Mind, Thinking, Creativity and Innovation

Learning to Think Creatively

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Learning to Think Creatively

We start with the **Da Vincian approach** that considered our spacetime universe as an **indissoluble unity** to arrive to the **Galilean approach** where **spacetime was split into absolute time and relative space.**

Then the **Reductionist Positivist approach** by Newton considered **absolute time completely separated from absolute space**, till the **Relativistic Einsteinian approach rejoined absolute time and absolute space into an indissoluble unity called spacetime.**

❑ 1- Naturalistic DaVincian (1478): sxt.
❑ 2- Relativistic Galileinian (1632): $t \equiv A$; $s \equiv R$.
❑ 3- Reductionist Positivist (1687): $t \equiv A$; $s \equiv A$.
❑ 4- Relativistic Einsteinian (1921): sxt.
❑ 5- Quantum Stochastic (1924–1927): $E(f(sxt))$.
  (The Copenhagen Interpretation: Niels Bohr, Werner Heisenberg and Paul Dirac.)
❑ 6- Quantum Causal (1950-1992): sxt (Open System).
  (The de Broglie–Bohm theory Interpretation: Louis de Broglie, David Bohm.)
❑ 7- Quantum Relational (1994-1997): (Open Systems).
  (The RQM Interpretation: Carlo Rovelli, Basvan Fraassen and by Michel Bitbol.)
❑ 8- Quantum Transactional (1986-2013): (Open Systems).
  (TIQM: John G. Cramer, R. Kastner.)
❑ 9- Quantum Bayesian (2002-2013): (Open Systems).
  (QBT: Carlton Caves, Fuchs and Schack.)

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The term "**Timeline**" (first quadrant, top right) is considered the combination of a major linear time representation framed by folded minor space representation.

The term "**Overview**" (second quadrant, top left) is interpreted as the combined representation of major linear space and major linear time representations, with minor complementary folded time and space components.

The term "**Snapshot**" (third quadrant, bottom left) can be assumed as the combination of a major linear space representation framed by minor folded time representation.

The forth quadrant (bottom right) represents the combination of major folded space and time components, framed by the combination of minor linear space and time components.

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We can start to divide human experience into two interacting concepts or parts, "**Application**" and "**Domain**", in the sense that experience is always gained when an application is developed to act within a specified domain, and a domain is always investigated by a developed application.

In this way we get the **Four-Quadrant Framework for Application Definition and Domain Definition Coupled Modeling.**

APPLICATION		
DOMAIN	SIMPLE STRUCTURED TECHNICAL	COMPLEX UNSTRUCTURED NON-TECHNICAL
SIMPLE STRUCTURED TECHNICAL	(known knowns)	(known unknowns)
COMPLEX UNSTRUCTURED NON-TECHNICAL	(unknown knowns)	(unknown unknowns)

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From this figure, it is easy to see that any traditional stochastic data analysis method will eventually hit a wall (Taleb, 2015), and some common sense will be needed to get the process moving again.

In fact, if various methods come up with different answers, that is a suggestion to be more creative and try to find out the concealed reason, which should lead to a better understanding of our underlying reference.

APPLICATION	Simple payoffs	Complex payoffs
DOMAIN		
Distribution 1 ("thin tailed")	Extremely robust to Black Swans	Quite robust to Black Swans
Distribution 2 ("heavy" and/or unknown tails, no or unknown characteristic scale)	Quite robust to Black Swans	LIMITS of Statistics – extreme fragility to Black Swans

