“ARTADEMIA”

Visualizing and Animating Academia for Multi-Modal Learning

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Modern academia is built upon only two of the first three or "trivium" of the original Seven Liberal Arts of Plato's Academy: Grammar and Rhetoric. Logic has been ignored, probably since it would become obvious to even young children that the construction of the English language, unlike the Greek, is utterly illogical. Arithmetic is the only subject of the "Quadrivium" to have survived in General Education. The other three subjects, Geometry, Music and Astronomy have been isolated from each other and relegated to specialized or elective study. All we know about the Greek curriculum is the English version of what monks translated into Latin 900 years ago, 1500 years after Socrates died condemning Writing. He believed it would cause us to lose our oral history and our ability to remember, perform, and pass on ancient wisdom. The greatest loss has been in the logical and musical structure of the Greek language, which we can barely comprehend in the English translation of Greek thought.

The "Academic" dictionary definition:

1. [n] an educator who works at a college or university
2. [adj] hypothetical or theoretical and not expected to produce an immediate or practical result; "an academic discussion"; "an academic question"
3. [adj] a narrow focus on or display of learning especially its trivial aspects
4. [adj] associated with academia or an academy; "the academic curriculum."

My "ARTademic" definition:

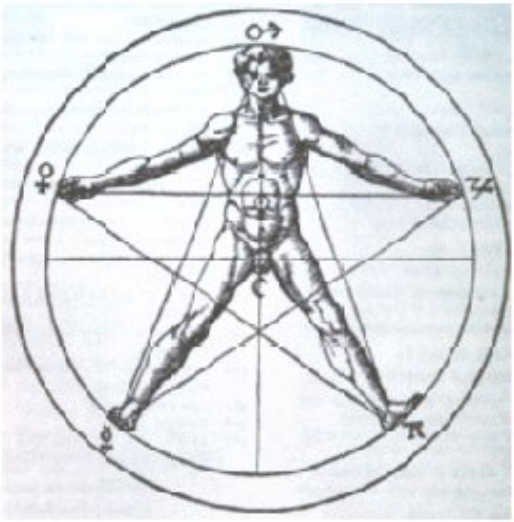
1. [n] an educator who works at an ART college or university
2. [adj] NOT hypothetical or theoretical but expected to produce an immediate or practical result; "an artademic solution"; "an artademic answer"
3. [adj] a harmonic focus on or display of learning; especially its quadrivial aspects
4. [adj] associated with artademia or an art institute; "the artademic curriculum."

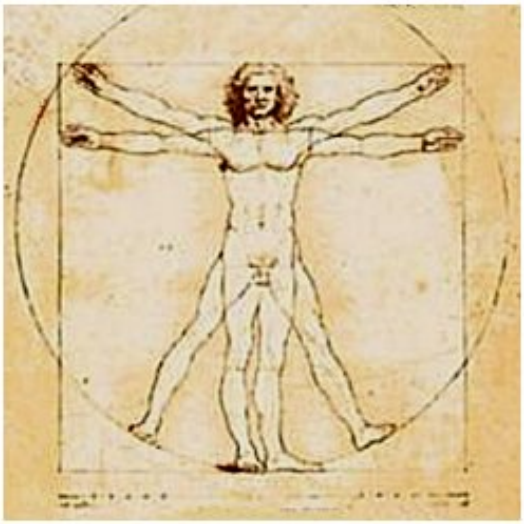
The academic environment has historically favored learning by written language and mathematical calculations, with little or no graphical

references. This approach doesn't work for artists and needs to be expanded into the larger educational needs of multimedia professionals, hence the reason for the term "Artademia" and its focus on communicating and learning in different ways, using various media.

Traditional graphic art and design fields are most impacted by the rapid switch to digital media production. The new media artist must not only learn the traditional foundations of art and design, but also be computer savvy and fast. They need to know several software tools, and possess a number of skills borrowed from the careers of people they will be working with. These include various animation techniques, character development, costume design, architecture, staging, lighting, cinematography, acting, writing, and directing their own performances. This is an appealing new career option for high school students planning for college. So teacher education is critical and it has to happen at all levels and in all subjects very quickly, because it's about the way we really learn, and have been prevented from learning by the educational establishment.

The components consist of drawing instruction, visual imagery, humor, music and non-decimal mathematics, connected by geometry and a phonetic alphabet which visualizes sounds with more accurately designed iconic shapes and sequences. To make the concept as simple as possible and easy to understand at all levels, Artademia connects math, music and language via the geometry of one drawing: DaVinci's Vetruvian Man.

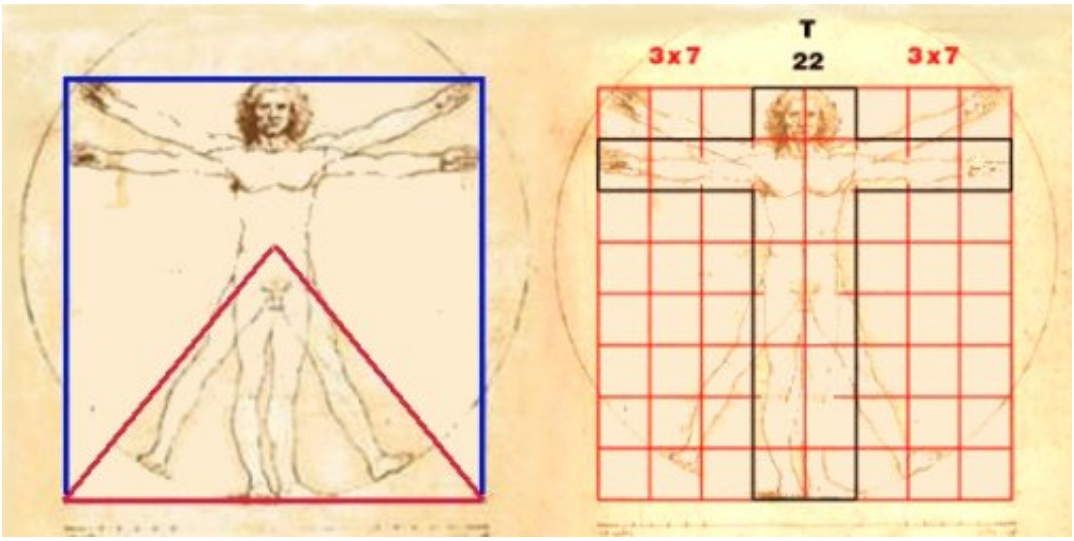




VITRUVIUS 90 - 25 BC

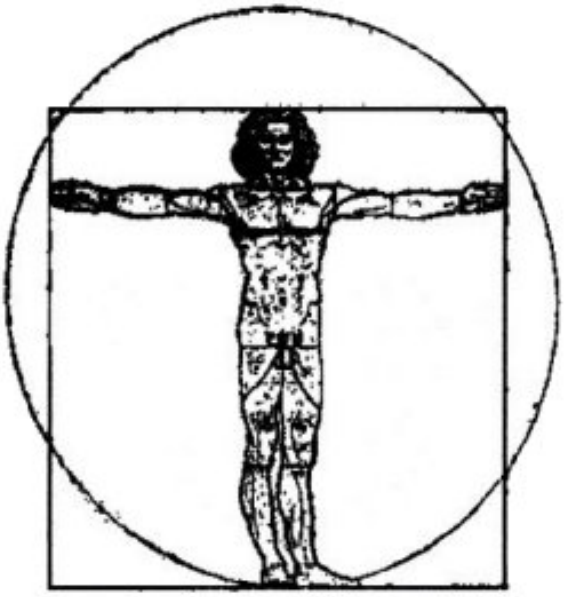
Marcus Vitruvius Pollio was a Roman building architect and engineer for Julius Caesar and a designer of siege engines for Octavian. One of ten books he wrote later in life, *On Architecture*, delineates the technology of the time, and was the primary architectural reference in the world until the Renaissance. He also wrote about such subjects as city planning, building materials, pumps, acoustics, water clocks, sundials, astronomy, law, medicine, music, and the arts. This is who DaVinci studied.

