

Undeniable Similarities in Fine Arts and Science

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Abstract

In seeking clues to the secrets of the universe, scientists send waves into the cosmos and frequently bestow odd, affectionate names – gluon, quark, charm – on their fascinating finds. Artists adopt these poetic concepts and translate them into visible forms. Technology has transformed the fundamental relationship between artist, dancers and art forms; the painter to the hand and eye; the musician to the ear; and the dancer the body and their limbs. As such, the very nature of communication between performer and public is modified. When composed with the aid of computers, art becomes a pluridisciplinary affair: painting has access to millions of hues; photography uses numerical images that can be transformed at will; and video animates these images.

The *process* of producing art, and the *process* of advancing science, they are very much the same. Like science, good art requires Insight, Perseverance, Originality, Inspiration and Innovation. The goal of science is to create new understanding of how the world works and develop practical solutions that address challenges.

Aim: This study explored the birth to ideas and forms is what makes an artist or a scientist

Key words: Aesthetics, Optics, Movement, Parallelism, Enigma,

“To develop a complete mind: Study the science of art; study the art of science. Learn how to see. Realize that everything connects to everything else”. – Leonardo da Vinci

According to the mathematician and philosopher, Bertrand Russell: ‘In Art, nothing worth doing can be done without genius; in science, even a moderate capacity can contribute to supreme achievement.’

Whereas the Artist tries to stir emotions, the Scientist has to convince. Art looks into the ‘why’; Science also raises the question of ‘how’.

At the most basic level, both Artists and Scientists strive to see the world in new ways, comprehend what they’re seeing, and then communicate that vision.

The Concept of Fine Art and Science

Fine Art is not limited to Drawing and Painting. Art also encompasses Music, Dance, Literature, Drama, and these media also have numerous historical links to branches of science.

The goal of science is to create new understanding of how the world works and develop practical solutions that address challenges, such as climate change. Artists strive to evoke a sense of beauty or an emotional reaction through their work – whether it’s in Painting, Music, Dance or any other art form. Science is designed to be objective and guided by data; art is subjective and deeply influenced by feelings and opinions.

While the outcomes of science and art are quite different, the processes involved have undeniable similarities. To innovate and inspire, scientists and artists alike have to create something original that no one else has thought of or tried before.

This doesn’t mean, however, that discovery in science and art starts from scratch. Scientists and Artists both build on what is known or already exists. The key is in seeing things from a different angle, making novel connections, and forging new paths.



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For the Cubist Painter Georges Braque: ‘art provokes, while science tries to reassure.’ Science, working towards collectively recognized and precise objectives, tries to remove ambiguities, where art accepts and even emphasizes as inevitable in the realm of subjective experience.

It is commonly thought that everyone has the ability to appreciate art, while science is accessible only to some. What is more, scientists and artists generally consider themselves very different from each other. A recent ‘left brain / right brain’ hypothesis reinforces the notion. It states that scientists, whose tasks are primarily logical and analytical, mainly use the left side of the brain; the right side, seat of intuition and imagination, would be more developed in the artist.

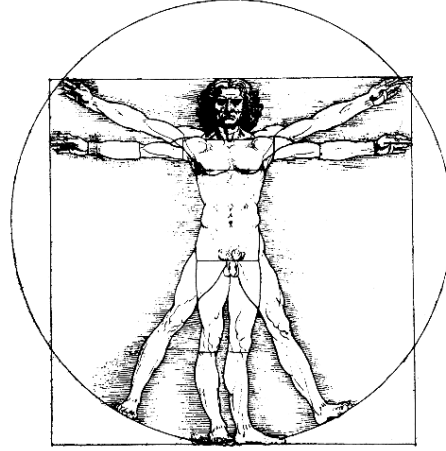
Together, art and science conquer innovating concepts, often using the same subjects to the same end. Giving birth to ideas and forms is what makes an artist or a scientist.

The Artist-Scientist

The word ‘Aesthetics’ designates a branch of philosophy concerned with the ‘science of beauty’ in nature and art. Beauty and discipline are important for both Artists and Scientists.