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We do not use even a small part of our powers and our forces as human beings. We have in us, so to speak, a very big and very fine organization, only we do not know how to use it.
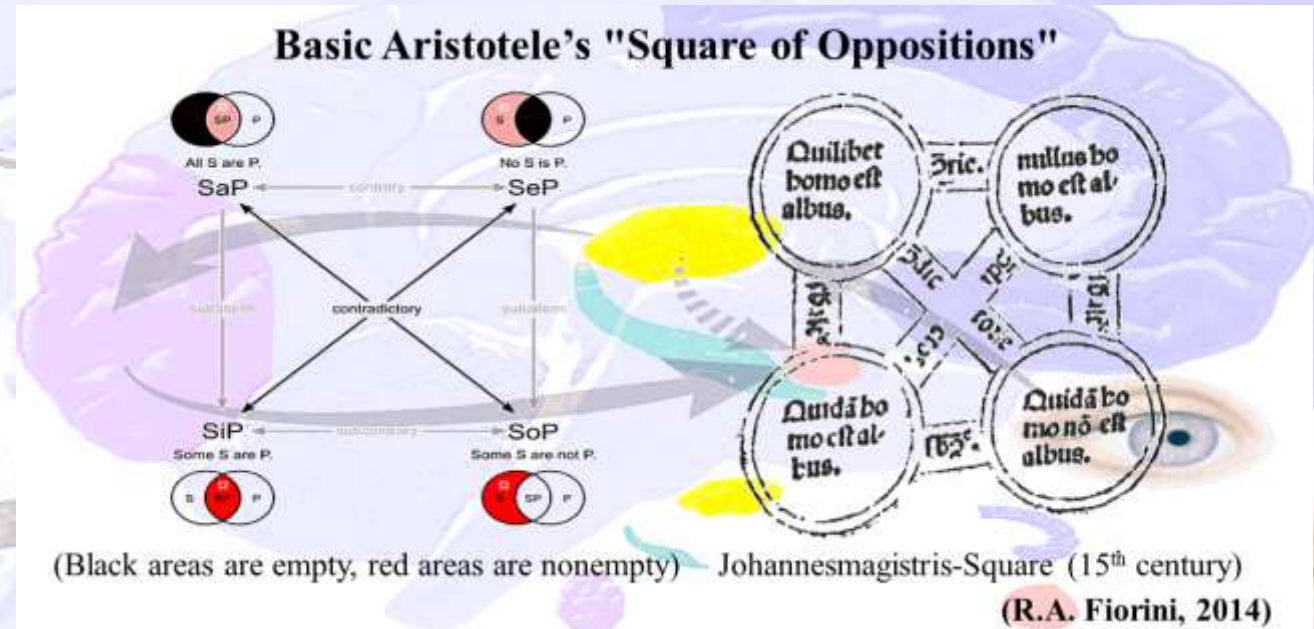
We can apply our previously developed framework for structuring our Systemic Learning Basic Scheme.

APPLICATION	SIMPLE UNFOLDED LINEAR	COMPLEX FOLDED NESTED
DOMAIN		
SIMPLE UNFOLDED LINEAR	DISCIPLINED (TRAINING)	SYNTHETIC
COMPLEX FOLDED NESTED	ANALYTIC	INTUITIVE

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The origin of **the square of opposition** (SOO) can be traced back to Aristotle making the distinction between two oppositions: contradiction and contrariety. But Aristotle did not draw any diagram. This was done several centuries later by Apuleius and Boethius in the second and sixth centuries.

SOO are considered as important basic components of logical competence and of human predicative rationality.

Basic Aristotele's "Square of Oppositions"

(Black areas are empty, red areas are nonempty) Johannesmagistris-Square (15th century)

(R.A. Fiorini, 2014)

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The Piaget-Klein four-group structure generates squares of opposition (SOO), and an important component of human rationality resides in the diagram of the SOO, as formal articulations of logical dependence between connectives.

In the Piaget-Klein Group Cayley Table we see the four fundamental transformations of predicative competence:

identical transformation (**I**), **inverse** transformation (**N**), **reciprocal** transformation (**R**), and finally, the **dual** transformation (**D**).

