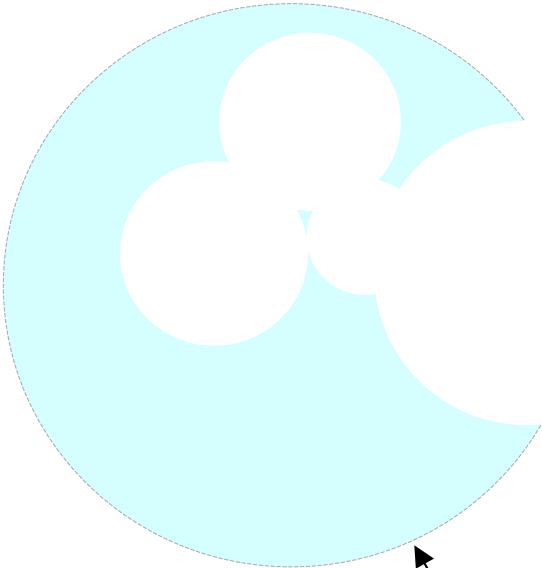


The Yes-man Model

See Seize Secure Sequester



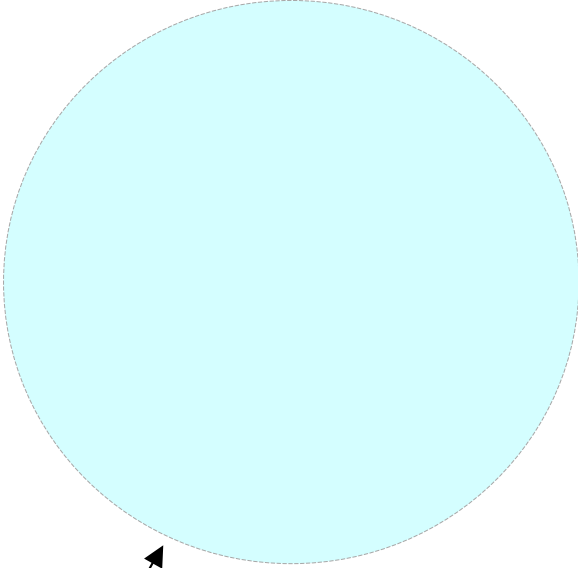
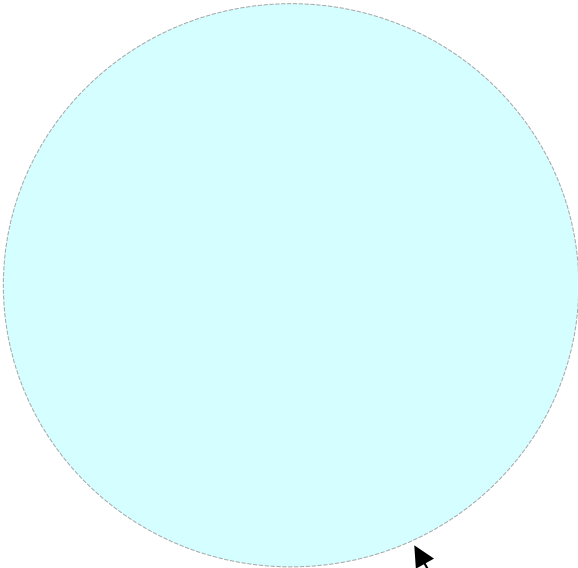
Conventional 'Expert' Collaboration