The wisdom of Vitruvius came from the Greeks. His Zodiacal man came from Pythagoras of Samos, four hundred years earlier, who was a descendent of a long line of philosopher scientists, dating back to 2500 BC.

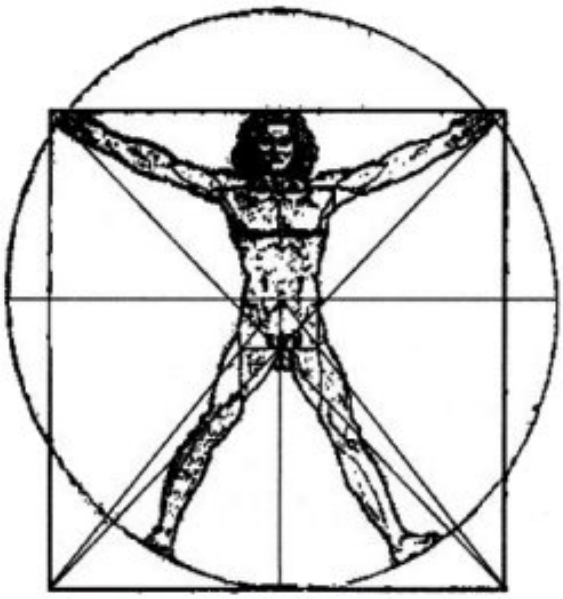


DaVinci 1452-1519

Like his ancestors, Pythagoras studied in Egypt. And like Pythagoras, DaVinci borrowed sacred Egyptian geometry from their priesthood to redesign the Vitruvian man. Long before the Renaissance, Pythagorean concepts and symbols were relegated to paganism, in particular the pentagram. DaVinci's design is of the man-god, Pharoah, constructed from the knowledge of Philosophical Geometry, which includes the Golden Mean, the Fibonacci Spiral, proportions of the Great Pyramid, and the Harmonic structure of Music, all of which contain the Phi proportions of the pentagram, without showing it. He perpetuated the ancient wisdom by embedding it in Christian symbolism. This is translatable into any of the 6800 languages on Earth, and in any religion, because it is displayed in that universal language of Art. This is the real DaVinci Code.

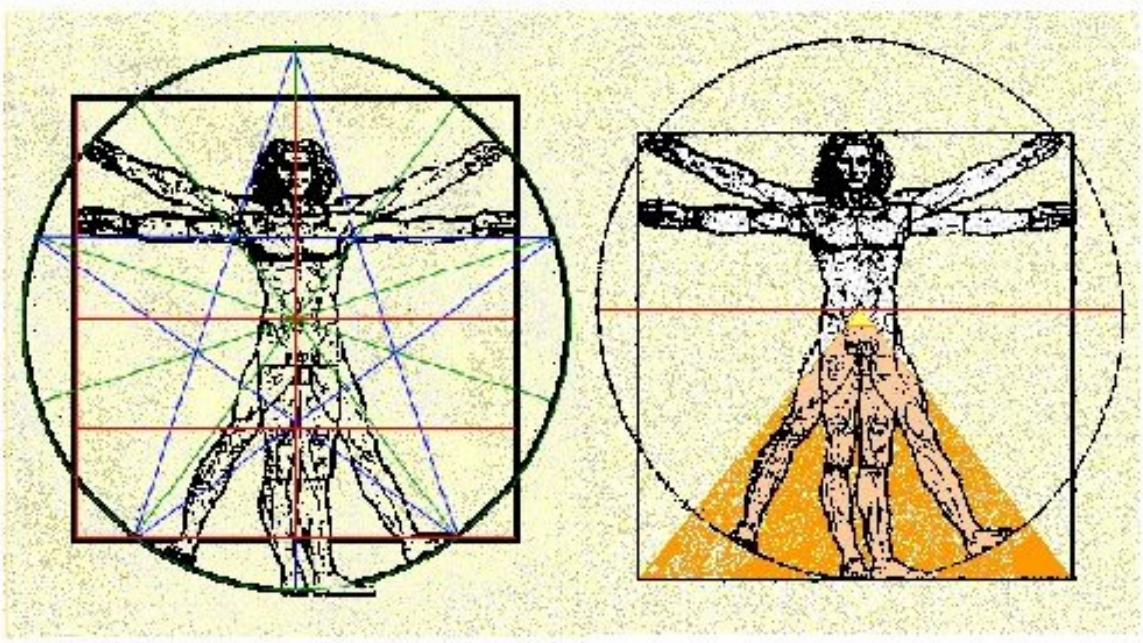


"Squaring the Circle"
Perimeter = Circumference

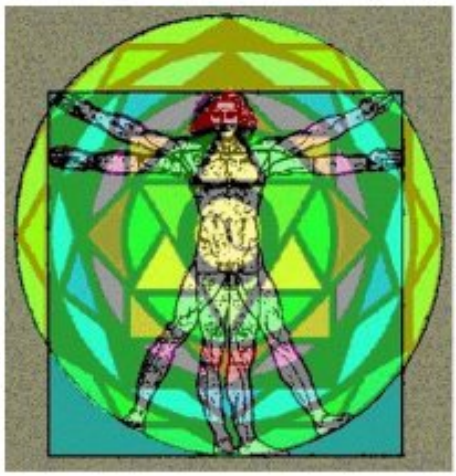


Radius = 280 Side = 440
Circumference = 1760

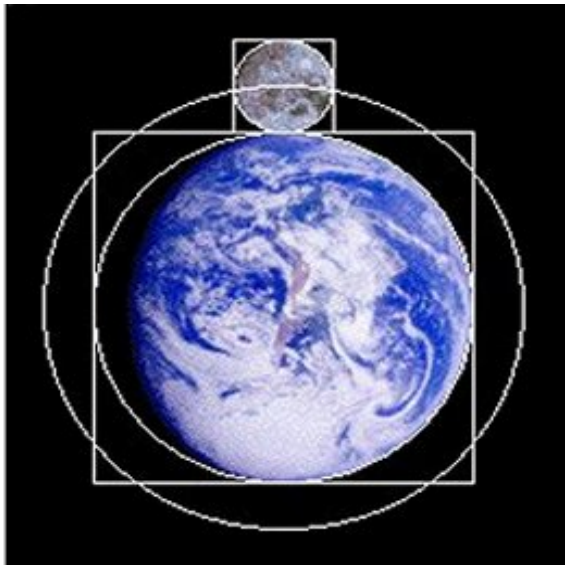
The dimensions above are based on the cubit. Inside the square, DaVinci shows that the length of the outstretched arms of the perfect man equals his height. Inside the circle, the position of the figure shows the radius emanating from the navel, the diameter cutting the square at the Phi ratio, giving the height of the great pyramid, and the fingers point to the intersection of the circle and square, symbolizing Heaven and Earth.