x	I	N	R	D
I	I	N	R	D
N	N	I	D	R
R	R	D	I	N
D	D	R	N	I

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The formal rationality provided by the SOO is not spontaneous and therefore, should not be easy to learn for adults.
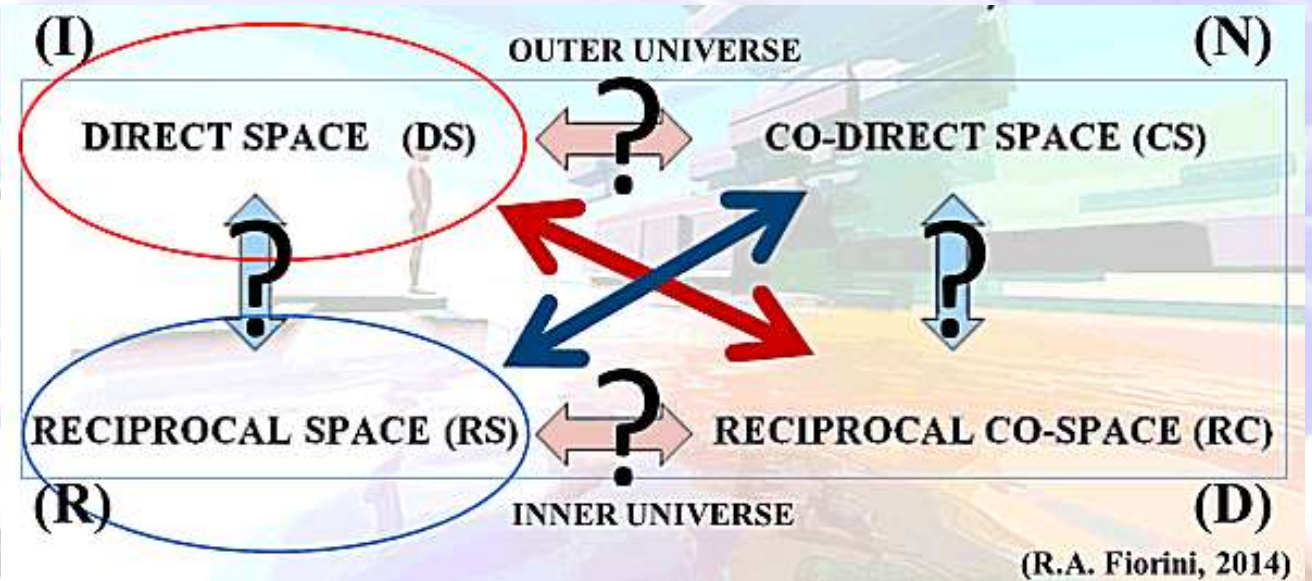
This is the main reason why **we need reliable and effective training tools to achieve full logic proficiency, like the Elementary Pragmatic Model (EPM).**

The Systemic Neuro-Axiological Approach by EPM Logically Articulated Learning Support has been **developed by Prof. Piero De Giacomo since the 1970s.**

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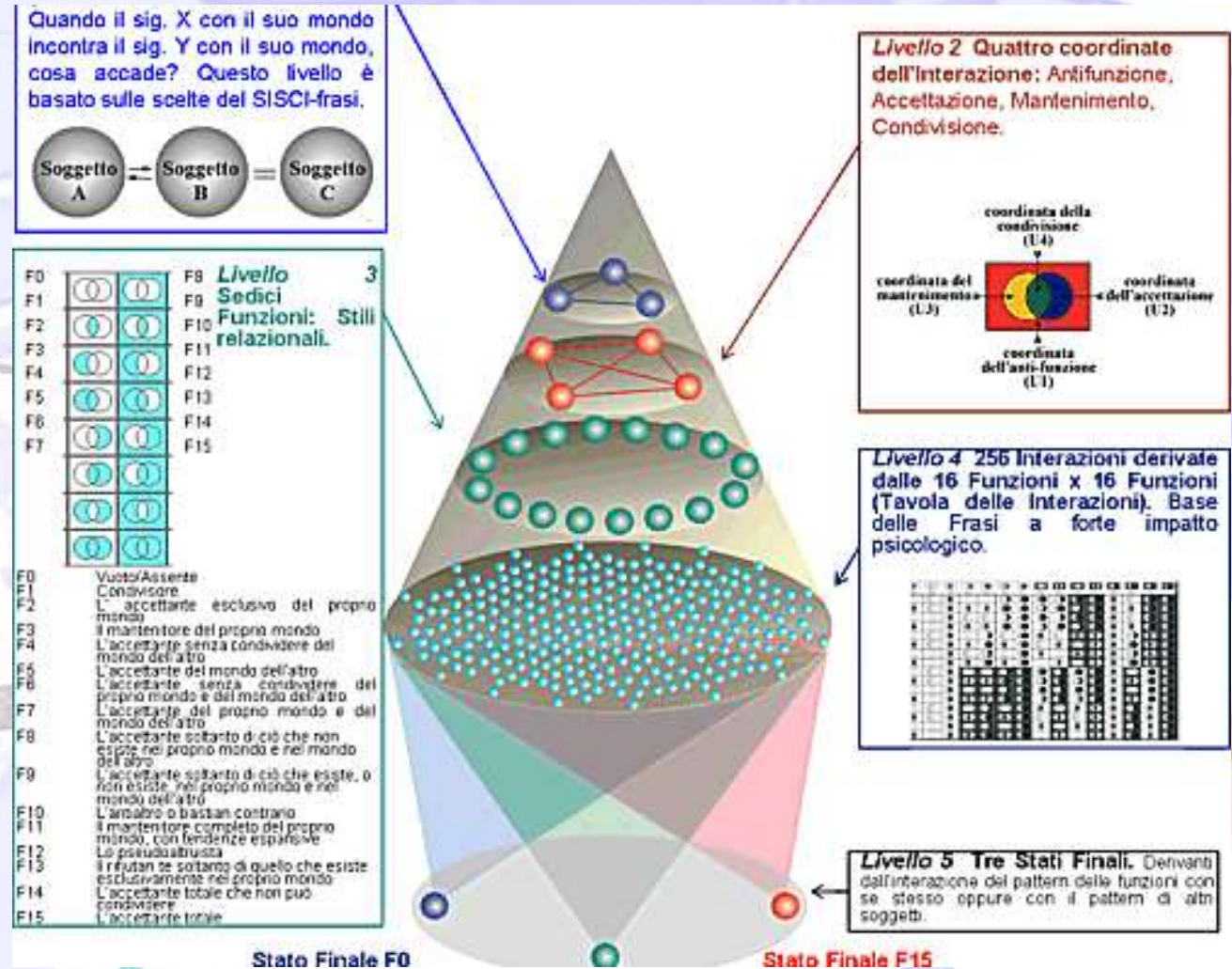
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The Piaget-Klein four-group structure can be even interpreted as the transformation mapping the human perception and representation of our universe, where the encoding process is carried out by human affectors (our biological sensors) and the decoding process is done by human effectors (our biological actuators), **according to R. Rosen modeling relation.**