the initial problematic
situation remains
substantially unresolved

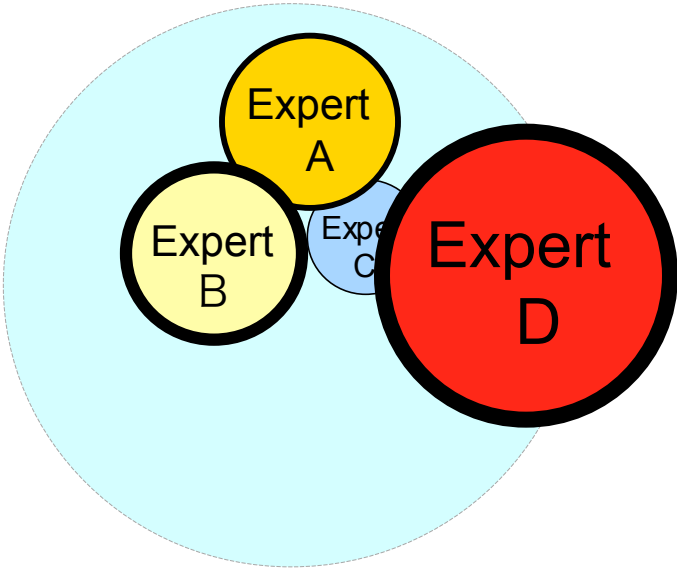
Conventional 'Expert' Collaboration

A 'Pre-Expert' Collaboration

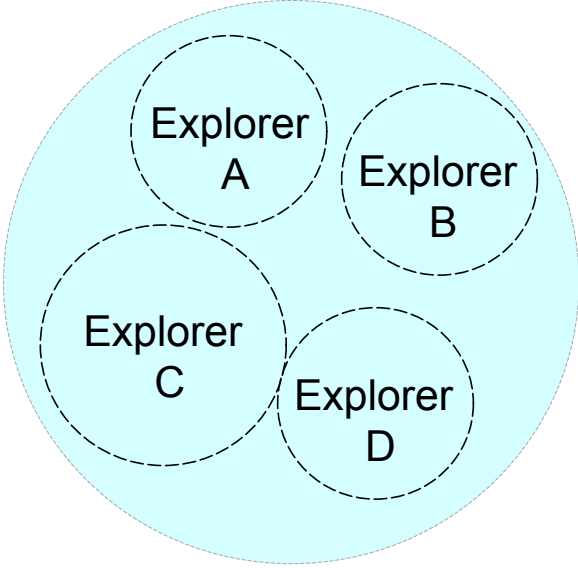


a problematic situation