Above left, the square is centered on the circle, marking the intersection of the circumscribed pentagram. Above right, with the square at the base of the circle, the silhouette of the proportions of the Great Pyramid puts the peak of the missing capstone at the navel, establishing its height as one-sixteenth of Phi. Below left are superimposed nested Platonic solids, the dimensions of which represent the cycles per second of a major chord, with the missing capstone being the interval. This connects the Man to the World and the World to the Heavens, via the astronomical Music of the Spheres.



This is just a small portion of the knowledge possessed by the Egyptians and the Pythagoreans, upon which Plato built the Quadrivium of his Academy. It is the loss of this knowledge, which can be learned only through the Arts, that necessitates the resurrection of Plato's Quadrivium, via the multi-modal learning approaches of Artademia.

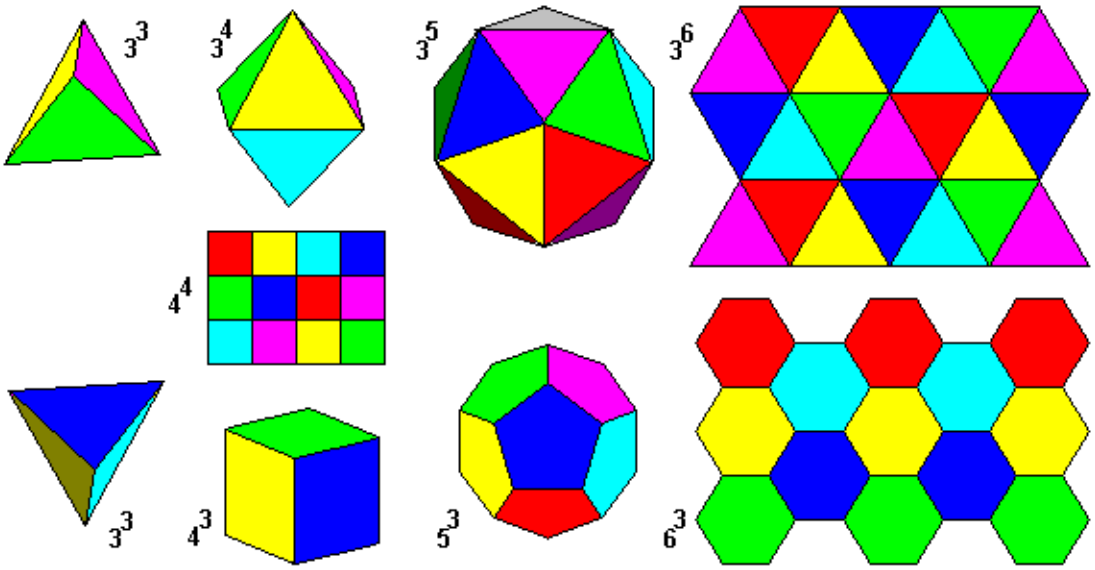


PLATO 427-347 BC

The motto for Plato's Academy was:

ΑΓΕΩΜΕΤΡΗΤΟΣ ΜΗΔΕΙΣ ΕΙΣΙΤΩ (AGEOMETRETOS MEDEIS EISITO)

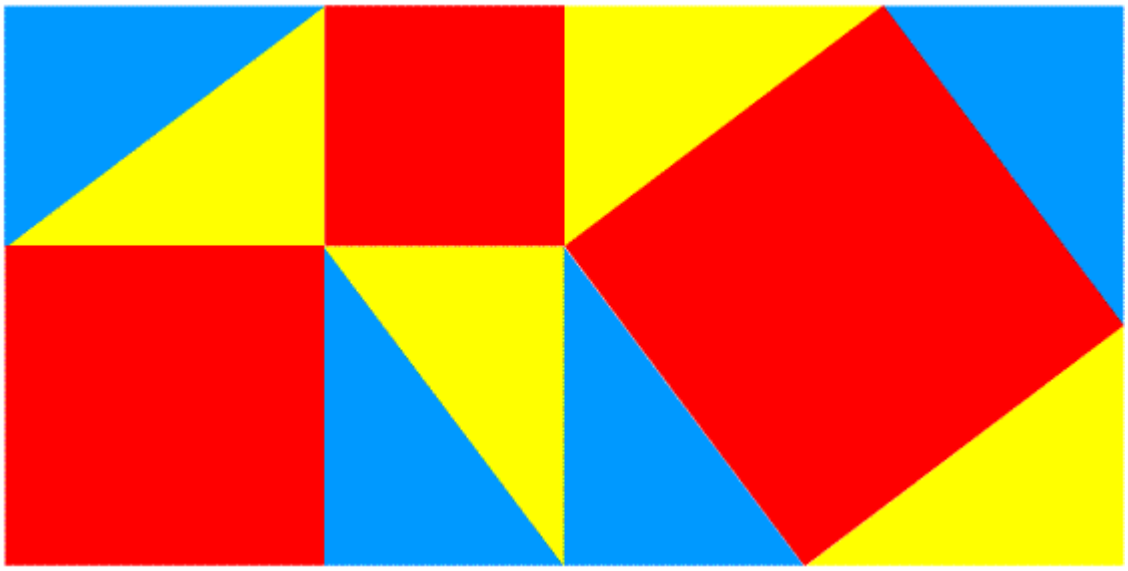
"LET NONE IGNORANT OF GEOMETRY ENTER HERE."



