



Received: 13-06-2022

Accepted: 23-07-2022

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

On the Interdisciplinary Nature of Art and Science

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1. Is art practice a form of research and generation of – or contribution to - knowledge?

What constitutes knowledge? Knowledge necessarily has an object. To have knowledge is to understand something or many things about a certain something. Therefore, to know is to know $x \dots x$ to the n about y .

There are some problems with this definition:

1. If knowledge has an object, then one needs a pre-existing concept to have an object in the first place. This is the same as saying one needs knowledge to have knowledge which is self-contradictory or a non-starter.
2. To know innumerable properties or characteristics of y does not entail knowing y . For example, one can see innumerable artworks without knowing art as such. The instance does not imply knowledge of the concept.

What then might be a more accurate definition of knowledge?

To know is to connect properties or characteristics to a common object and relate such an object to further instances. Knowledge is then built through that progressive iteration where properties and concepts are said to correspond. This creates a picture of reality. Language (verbal sounds; written symbols; mathematical calculations; scientific endeavor and the arts) mediate such a process.

My question then is what is peculiar about the arts as a mediation tool for the generative production of knowledge? In what sense do the arts (visual; musical; theatrical) constitute knowledge under such a definition? And would this also include all aspects of culture as expressions of an everyday aesthetic?

However, this definition too is faulty:

1. The “property” and “concept” that combine as the “object” is unknowable without the mediation of language in the first place. Thus, what is known is the medium, the form that structures the world so. The world of discrete objects is the world of words or pictures or sounds or numbers, not the thing-in-itself (to borrow from Kant). Although the sensory experience of y is one’s initial contact, any understanding is mediated first by the limitations or perceptual apparatus of the perceiver and then “tamed” by some or other language-system.
2. Language necessarily divides the world so that whatever is known through or as language cannot be grasped as a unified, single concept. One might be able to have the concept of “universe”, for example that connects all objects known and unknown, but the word “universe” might expand in meaning and definition as knowledge itself develops and thus not have a fixed meaning or operate in its intended way.

Perhaps these problems do not mean this definition is faulty, for the use of this definition defines the use of various kinds of knowledge as it is mediated or structured according to various language-games. I agree then with Wittgenstein’s invention of “language games”, “forms of life” and “meaning as use”. Therefore, the question is what kind of use the tool of art performs as an example, perhaps an exemplar, of knowledge (knowledge itself being something useful akin to playing a piece in a game in accordance with a rule and making a good move in a particular context).

Since the visual arts draws its value primarily through the organ of sight, art extends our sight; it peers into the world (into nature); it creates a world; it develops new ways of seeing and thence understanding. In these ways, one can describe art as a species of knowledge, as a kind of research.

What kind of knowledge does art constitute and in what respect could it be considered research? Even in its most trivial form, that is art bereft of content and simply design, art is about aesthetic harmony. This as Kant argued is the basis for or the representation of the faculty of understanding, for in its formal coherence, its purposiveness without purpose, the basis for cognition is rendered visible. Art on the other hand that harbors deep content takes such formal beauty further and sets in motion a dialectic between imagination and understanding. Sublime art goes beyond even that toward the ineffable, the

infinite. To the extent some kind of understanding is produced (and this may require not simply the art object perse, but the theory, history and discourse around such works as well as the biographical, process-generated creative evolution of the "final product"), one can call the work an object of knowledge and the process by which it comes to be as consisting of research albeit a different kind of research to scientific, laboratory work or through wading through books at a library, but a more subtle interface between life as such and art-making.

The features of artistic research on a conceptual level encompass the following:

1. Unity amidst variety: formal coherence
2. Pattern, order, symmetry: the aesthetic dimension
3. Holism: synthetic truth
4. Metaphorical (art has reached beyond the mimetic paradigm): what is, is and is not (i.e., the image gives rise to a multiplicity of meanings).
5. Open interpretation – meaning in art is not fixed but evolves.

2. The pursuit of scientific research and knowledge

The scientific method over the past 300 years or so has proven extremely beneficial in the generation of knowledge, allowing for technological progress that exponentially increases over time and deeper understandings concerning the very mechanism in or of nature. It is a robust system of data collection and analysis allowing innumerable applications. It is primarily skeptical, and propositions or hypotheses need to be subject to a rigorous standard of proof using both the tools of mathematics and empirical observation.

Eliding the realist-anti-realist debate, the utility of the sciences is unsurpassed perhaps as an objective body of knowledge and an accepted standard the world-over. Nevertheless, its inquiry is primarily concerning the "what" and "how" of things, rather than speculative philosophy concerning the "why" questions or the artistic pursuit where meaning is concealed through imaginative and creative play of various kinds.

Notwithstanding this, one could argue that the sciences and arts share a common set of properties that are aligned with the features of artistic research as enumerated above:

1. Science aims at formal coherence. The assumption must be – if there is to be science at all – that nature or reality has an inherent structure. Thus, reality itself is imbued with a certain "formal coherence" and this is mirrored both in the mathematical beauty of modelling reality and in the ability to perceive a language (a syntax) that pervades nature itself.
2. One might call such formal order an aesthetic sensitivity, where both perceptual awareness or sensory information and conceptual awareness or rational analysis, reveal a certain beauty, an awe one might say, when confronted with the ten thousand things.
3. The process of abstraction is the ability to connect disparate things together and create new categories by which to name such things. This process of abstraction one might understand as the capacity to think in terms of holism, that is, how elements combine and come together as unities and wholes within causal networks that links such entities or properties.
4. Even though science is precise and seemingly literal –

the heart is a heart and nothing else besides – and therefore does not permit figurative meanings, one could still conjecture that the theoretical aspect of science constantly shifts its gaze. That is, new meanings emerge in the pursuit of knowledge.