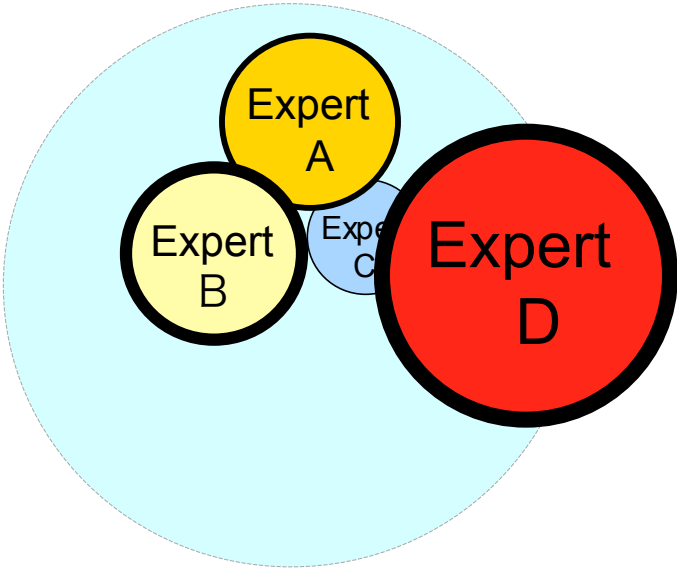
Conventional 'Expert' Collaboration



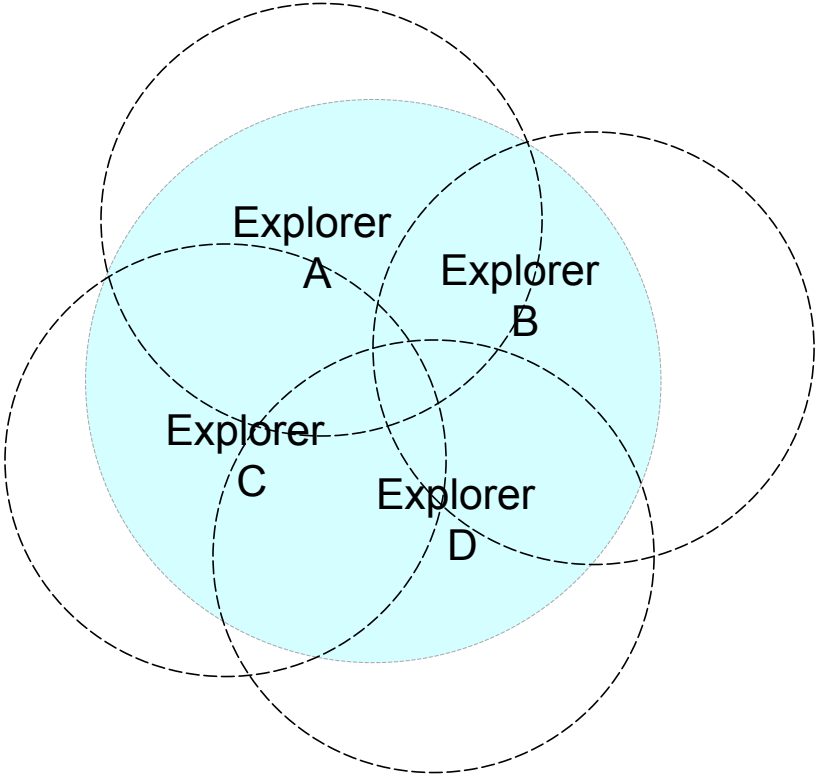
A 'Pre-Expert' Collaboration



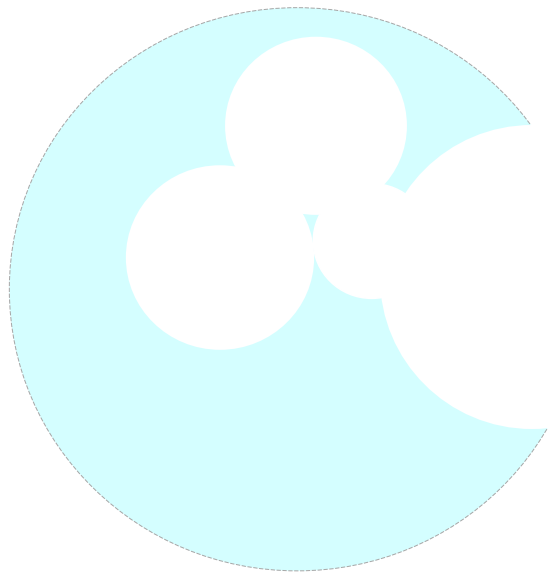
Conventional 'Expert' Collaboration



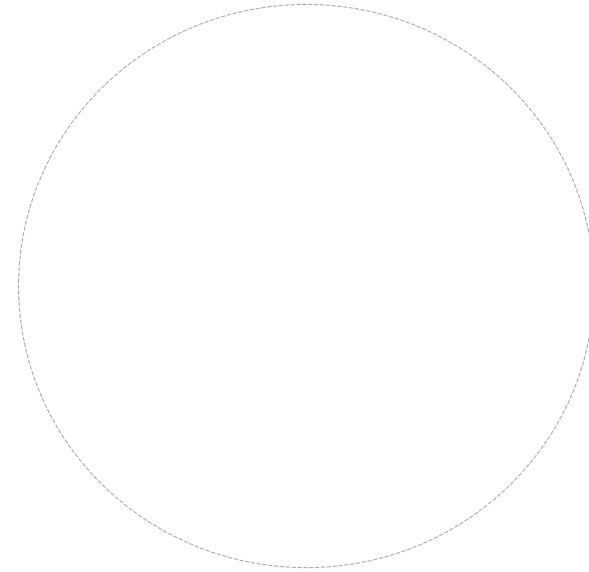