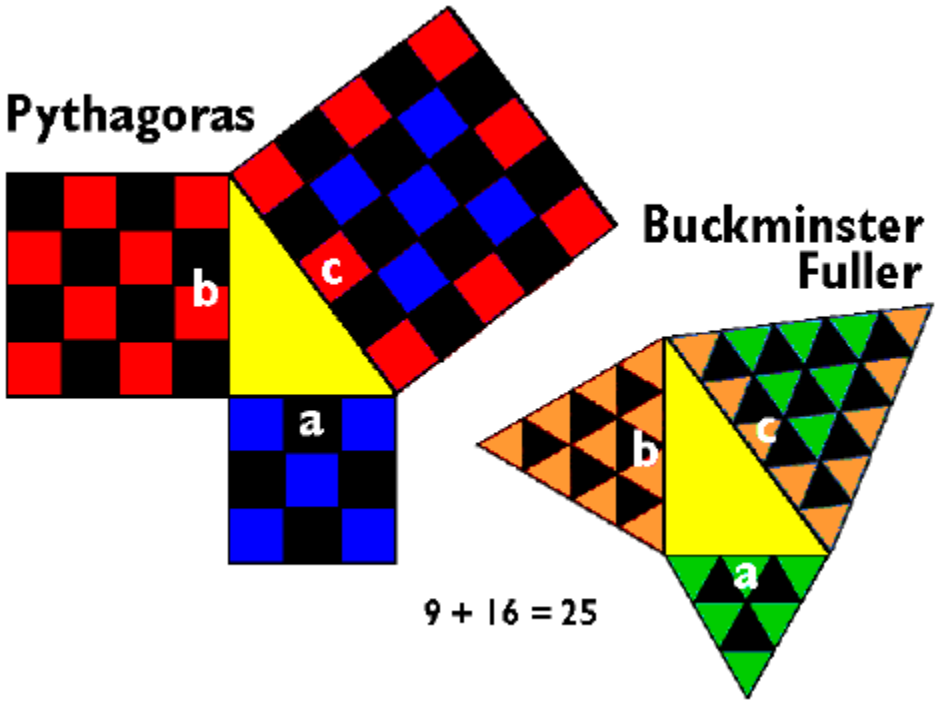
The Platonic Solids

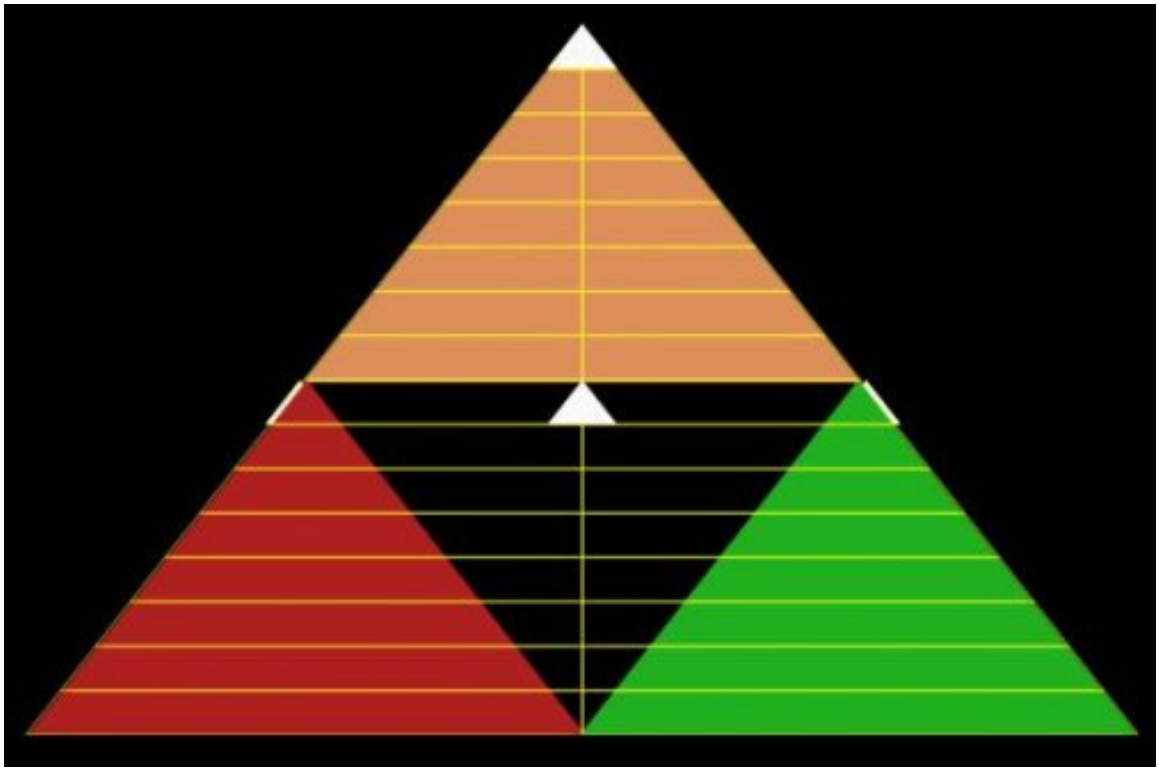
Plato's knowledge of Geometry, Mathematics and Music was passed down from Pythagoras. But modern academia seldom displays Pythagoras' own visual of his theorem, nor even acknowledges its relationship to musical harmonics and the measurement of time. In my own life, not one teacher ever mentioned that Pythagoras was also a musician and that he used his mathematical knowledge to build, tune and play his own instruments. Every harmonic note is related in 3,4,5 ratios, and time itself is calculated in subdivisions of 60, which is 3 x 4 x 5. This simple fact allows music, and the time through which it flows, to be visualized in 3D space.