The best known Western historical figure who was both Artist and Scientist is Leonardo da Vinci is famous for his paintings, particularly the Mona Lisa or The Last Supper. But he was also known in multiple Science and Engineering fields; he dreamed up inventions for ahead of his time, including the parachute and calculator.

During Antiquity, human proportions were used to determine the dimensions of sculptures and monuments. This practice re-emerged in the Renaissance and is still in use. The circle



The Vitruvian Man, Leonardo da Vinci, 1492

and square in which *The Vitruvian man* is inscribed symbolized, respectively, the cosmos and the earth – analogies of macro and micro cosmos, with man at the centre of the universe.

At the Rome venue depicted in this figure, masters (with beards and hats) instruct young artists. The masters teach the principles of design, which entails both the ability to render a drawing and the intellectual capacity to conceive its design. One master displays a sheet of sketches to two students at left, while another gives a lesson on geometry in the centre. In the background on the right, a group examines a corpse is dissected to learn about anatomy. Grounding in art meant learning the rules of perspective and studying anatomy, just as it does in art schools today. Filippo Brunelleschi (1377-1446), the developer of One-Point Perspective and designer of the famous Florence Cathedral dome, was the first to bear the title of Architect. Just once century later, Michelangelo (1475-1564) would be described as a ‘genius’ by the public.



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Painting Academy in Rome, Pier Francesco Alberti (6th Century)

While Renaissance Artists dared to challenge popes, most of their scientific contemporaries had to pursue research, secretly, and were viewed as enlightened amateurs. Yet they used similar measuring instruments to those of artists, in order to respond to analogous preoccupations. In fact, artists and scientists functioned in parallel.

Some of the world's greatest Scientists – Aristotle, Alhazen, Becon, Descartes, Einstein – were fascinated by optics and visualization. So, too, some of the greatest painters – Velazquez, Vermeer and Turner – methodically analysed light, colour and image formation. And did not Titian or Bonnard paint most radiant works after they had almost lost their sight? 'What I did not draw, I did not see,' said Goethe.

In the past, researchers were puzzled by the mysterious functioning of the eye. Today, they try to understand how the brain decodes the images it receives from the eye.

Concept of Space, Time and Matter

The new concepts of Space, Time and Matter, put forth in science at the beginning of the century, can transform the imaginary world of artists.

The relationship that exists between Art and Science cannot be reduced to a simple case of an artist's appropriation and application of scientific methods and concepts. Art is not the illustration of scientific ideas; there is no cause-and-effect relationship between the two fields. Art and Science are engaged in a common struggle to confront universal questions.

One of the characteristic aspects of Art always felt a kinship: 'Movement'. Artists have always been vitally interested in movement; both Lascaux and Bhimbetka bear witness to this age-old concern. Other cultures nearer to us in time – those of Egypt, Assyria and Greece – manifested the need to make the figures in their painting and sculpture move. Later on, from the Middle Ages until the eve of the Renaissance, the artist felt compelled to represent the same figures several times – either in the same space, or in successive spaces – in order to suggest the passage of time and the idea of a series of separate actions united by their meaning.

In spite of the permanence of this concern throughout history, there have also been times when painters have wanted to represent moments of reality.

One of the most interesting aspects of the parallelism between Art and Science concerns the problem of space and its relation to matter, as well as the behaviour, measurements, characteristics and dimensions of matter. In the days when universe was viewed as a huge mechanism in which bodies or



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masses were carried also in space and time by certain forms, all of which could be measured by Euclidean geometry, the painter's task consisted of placing bodies or shapes in three-dimensional space according to the laws of perspective.

Representation and Interpretation

Towards the end of the Stone Age, 3 forms of pictorial representation had developed: 1. the imitative or realistic form, 2. the abstract or decorative form, and 3. the informative form.

During the Stone Age, physical methods for grinding pigments had already been combined with knowledge of how to extract them from nature. Black and blue were produced from Charcoal, Ochre yielded yellow, red and brown. Pigments were mixed with animal fat to make paint that could be rolled into little sticks like crayons, or blown through hollow bones – or applied with a brush made of horsehair, feathers or weeds.