A 'Pre-Expert' Collaboration



Conventional 'Expert' Collaboration



A 'Pre-Expert' Collaboration

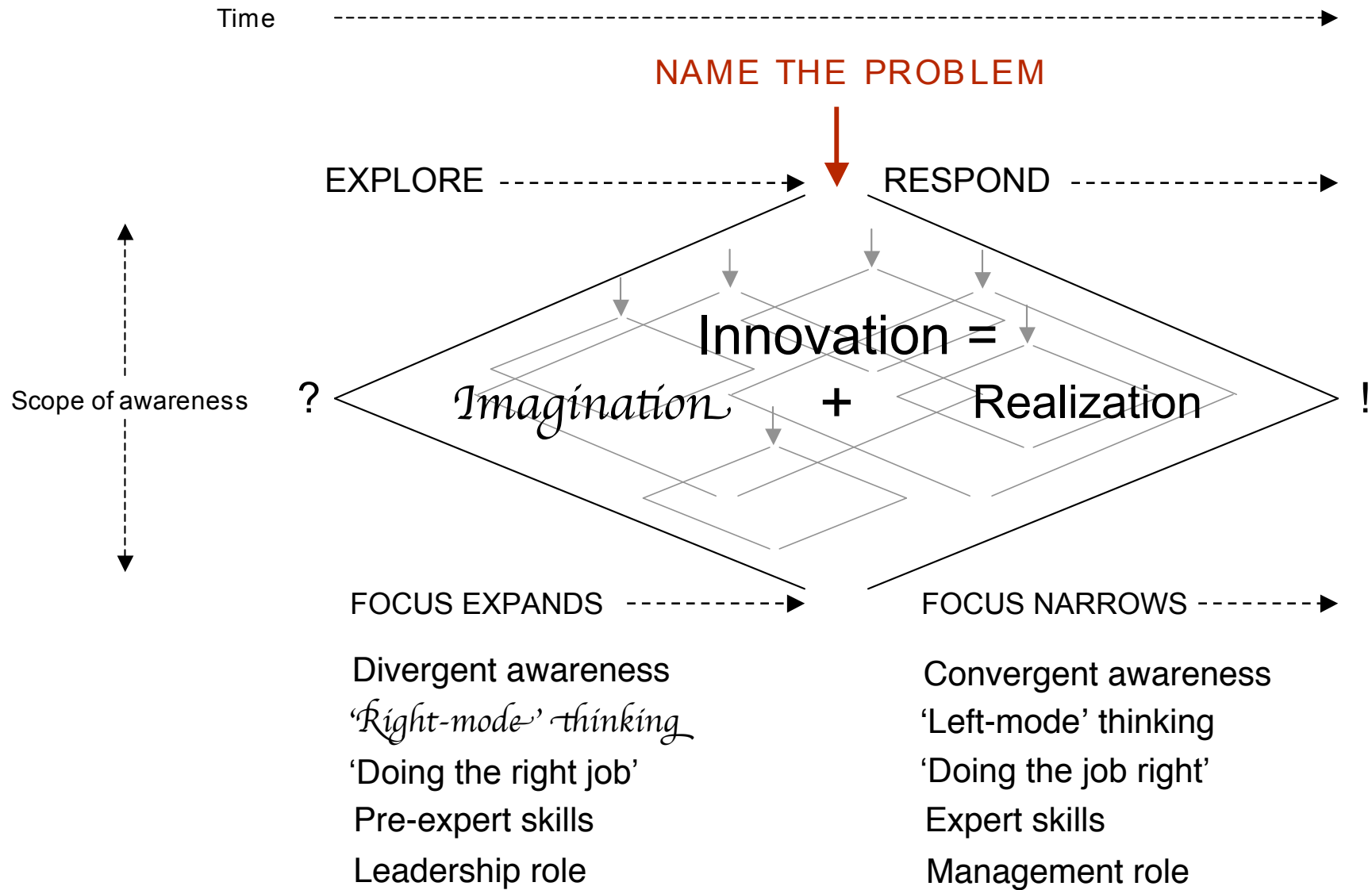


“In the beginner’s mind
there are many possibilities -

- in the expert’s mind there are few.”