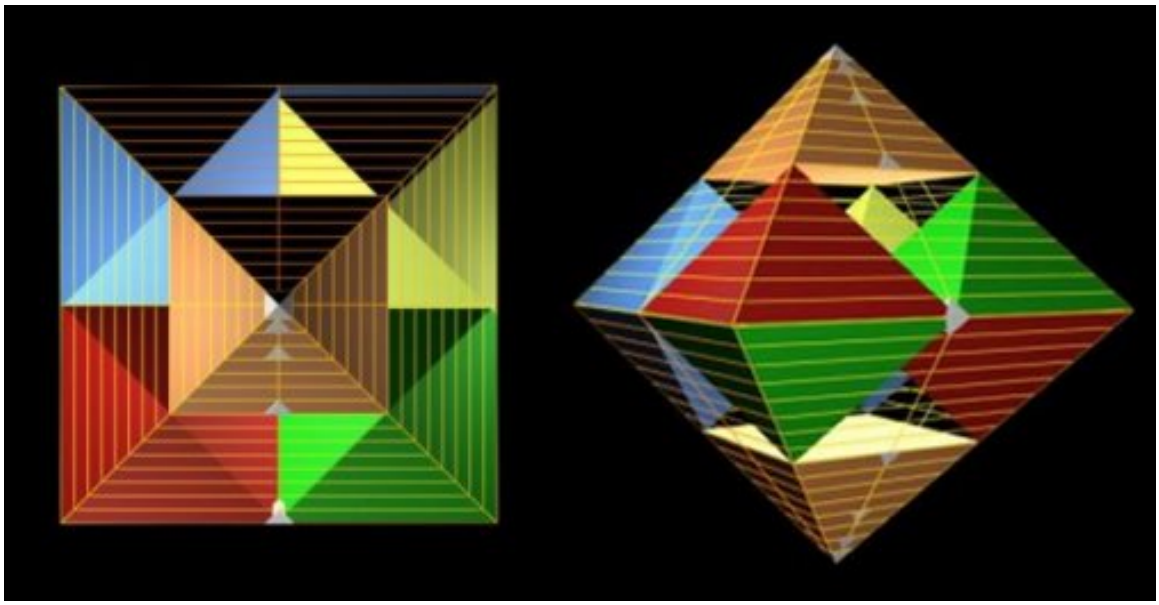
PYTHAGORAS 569-480 BC



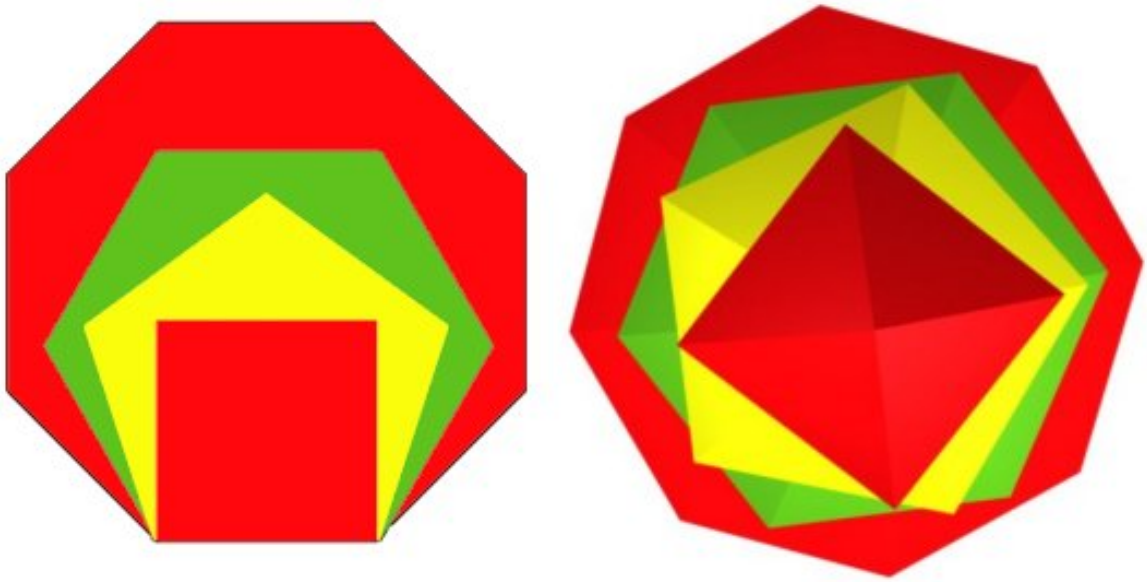
A squared plus B squared equals C squared.





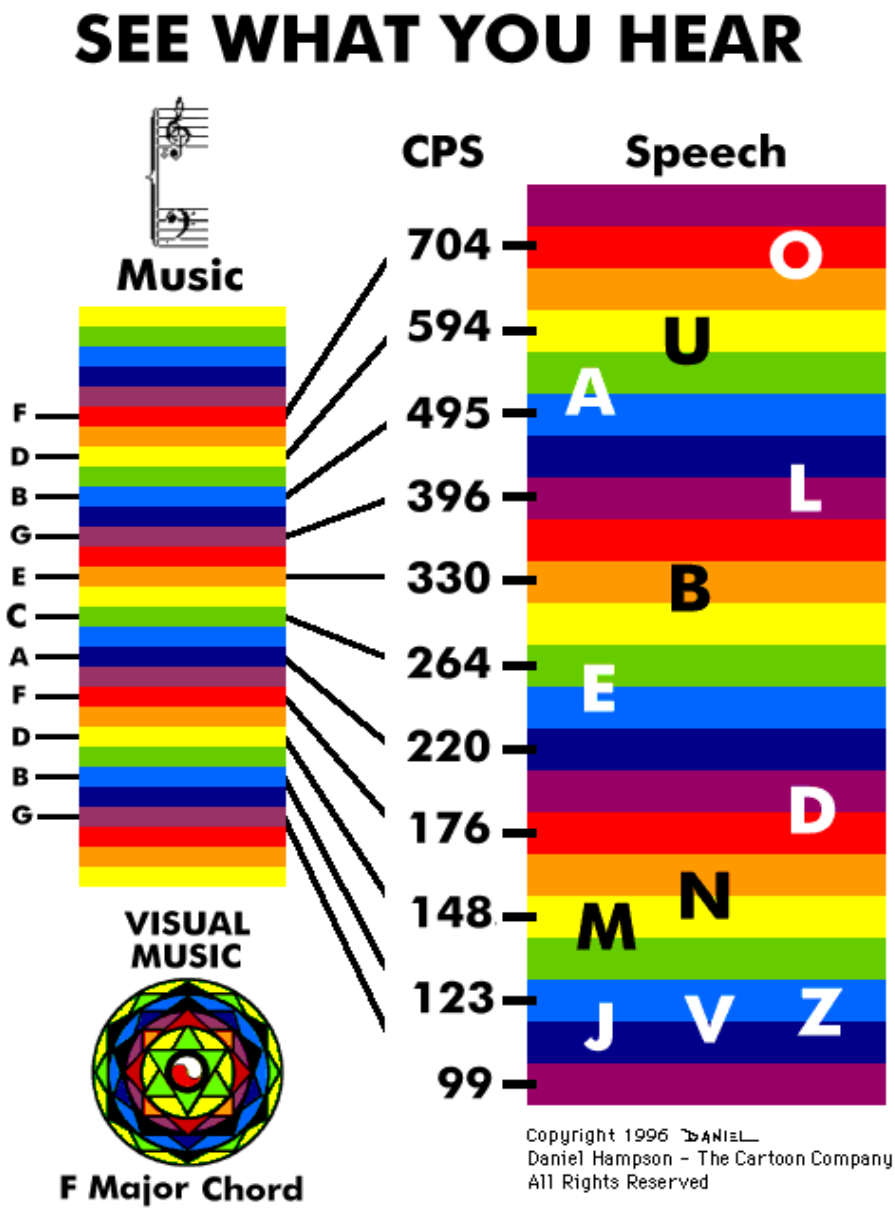


The white triangles are in the proportion of the missing capstone of the Great Pyramid. These are top and side views of an octahedron with open spaces where additional pyramids and tetrahedrons would be if it were solid. All of space can be filled with these objects and measured. It is the Cosmic Matrix.



