Universal Principles of Design

REVISED AND UPDATED
25
ADDITIONAL DESIGN PRINCIPLES

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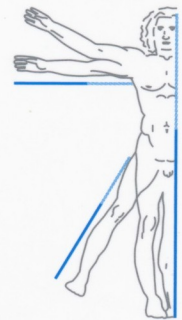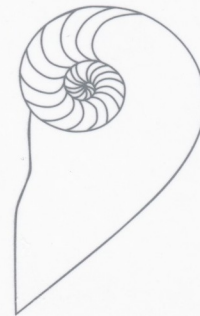
125 Ways to Enhance Usability, Influence Perception,
Increase Appeal, Make Better Design Decisions,
and Teach through Design

Rosetta Stone

A technique for communicating novel information using elements of common understanding.
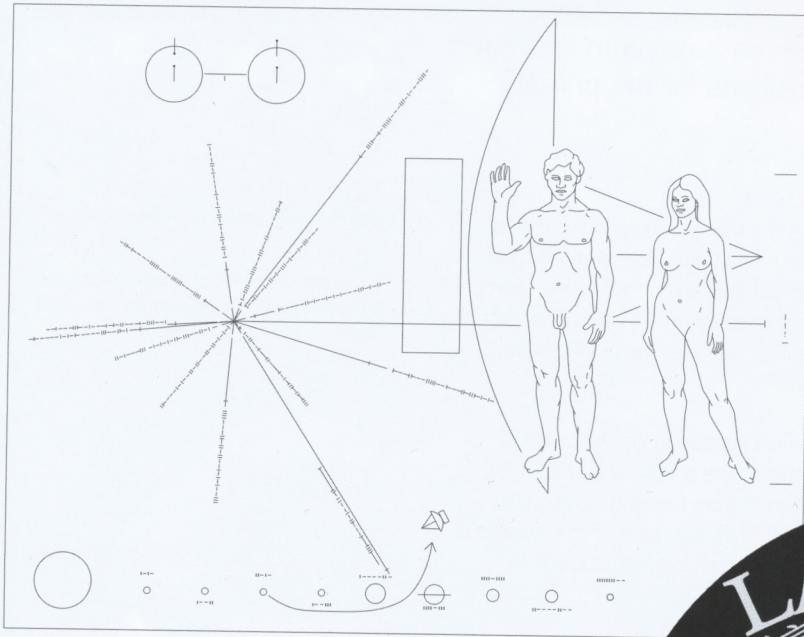
At some point during the fourth century, all knowledge about ancient Egyptian scripts was lost, leaving no way to decipher extant hieroglyphics found on papyrus documents, stone tablets, and Egyptian monuments. Then in 1799, Napoleon's army discovered an Egyptian artifact that contained writing in classical Greek and ancient Egyptian. This Rosetta stone, as it would become known, enabled scholars to use their extensive knowledge of Greek to comparatively translate the Egyptian texts, which turned out to be hieroglyphics and Demotic, a cursive form of hieroglyphic script. The Rosetta stone illustrates the power of embedding elements of common understanding in messages to ensure that their meaning can be unlocked by a receiver who may not understand the language of transmission. The principle has broad applications, ranging from the design of effective instruction (e.g., using familiarity with one concept to teach another) to the development of games and puzzles (e.g., crossword puzzles) to devising communications for extraterrestrial intelligences (e.g., plaques designed for the *Pioneer 10* and *Pioneer 11* space probes).[1]

Applying the principle involves two basic but nontrivial steps. First, identify and embed an element of common understanding, or a key, that the receiver will understand. For example, researchers in extraterrestrial communication speculate that mathematical concepts (e.g., prime numbers, pi, the Pythagorean theorem) are strong candidates for keys in any attempted E.T. communication because of their universality—irrespective of differing perceptual faculties and cognitive systems, any civilization advanced enough to send or receive radio signals or recover a space probe will necessarily have an understanding of fundamental mathematical concepts. It is critical to make the key identifiable as a key. The breakthrough that enabled the deciphering of the Egyptian text on the Rosetta stone was discovering that the three languages represented a single message, a fact that was not at all evident. Second, construct the message to be revealed in stages, with each stage acting as a supporting key for subsequent stages. For example, in designing crossword puzzles, there are words that are relatively straightforward and solvable based on the clues provided, and then there are words that can be solved only by filling in the intersecting words, in many cases permitting the discovery of the solution without ever solving the clue.

Consider the Rosetta Stone principle to lay the foundation for communication and learning. Incorporate an element of common understanding to be used as a key for the receiver. Make it clear that the key is a key. Generally, favor keys that reference concrete objects that can be detected by the senses versus abstract concepts. When no verifiable element of common understanding can be identified, consider embedding numerous keys in the message, and referencing archetypal and universal concepts.

See also Advance Organizer, Archetypes, and Propositional Density.

[1] See, for example, *The Rosetta Stone and the Rebirth of Ancient Egypt* by John Ray, Harvard University Press, 2007; and "A Message from Earth" by Carl Sagan, Linda Salzman Sagan, and Frank Drake, *Science,* Feb. 25, 1972, vol. 175(4024), p. 881–884.

Carl Sagan, Frank Drake, and Linda Salzman designed this plaque for the *Pioneer 10* and *Pioneer 11* space probes. The plaque utilizes a number of keys to help extraterrestrials understand the "who, when, and where" of the probes. The most effective key, the image of the craft itself, gives the receiver an easily decipherable comparative to determine the appearance and scale of the senders as well as the solar system from which it came. Less effective are the abstract keys representing the hyperfine transition of hydrogen (top left) and the relative position of our solar system to fourteen pulsars (middle left).

What intelligent species, if any, will be around 10,000 years from now? How will they decipher the many artifacts we are leaving behind? The Rosetta Disk is a durable titanium-nickel human language archive designed to survive for 10,000 years. It contains more than 1,500 languages and 13,000 documents micro-etched onto its 3-inch (7.6 cm) surface. When knowledge about the audience is in doubt, use lots of keys.