

The Missing Unit

Why materials intelligence begins with interaction

Painting is a system of interacting materials. No element standing alone tells the story.

The problem

Information is abundant. Connected knowledge is scarce.

For more than five centuries, painters, colourmen, manufacturers, conservators, teachers and restorers have accumulated an extraordinary body of material knowledge. Pigments have been mined, synthesized and reformulated. Oils have been pressed, washed, heated and polymerized. Resins, waxes, solvents, driers, alkyds, grounds and supports have expanded the painter's vocabulary and introduced new possibilities — and new failure modes.

The knowledge exists, but it is distributed. Manufacturer literature explains products. Conservation science investigates mechanisms and deterioration. Painters accumulate working knowledge through practice. Specialist suppliers preserve fragments of institutional memory. Historical sources preserve recipes and observations whose relevance may depend on formulations that no longer exist.

Commercial information is optimized for selection and purchase. It is usually organized around individual products: a tube has a name, pigment code, colour swatch and price; a medium has a description; a support has dimensions and surface type.

The product is real. The behavior emerges from the system.

Painters almost never paint with one product, one property or one condition in isolation. They mix, layer, dilute, extend, wipe, glaze, impasto, absorb, seal and expose materials to changing environments. The practical question is therefore not only what a material is, but what happens when it meets other materials under particular conditions.

A simple example

A product does not carry its behavior alone.

Consider an apparently straightforward question: how quickly does this oil-painting medium dry? A product page may offer a range — perhaps a day, several days or a conditional touch-dry estimate. That observation can be useful, but it is not the behavior of a complete painting system.

Change the pigment and the drying trajectory can change. Change the amount of medium and it can change again. Increase film thickness. Place the mixture over a different layer. Alter temperature, humidity or airflow. Use a different binder formulation. The painter has not merely selected a product; the painter has created a new material interaction.

Conservation science makes the principle explicit. Drying oils cure principally through oxidative polymerization, and the rate and character of that process are affected by the oil, pigment, additives and film thickness. Some pigment chemistries accelerate oxidation; others retard it. [1]

Drying time is not simply a property of a product. It is a behavior produced by a system.

Once that proposition is taken seriously, the information problem changes. Product facts remain necessary, but they are no longer sufficient.

The organizing idea

The interaction is the missing organizing unit.

Art-materials information is plentiful, but very little of it is organized around the event that matters most to the painter: what happens when materials meet.

Traditional product information asks: what is this? Materials intelligence must also ask: what does this do, with what, under which conditions, and with what consequences?

A painter mixes Ultramarine with a particular white, extends it with oil, adds an alkyd medium, or places a transparent layer over a partially cured earth colour. The paint may be thin or impasted; the ground absorbent or sealed; the support rigid or flexible; the studio cool or warm. Each decision changes the system in which the materials operate.

The interaction is the connective unit between material identity and material behavior.

MATERIALS the nouns

INTERACTIONS the verbs

BEHAVIORS the consequences

SIGNALS the evidence

This sequence gives EUAS a different place to begin. The aim is not merely to make a more complete catalogue. It is to build a governed structure capable of representing relationships among materials and the behaviors painters actually encounter.

The EUAS proposition

Commerce is the vehicle. Materials intelligence is the larger proposition.

EUAS begins with commerce because commerce provides a governed universe of real materials that painters actually buy and use. It gives identity to products, creates transactions, places materials into use and generates recurring opportunities for observation.

The catalogue is therefore substrate, not destination.

At the material-identity level, EUAS can describe what a product is: pigment composition, binder, formulation, support, medium, solvent or varnish. At the behavior level, it can describe properties such as transparency, tinting behavior, viscosity, flow, drying tendency, gloss, flexibility and film formation. At the interaction level, those properties can be related to mixtures, layers, techniques and environmental conditions. At the problem level, recurring observations — wrinkling, sinking-in, cracking, poor adhesion, unexpected drying or incompatibility — can be associated with the systems in which they arise.

This is why EUAS has been developing structured material records, a Mediums intelligence model, a canonical Problem-Zone library and deterministic decision logic. These are not unrelated features attached to commerce. They are early instruments for observing different dimensions of the same material system.

Commerce carries the interaction. The interaction creates the possibility of evidence.

Evidence, uncertainty and memory

Every interaction can produce a signal.

A painter choosing a paint, medium, ground or support is not simply selecting inventory. The choice places materials into relationships. Subsequent use produces observations. Properly structured, contextualized and governed, those observations can become signals.

A report that a mixture dried unexpectedly fast is weak information by itself. Add pigment, binder, medium, proportion, thickness, layer position and working environment and it becomes more useful. Repeat comparable observations across different products and users, and the possibility of meaningful pattern recognition begins to emerge.

EUAS is not claiming to possess that comprehensive dataset today. It is building the architecture that can begin collecting observations without discarding the context that gives them meaning.

A signal becomes useful when the system remembers its context.

That requirement makes provenance central. Manufacturer specification, conservation research, measured property, painter observation, historical recipe and hypothesis are different evidence classes. A trustworthy system should preserve those distinctions rather than flatten unlike evidence into one authoritative-sounding answer.

The ambition is not to convert painting into a formula. Artists exploit contingency; formulations vary; working practices differ; important observations will remain conditional or probabilistic. The purpose of governance is not to eliminate uncertainty, but to record what kind of evidence supports a statement and how much confidence it deserves.

Why this matters now

Five centuries of knowledge should not remain stranded.

The history of painting materials is not a clean progression from primitive to modern. Valuable knowledge is scattered across workshops, conservation laboratories, manufacturers' technical departments, artists' notebooks, teaching traditions, specialist suppliers and generations of studio practice.

Some knowledge has been rigorously studied. Some survives as craft knowledge. Some has been superseded by changes in formulation. Some has simply become difficult to find. Digital commerce has made materials easier to buy; it has not made the relationships among them easier to understand.

EUAS treats those relationships as intellectual infrastructure. A modern materials–intelligence framework should be able to preserve historical knowledge while accommodating new products, new formulations, contemporary conservation findings and observations generated through present-day use.

We therefore begin modestly: bounded product sets, governed attributes, canonical problem cases, explicit relationships and evidence-backed rules. The objective is not omniscience. It is to establish a structure that becomes more useful as evidence accumulates.

| *No one element standing alone tells the story.*

The proposition

Build around interaction, and the catalogue changes meaning.

The pigment matters. The binder matters. The medium matters. The support matters. The previous layer matters. Thickness matters. Technique matters. Environment matters.

But what the painter ultimately experiences is what happens when those things meet.

That is the organizing opportunity: the interaction.

Build a framework around interaction and the catalogue becomes more than inventory. It becomes a map of material possibilities. Record behavior in context and experience can become evidence. Accumulate governed evidence and patterns can become intelligence.

| *EUAS is building the system that remembers.*

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- [1] Canadian Conservation Institute, Caring for Paintings — overview of drying oils, oxidative polymerization, and the influence of pigments, additives and film thickness on drying.
 - [2] Gamblin Artists Colors, Oil Painting Mediums Guide and Cold Wax Painting — manufacturer specifications for Galkyd, stand oil, refined/cold-pressed linseed oil, poppy oil and cold wax behavior.
 - [3] Winsor & Newton, Liquin Original and varnishing guidance — manufacturer specifications illustrating conditional drying ranges and the distinction between painting mediums and final varnishes.
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EUAS, a new form of knowledge commerce

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