5. Science evolves and is progressive. Nothing is taken as immovable or not subject to critique. In this way, science is open to interpretation as new theories, experiments, hypothesis, paradigms and the like are developed, discovered and invented.

3. The New Paradigm: The Interdisciplinary Nexus of Art and Science

Given the overlap between art and science as kinds of research in the generation of knowledge whose methodologies entail an aesthetic sensitivity, I propose the following idea that I dub "The New Paradigm".

I would formulate it thus: *Knowledge is inter-related which elides a clear description of reality.*

If it is the case that disciplines share similar concerns and underlying principles, then the output of these various knowledge systems all combine to give an understanding of a certain something or even the totality of somethings, that is a description of reality. However, because a) each discipline can operate separately, b) in an inter and multidisciplinary framework, knowledge is necessarily partial and c) in the fusion of disciplines, one can speak of the trans-disciplinary, the productive knowledge thus attained is an approximation, a map of things, rather than the thing itself.

Epistemologically, one talks around the object of knowledge and also acknowledges the subjective origins of such knowledge, for even science really is more accurately the human sciences. Art is not a polar opposite who origins are purely subjective, but also contains objective qualities of analysis, logic, methodological coherence and so on.

4. A Phenomenological Account - The Art's Studio and the Science Lab as sites for Research

Being in the art studio is a wonderfully gratifying experience. It somehow combines one's thinking, one's feelings, heightens the senses in the creative act of making/painting/sticking/drawing...Its methods are not sequential, and one moves from the craft of painting to intellectual subtleties that occur in this process in the simple act of pouring, flicking, drawing, coloring, dripping, squeezing, rubbing and so on and so forth. It is an awareness of the eternal present where time flies by. The result may be an object or an "image" (picture), but the "product" is the culmination of a research process that begins with inspiration and is consummated with discipline.

Science seems to be wholly different from this: it begins with the empirical and then seeks to understand the phenomenon in question through numerical relationships gleaned through measurements of that portion of reality. It builds a hypothesis to explain that manifest reality in the hope of discerning underlying laws and based on this can then quantify and make predictions concerning the phenomena in question. Its outcome or product is not an object (accept in its application to technologies), but rather factual and objective knowledge of the external world, notwithstanding the philosophically dubious nature of an "external world".

At face value, it appears that art and science are completely

different activities. Their methods or modes of inquiry both in terms of data collection and analysis are clearly distinct, in addition to the kind of results established or the form that such solutions will take. They are furthermore distinct institutions, requiring specialized training and craft with peculiar histories and theoretical knowledge. In fact, they ask different questions and contribute in their own way to society at large – science driven to produce technology, while art forms the bedrock of culture or in its more superficial form, as entertainment. They may overlap in fields such as architecture and product design or in arts such as film where certain technological prowess is required. So, what motivates my objective, namely in arguing for an overlap and meaningful dialectic between the two?

Imagine a situation where one came across a new kind of animal. What would one do both out of curiosity and perhaps fear? One might make drawings of it, both realistic and emotive. One might study it: its habitat; what it eats; how it behaves; its potential danger and so on. Now whether one is making a drawing of it or collecting data or factual knowledge, it would appear that the former is designated as an artistic understanding of this creature and the latter, a scientific one. Where then is the overlap? The initial experience – that poignant aesthetic moment – is artistic. It precedes knowledge. The consequent “drawing” and analyzing may both then be described as “scientific” – ways of taming and understanding that original experience. Such “taming” (labeling/categorizing/numerical relationships/formal relationships) also reinvigorates that initial contact and thus science or scientific investigation leads back to the artistic – a sense of the creature itself.

Consider another example: humans develop in relation to other objects from infancy – fiddling with our own bodies/playing with toys/ making things/studying faces and objects/later thinking symbolically through say language/mathematics/abstract forms/music and so on. This process of exploration need not be compartmentalized as either science or art, but a dramatic experience of the senses, an aesthetic dance with the outside world and slowly, incrementally perceiving structure, naming the manifold and then the later separation of the arts and sciences, only in their pristine, primordial state of saturation and connection to the external world, there is no such distinction.

Having argued that there may not be a clinical separation between the arts and sciences, one may develop such an argument with the concept of “flow” as elucidated by Csikszentmihályi a few decades ago. This heightened kind of awareness where time appears to dissolve as one is completely immersed in one’s work and thus operates at an optimal level, can describe both the experience of working in a laboratory (I would imagine) and studio alike (as I know only too well), thus implying that intense focus in either domain yields a similar peak performance. In this sense, doing science and art is playful; fun; may involve discoveries and is an idealized realm beyond the mundane aspects of the lifeworld.

5. Conclusion

One can begin with definitions in which case art and science are as distinct as is x and y . On closer inspection – “the definition quantum” if you like – one cannot define art and science so rigorously to exclude their intertwining nature: x and y are related terms. One could envisage this as the standard x -axis and y -axis, so that knowledge is a composite

of differing systems acting in unison; a synthesis and not simply following deductive, analytical processes. At the same time, art and science are distinct and can be “played” without any obvious overlap. Yet the point of this article is to suggest a continuum of such activities, so that the concept of aesthetics; creativity, knowledge and research becomes a multi-faceted dynamic process that includes artistic and scientific dimensions simultaneously. Just as the mind can only be known through its embodiment in action; written records; art; tools and so on, so the human capacity to know will itself create different ways to know and new standards as to what constitutes knowledge. In this sense the body and mind themselves are on a continuum. While on one end of the spectrum science peers into nature, art projects outward the symbolic meaning of matter – yet such a spectrum or line extending through a point into a three-dimensional depth (science) and then outward into a three-dimensional projection (art) are indeed the very same line.