Shunryu Suzuki

Design as a Breathing Cycle

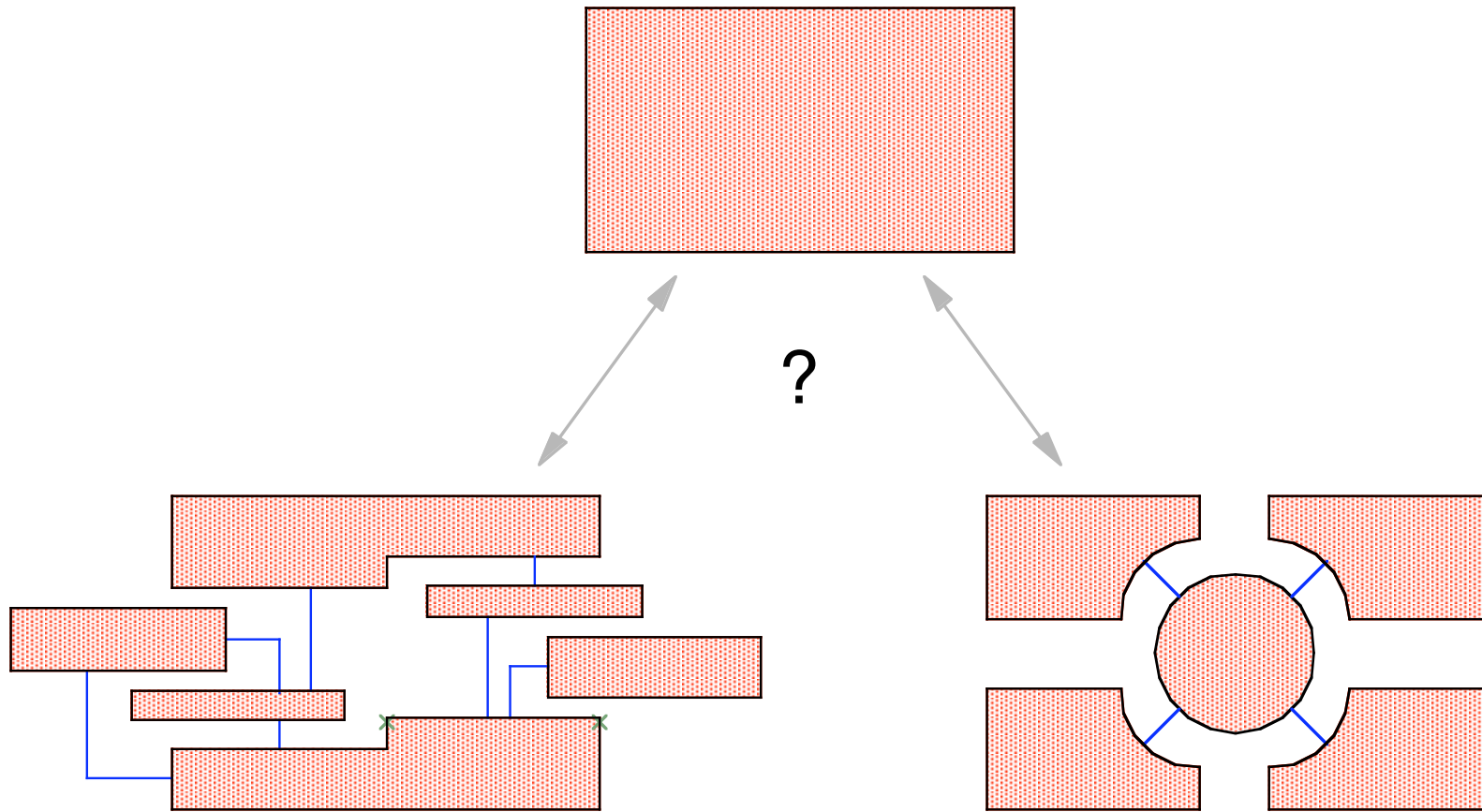


“The division of the perceived universe into parts and wholes is convenient and may be necessary, but no necessity determines how it shall be done.”

Gregory Bateson

“We must stop acting as though nature were organized into disciplines in the same way that universities are.”

Russell Lincoln Ackoff



Our models of reality (?) are arbitrary - both in the 'pieces' we see and in the relationships we recognize among those pieces.