Enigma, Isia Leviant

Stare at the centre dot in the picture to the left. Does it appear that the rings are moving? Now, do it a second time, but consciously fixate your eyes very strictly at the centre. Finally, stare at the centre a third time while only loosely fixating your eyes. Does the apparent flow of the rings change relative to how steady your eyes remained?

We perceived flowing movements to the concentric rings. Scientists have collected evidence to support or discount a few hypotheses. For example, brain imaging of people looking at the picture showed activity in the area of the brain that is responsible for identifying movement. This led scientists to propose that brain processes caused the illusion of movement in Engima.

Such works of Art help to reveal how the brain interprets signals. Scientists can now localize specific brain cells which interpret Colours, Shapes and other signs used by abstract painters to emotional ends.

Scientific principles behind the Bharatanatyam

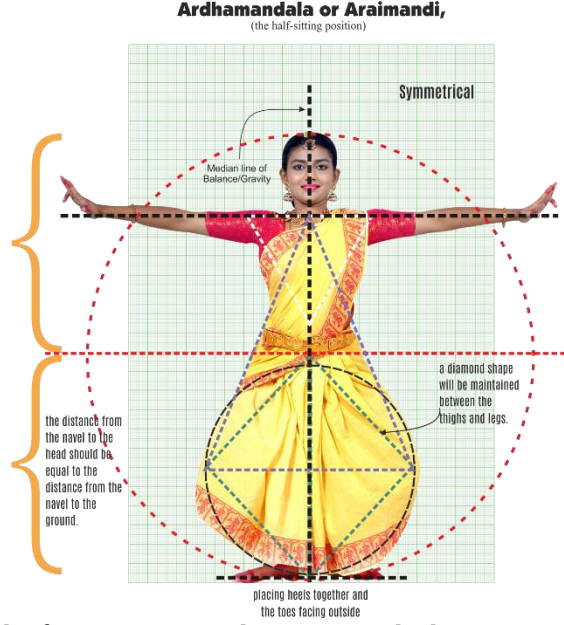
Literally, Science is all around us. Dance is viewed as an 'art' and people rarely make the connection between science. The scientific principles behind the Bharatanatyam are fascinating. Bharatanatyam is based on an ancient scientific text, '*Natyashastra*'.



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In Bharatanatyam the fast movements that increase the heart rate to cardio levels, and there are sculpting movements that cause muscles to burn fat. A well trained Bharatanatyam dancer will have extremely strong thigh muscles, due to the 'Ardha mandala' or 'Arai mandi' (half-sitting position) that is the basis of the entire dance. Her upper torso is small and light to allow for flexibility. Her biceps and triceps are nicely outlined because she holds her hands such that the elbows are in a horizontal line with her shoulders.

When this 'Arai mandi' is not done exactly as specified, the weight of the body is borne by the knee joint rather than the thigh muscles, leading to joint pain and degeneration. It is similar to the emerging understanding of the scientific basis of Yoga, there is a growing scientific basis of Bharatanatyam.

Another important point in Bharatanatyam is visually striking colours and make up. Which is based on the study of Botany. The dancers used red-dye for their hands is derived from specific types of Lacs. Through the scientific research, The Indian Institute for Natural Resins and Gums is warning that the use of synthetic alternates are reviving the use of natural lac due to its therapeutic effects.

Conclusion

We are about to enter a new millennium with as many unanswered questions as our 19th century forebears raised when Darwin formulated his theory of evolution; Dancers and Painters bade farewell to conventional representation and beauty as the ultimate aims of Art. What is more, in the 18th century, machines were already expected to replace humanity... yet we are still here. Artists and scientists have mutually contributed to the cause of visual communication.

Artists and Dancers should not try to study the vast details of scientific theories or concepts but should instead grasp the fundamental principles and general philosophy underlying these ideas and use them in artistic research. The real benefits of science to mankind lie in the improving application of scientific principles.



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