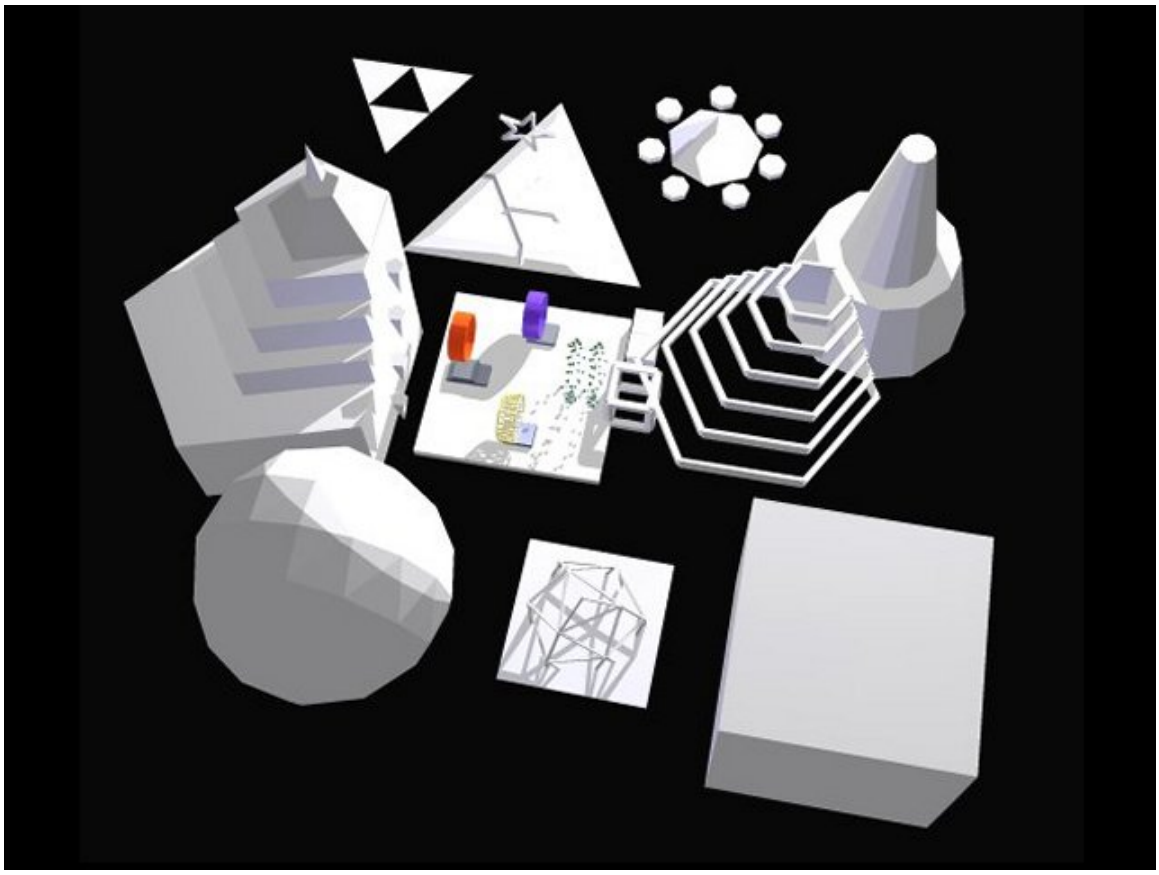
Above left is a square, pentagon, hexagon and octagon, with sides of the same length. This is the geometry of a perfect major chord, in two dimensions. Above right are the same objects in three dimensions, seen from above, centered and spinning. The proportions seem to change because of perspective. The square pyramid is much closer to the eye.

Below left are two transparent, intersected tetrahedrons, which appear to be a cube, looking at it from one direction, and a hexagon from another. Below right are four of these objects, mirrored to reflect their environment. These exemplify the application of new media and 3D technology to enhance the understanding of ancient philosophy and mathematics. This is Artademia at work.



This is part of the Artademic "MatheMusical" visualization program, showing twelve phonemes, in cycles per second, superimposed over musical notes, as if they were wavelengths of light, forty octaves higher than audio. This displays the manner in which the Arts can increase understanding. In this case, you can see the sounds of speech and musical tones that would not be heard by those with a low frequency hearing loss.