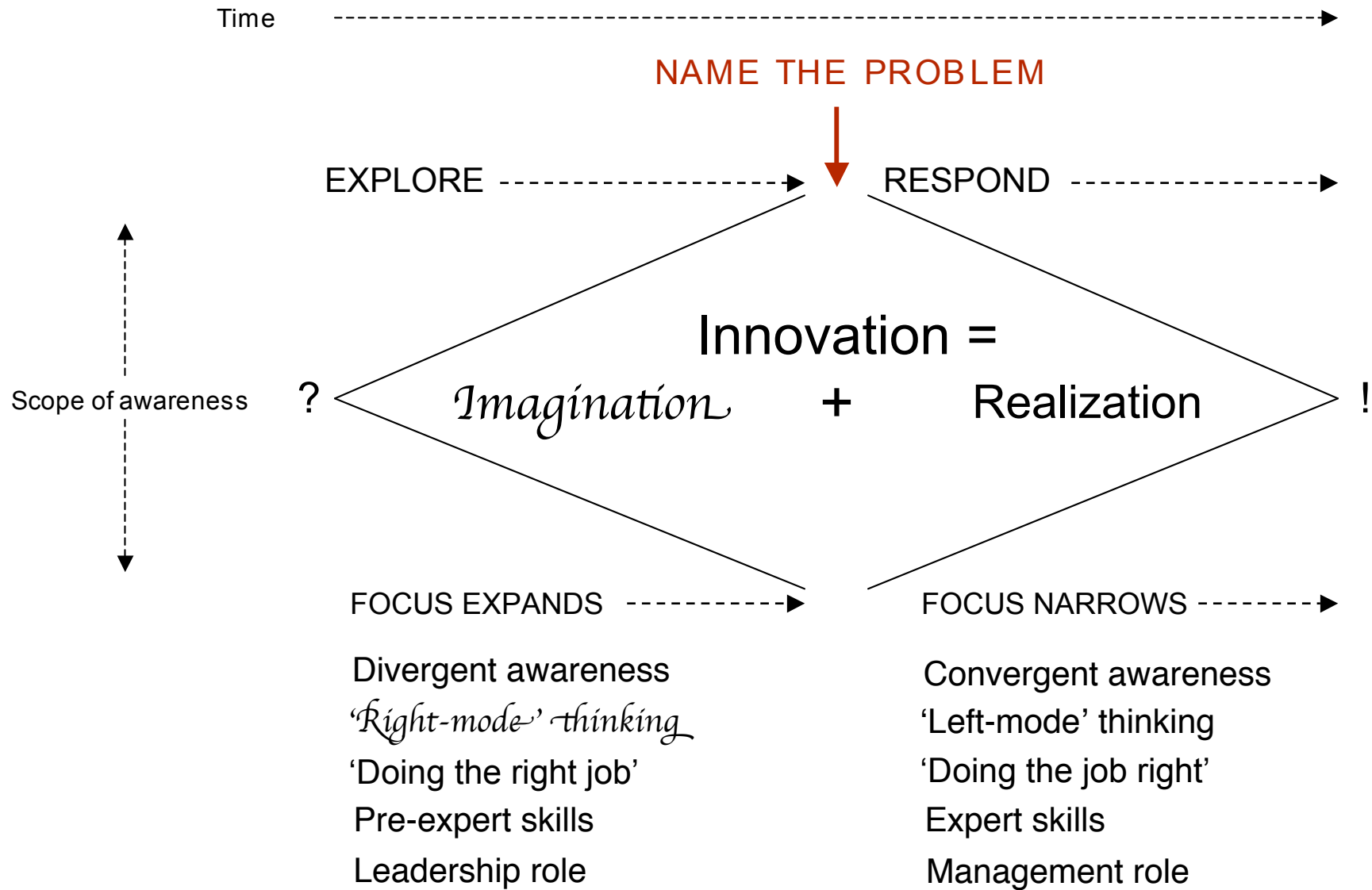
“The meaning of a whole and a part will concurrently exist in our mind only when we think about the relationship between them instead of about the things themselves.”