(R.A. Fiorini, 2014)

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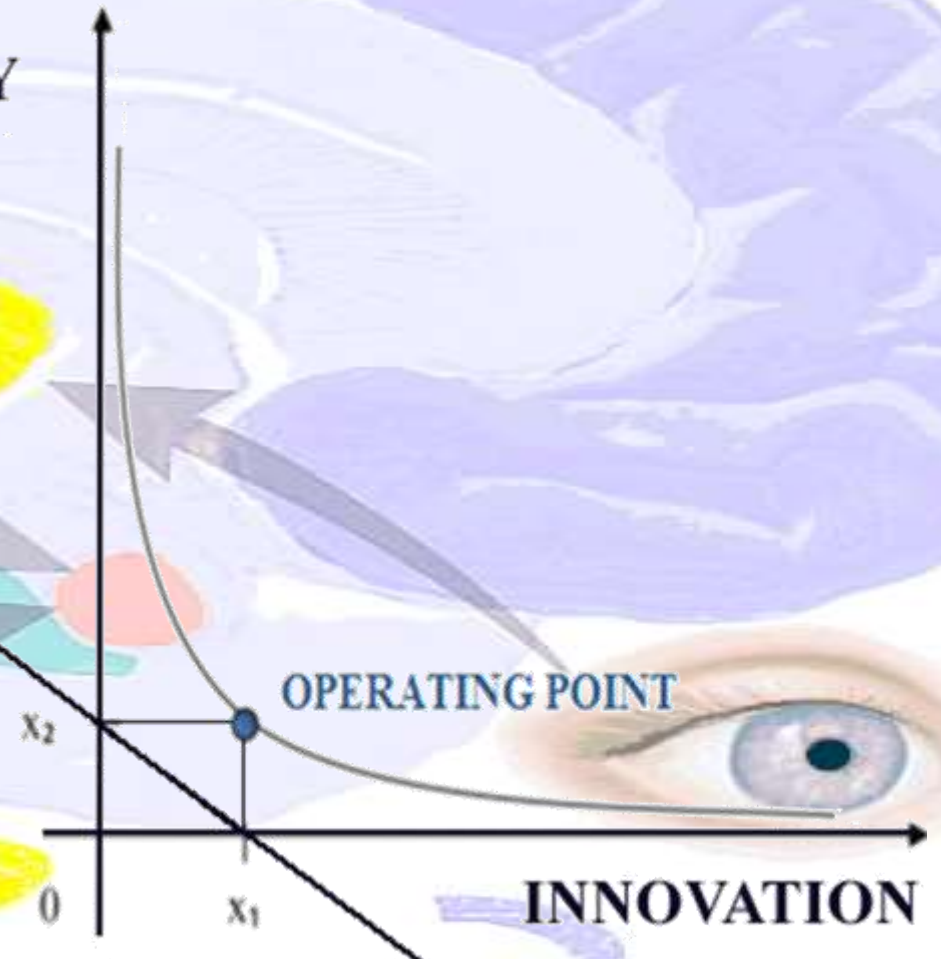
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Innovative or Inventive Problem Solving (IPS), Innovative Creativity, Creative Innovation, Creative Problem Solving (CPS), etc. can all be thought as **an emerging operating point from the fundamental, complementary and irreducible dichotomy Creativity and Innovation.**