SOCRATES 470-399 BC

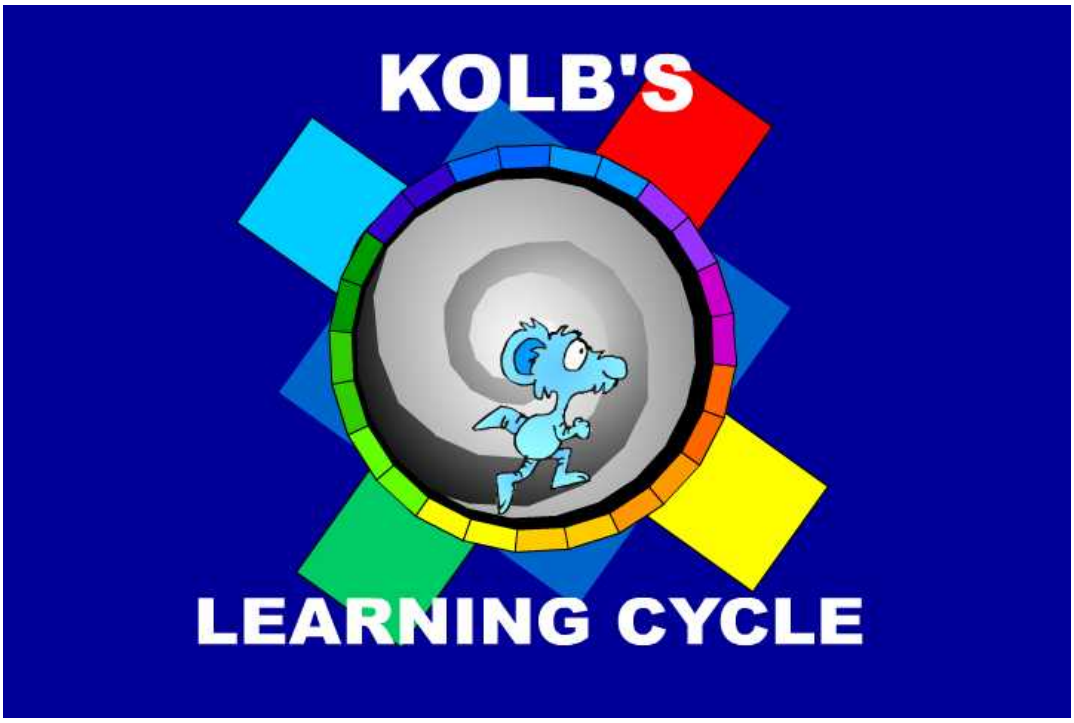


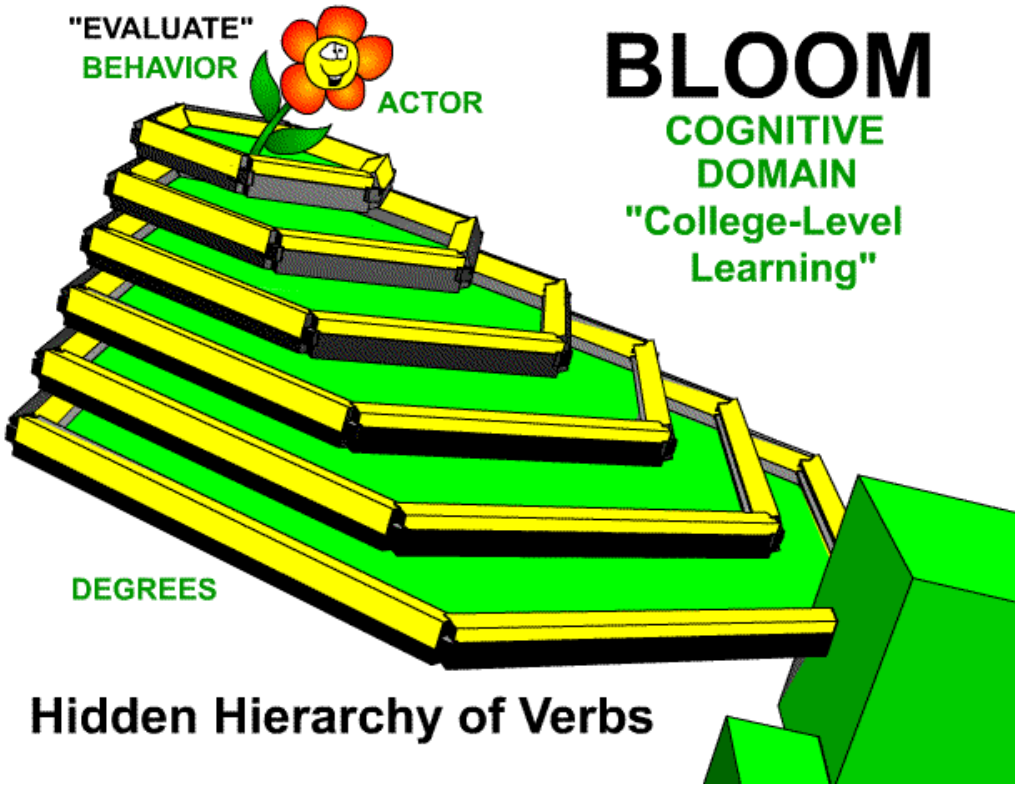
Memory Castles

Ancient Greek orators devised sophisticated systems of memorization, which Socrates referred to as “memory castles.” For example, the sequence of thoughts in a speech might be associated with the rooms in the orator’s own home. As he visualizes himself strolling through the house, each thought can be recalled through its connection with a specific object in each room, like a vase, a painting, a window and so forth.

Using this technique, I have visualized different geometric shapes to represent the mind map of the collection of theories I use to develop my learning environments. Kolb’s learning cycle, for example, is a series of four wheels, through which lab rats scamper. Bloom’s cognitive hierarchy of verbs is a terraced garden, where talking flowers bloom.

KOLB and BLOOM





RESEARCH

Artademia: "Visualizing and Animating Academia for Multi-Modal Learning"

For the past thirty years my life has been a series of experiments and informal research projects designed to ascertain how best to help people integrate the Arts into their lives. My first experiments resulted in the development of a sequence of characters, which became my Startooning drawing workshops. These soon generated a number of interchangeable facial expressions, which initially categorized character emotions. From there it gradually grew into dozens of characters and ultimately into a visual arts curriculum. From this foundation, I have developed and taught eight college courses in Drawing, Animation and Game Design.

TOPIC

Areas of Interest:

1. Differences between "Fine Arts" and "Applied Arts."
2. Cognitive level of Arts.
3. Impact of Arts on learning.
4. Ways "New Learners" think.
5. Appropriate methods to upgrade teacher training.

Preliminary Inquiry:

About Education:
Can Gen Ed teachers learn to teach the Arts?
How can Arts professionals be trained to teach?
Will either group be willing to change and integrate?
How do we interpret images, and within what context?
How can Advertising Art techniques be adapted for use in Education?
What impact will Arts research have on Education at all levels?

About Arts & Cognition:
Does training in the Arts change how the brain processes information?
Do these changes in brain processing affect how an individual acquires new information?
Is there a transfer to other domains or academic subjects?
What brain regions are activated by Arts training that may be used in other tasks?
Is there a critical period for acquiring an Arts education?

RESEARCH QUESTIONS

1. "When you think, do you see movies in your head?"

My wife, Lynn, asked me this question after she came home from yet another educational workshop in 1999. I responded, "Well, duh, how else would you think?" When she just stared blankly at me, I asked the follow-up question, "Don't you see movies in your head?" She replied, "No, I don't see anything." She then related to me the story from the first Lindamood – Bell workshop she had just attended, entitled

"Visualization and Verbalization." Like Lynn, Nanci Bell and Patricia Lindamood were special education teachers. One day, after encountering great frustration while working with a "learning-disabled" child, they asked him to describe what happens when he thinks about something. He replied that he saw movies in his head. This amazed them as much as it amazed my wife. My amazement went beyond theirs. I was stunned speechless. My wife has a Bachelors degree in English, a Masters in Education, an MBA and almost every teaching and administrative certification possible. She was the Special Education Early Childhood Coordinator at the State Board of Education for seven years. We had been married for twelve years and never had a conversation about the way we think. The great "AHA!" moment in my life had just occurred. "So that's the problem with Education!"

Lynn and I continued this discussion every evening after she came home from the week-long series of workshops. I took the question to my fellow faculty members. The Art faculty looked at me and said, "Well, duh, how else would you think?" The Gen Ed faculty stared blankly and said, "What do you mean?" The AHA! Moment grew into a week, a month, a year, and then an obsession. What was going on? Roger Sperry won the Nobel Prize in 1981 for the research he did in the 1960s on brain hemisphere functioning and cognition. There are over fifty learning theories out there which nobody has built upon the "Right Brain" way that artists think! They've never even asked the question! So I typed out a quiz for my students, which included the question, and added it to my syllabi. I began incorporating my story into my introductory lecture for each course. It became apparent to me that non-artists were being routinely recruited into art schools because nobody in the bureaucracy has ever heard the question and to this day cannot comprehend that all animators see movies in our heads and that you cannot learn to become an artist unless you can pre-visualize the imagery in your mind before you draw it. This question should be asked of every student and teacher at every grade-level today, right now. Collecting the answers could profoundly change Education. For academic stakeholders, unfortunately, it could also lead to a lot of questions about how it has been possible for administrators to be oblivious to such a dichotomy of thought processes in the populations that they supposedly serve, especially with the "No Child Left Behind" mandate. Artists have always been left behind to fend for ourselves in what we consider to be an academic wasteland. And there is a racial bias. People of color have a greater proclivity for visual thinking and learning than do whites. When I brought this situation to the attention of an attorney friend of mine, he told me that long ago the State Legislature decided that schools could not be sued for "malpractice."

2. "What are the primary images that all Animators should have in common?"

Without a History of Animation course, students have no common visual framework for the industry into which they plan to enter. To become more specific, and to concern ourselves with the primary stakeholders, the students themselves, I asked the Animation faculty to prepare their own list of what they consider to be primary imagery. It has become obvious that the Game Arts students have a significantly different collection of shared imagery. Further, this question deals with providing a shared environment for students that have been victimized and excluded from Academia most of

their lives, without dealing with the larger questions of the "academicization" of the Arts, and without coming into direct conflict with the General Education curriculum. While I don't prefer the isolationist approach, it is the path of least resistance. Unfortunately for all the non-artists at the school, it is also the path of least change and least enlightenment.

3. "What images connect an Art curriculum to a General Education curriculum?"

This is the most functional question concerning the practical application of research to the integration of Arts into General Education courses at my own workplace. My goal here is to create a shared activity among faculty and students across the entire curriculum. Focus on the appropriate imagery for building a website, or producing a TV show, for example, is not seen as an accusatory or threatening stand against the failure of Education. Rather, it is seen as a positive educational approach to helping Art students better appreciate the range of applications of their future work in subject areas outside the entertainment industry, like Academia.

4. "Does training in the Arts change how the brain processes information?"