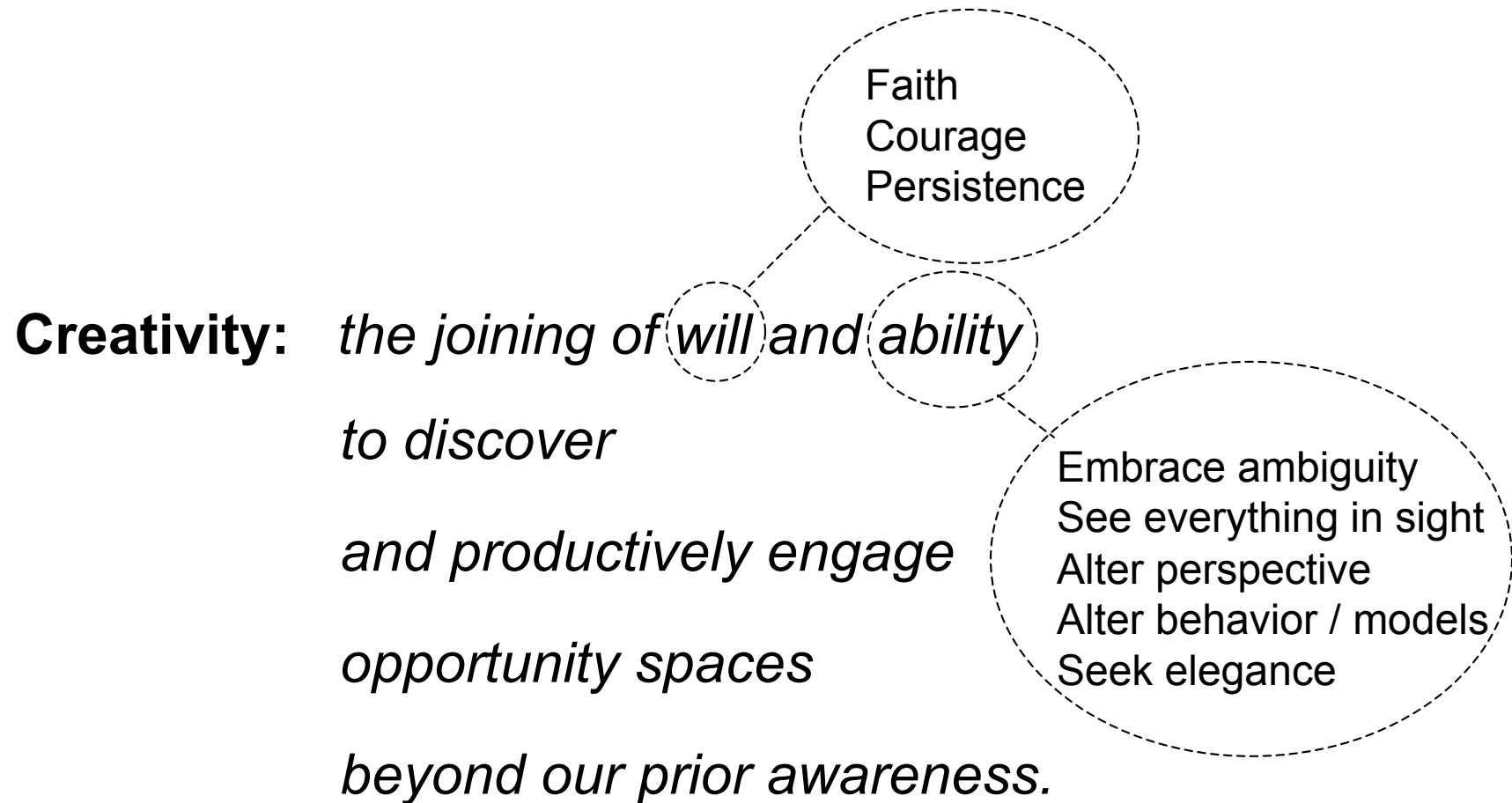
Amos Ih Tao Chang

*“All the serious mistakes
are made the first day.”*

via Eberhardt Rechtin

Design as a Breathing Cycle





Ten Maxims of Creativity in Education

	Criteria Felt to be Missing	
	by Instructors	by Students
1. Keep an Open Mind		●
2. Ambiguity is Good	●	● ● ●
3. Iterative Process w/ Idea Incubation		●
4. Reward for Creativity	●	● ●
5. Lead by Example		● ●
6. Learn to Fail	●	● ● ●
7. Encourage Risk		● ●
8. Search for Multiple Answers	● ●	●
9. Foster Internal Motivation	● ●	
10. Own the Learning Process	● ● ●	● ●

Intelligences and Thinking Skills

Left-mode (“IQ”)

analytic, abstract,
digital, logical, linear

Right-mode -

synthetic, concrete,
analogic, intuitive, holistic

Lateral thinking

Emotional intelligence (“EQ”)

Social intelligence

Spiritual intelligence (“SQ”)