CREATIVITY

x_2

OPERATING POINT

0

x_1

INNOVATION

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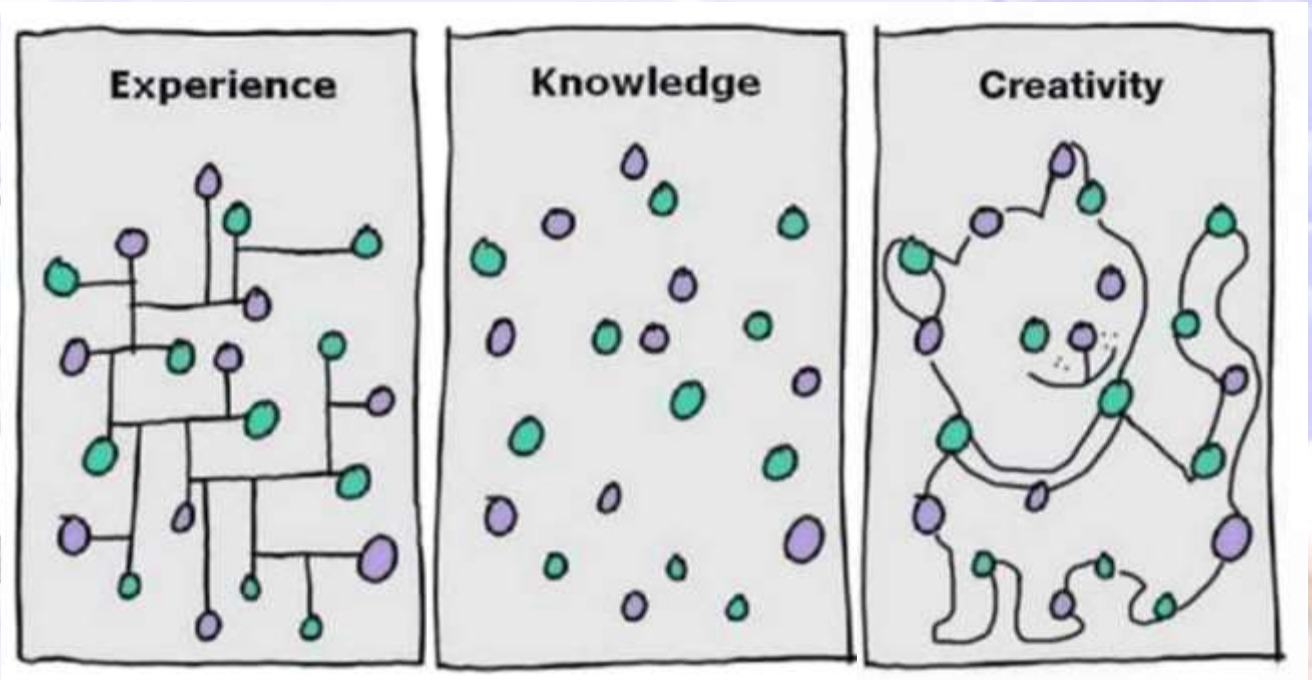
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We can apply our previously developed framework for coupled Application and Domain Definition as the two sides of the same coin, where **Application (the problem) is Innovation and Domain is Creativity.**

APPLICATION	SIMPLE UNFOLDED LINEAR	COMPLEX FOLDED NESTED
DOMAIN		
SIMPLE UNFOLDED LINEAR	INVENTIVE INNOVATION	INVENTIVE CREATIVITY
COMPLEX FOLDED NESTED	CREATIVE INNOVATION	CREATIVE CREATIVITY

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A collective cartoon creative example:

Experience, Knowledge, and Creativity, as starting from Cartoonist Hugh MacLeod and ending to collective anonymous contribution(s) on Web 2.0 (Experience, Knowledge and Creativity).

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Thank You for Your Attention