This larger question has never been completely answered. It is now the most important question that Dana Foundation research is asking about arts and cognition. For years, Education has used every excuse possible to remove arts programs from schools at all levels, even after Sperry's neurological research. There is no equivocation in my own mind that the answer to this question is YES. Some of the things that I have learned to do through the Arts should stand as examples of that fact. But this new research should provide more specific qualitative details about the process. Perhaps the removal of arts programs will no longer be acceptable when it's proven that such actions also prevent brain development. My belief is that we can use the Arts to research, link and identify the people historically responsible for making these decisions and hold them accountable, either for their own ignorance or for the crimes of omission they have perpetrated against humanity, whichever shakes out.

REVIEW OF LITERATURE

The literature on this subject falls into the categories of Arts and Cognition, and Arts-based Curricula for Multi-Modal learners. Research has been done on this subject for forty years, but seldom adapted to academics. I believe that part of the reason for that has been the segmentation of the data into specialized subjects and fields of study that use esoteric vocabularies, such as psychology, neuroscience, and research, which are quite removed from the study and practice of both General Education and the Arts. The significant authors that have potential impact on the development and delivery of Artademic materials in Art are: Betty Edwards, Arthur Eflund, and Edward Tufte; in Science; Michael Polanyi and Donald Hoffman; in Neuroscience, Roger Sperry and Michael Gazziniga; and in Psychology; Rudolf Arnheim and Howard Gardner. Some of their specific works, and those of lesser known authors are included in the bibliography.

Reflections on Reflective Thought

The academic model would like me to make some connection to reflective thought, via John Dewey's definition, or some other well-published theorist, like John Van de Walle. Dewey's thoughts on the subject are a hundred years old now and as much as academics like to quote him, I haven't seen education improve much since he was around. Van de Walle is a mathematician and he probably could tell you more about this math than I could. But I doubt that he's ever incorporated the math of making a musical instrument in any of his grade-school or middle-school textbooks that he's so famous for. So let's reflect upon that.

"Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends, constitutes reflective thought." John Dewey, How We Think 1910.

Okay, but I don't know anybody that talks like that and I don't want to learn enough to hang out with them, so let me give you my definition: "Reflective thinking is re-evaluating what you thought before." That's what I did to first, learn about music, then learn about guitars, then learn about tuning, then learn about math, then learn about geometry, then learn about design, then learn about playing, then learn about vibrations, then learn about the tools to construct something myself that would sound the way I wanted it to sound. I've learned from meditation, contemplation, and self-reorganization. I learned the most experientially. Some of it was certainly transformative.

Constructivists might say something like "cognitive schemas" exist in my mind, which determine how well I can formulate an idea. Brain researchers might use another term, like "neural networks" to explain the interplay between my constructed knowledge and my developing mathematical concepts. As an artist, I will tell you that I learned by making connections. The missing verb form of art, which is "arz," means "to connect."

My own reflection about this lengthy five-year creative adventure is that both those dreams, and others I've had, came from outside myself. I received information and acted upon it as best I could for the purpose of learning something. I never concerned myself with pondering what the source of the information was, the mechanism by which I received it, nor what the implications of my belief might be. Nor did I consider the relevance of what I was learning or what I might learn in the future. I was just trying to ride the wave. And I'm still on it.

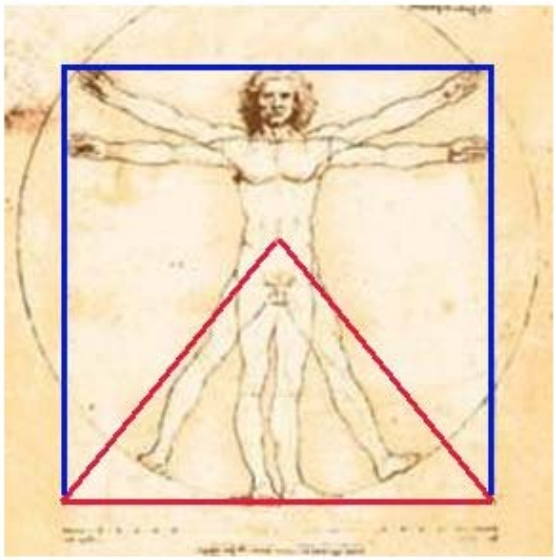
The difference between my reflections and Dewey's is that mine have been in multiple media. The ancient Greeks and Egyptians approached education believing that there were at least three different media in which an idea could be expressed: language, either written or oral, symbolic mathematics and geometry, or art. I have done that and added a fourth medium, music. Herein is contained the difference between the traditional one-dimensional, academic pursuit of writing about what you read and the Artademic theory, which exists only when it is put into practice, by creating another medium.

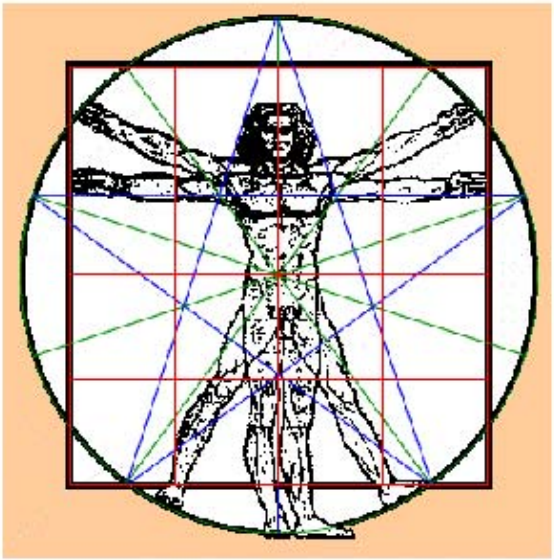
Secret Learning

Abraham Lincoln once wrote in a long letter to his wife that he was sorry he didn't have the time to make it short. Here I am, twenty years down the road, reflecting upon five years of experiential learning that profoundly changed me. Twenty pages seem pretty short to adequately explain the learning. But it isn't. This is what I learned and how I learned it. Each picture is worth another thousand words. Read them. Going through the other events in my life during that process would certainly take longer. I moved. I got married. We had a baby. I started a new business. I made a TV series.

It might be more marketable if I wrote the screenplay. More suspenseful if I open with my running from the Devil, for I certainly was. More spiritual if I included my search for God, but He had already found me when I wasn't looking. I could include the many other tormented days and nights of thoughts and dreams, but they become redundant.

I will tell you the secret of how I did this. I measured. That's how I learned it all. No amount of reading about this, no extended bibliography, no other modality could replace the simple act of just measuring stuff. Measuring reveals the underlying patterns of everything we study.





The one image I used over and over was DaVinci's Vetruvian Man. Contained in its geometry are the proportions of the Great Pyramid. The missing capstone is one-sixteenth of its height, which serves as a musical interval upon which can be constructed a visual, three-dimensional harmonic sequence of the Earth and the solar system, directly related to human geometry. In that one drawing, DaVinci encoded all the words and buildings that Vetruvius, the Greeks, and the Egyptians ever constructed, available to anyone, in any of the 6900 languages on our planet. This is multi-modal learning. It has been ignored by, and removed from, academia. At some point we all must ask if that has been purposeful, or casually done out of incredible ignorance.