Thinking skills

“Having -” vs. “Being -” a genius

Observing

Imaging

Abstracting

Recognizing patterns

Forming patterns

Analogizing

Body thinking

Empathizing

Dimensional thinking

Modeling

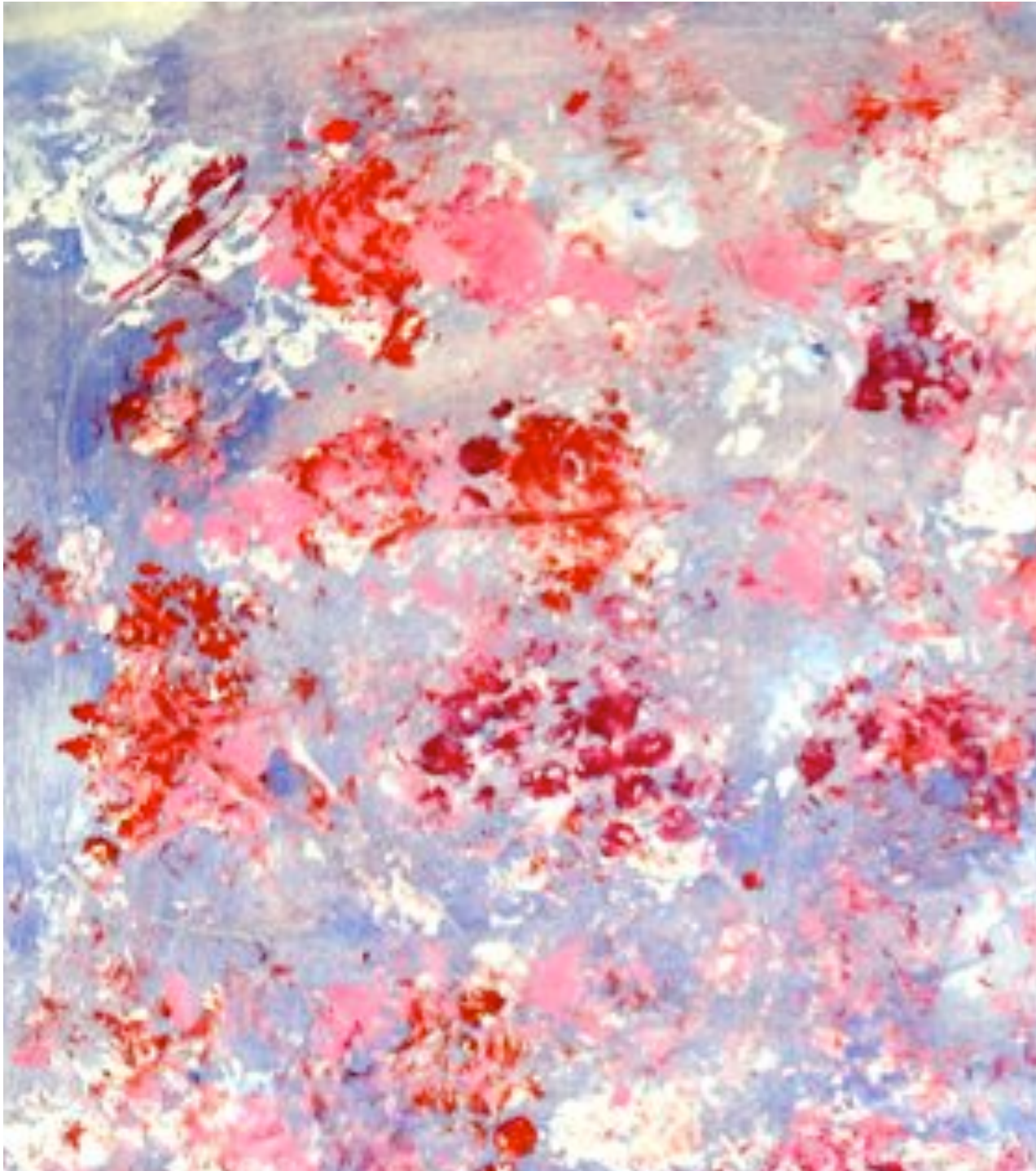
Playing

Transforming

Synthesizing



*“The process was fun
and relaxing
and allowed me to
stretch my boundaries
and play a bit.”*



*“It was the first time
I had painted creatively
since middle school.
I realized how soothing
and relaxing painting is
to the spirit.”*

*‘Painting exercise’
4 cycles in 10 total minutes*



*“It was a chance for us
to just be creative
in a way that there are
no right or wrong
answers.”*

*‘Painting exercise’
7 cycles in 15 total minutes*



Learning to observe





Before-and-after images
produced within three
hours of each other by the
same person.

“The studio taught me the key to good drawings: keen observation.”

“Now I know that my drawing abilities were impeded because of my pre-conceived images of my subjects.”

Lessons adapted from practices in Art education, can support us in becoming:

- stimulated by uncertainty;
- comfortable with risk-taking and failure;
- able to fully perceive the surrounding world;
- able to initiate dialogues in unfamiliar realms;
- able to move fluidly between *left-mode and right-mode knowing*;
- able to develop and move effectively toward authentic goals;
- able to relax and have fun.

***“The key lesson ... is the fact that
I don’t need to be someone special to be creative.”***

Senior M&AE student

*“Exploring creativity is not something you can lecture on,
you have to actually do it.”*

Senior - M&AE

Objectives for a curriculum to sustain sustainable design:

Share a deep understanding of 'creativity' and 'creative engagement,'

Encourage true exploration of whole systems,

Develop comfort with uncertainty, no 'answer,' many 'answers,'

Learn to 'see everything in sight,'

Integrate the practice of intrapersonal and interpersonal skills,

Explore 'elegance' as a driving concept,

Engage all sensibilities and forms of 'intelligence' and 'thinking'
and develop fluidity in moving among them,