

Craftsmanship as an Educational Concept:

An Historical Exploration of Vitruvius' *de Architectura*

AuThor Thomas Cline

The University of Louisiana at Lafayette

As part of a larger inquiry into the educational value of craftsmanship, this paper engages a historical narrative that establishes contemporary design practices as manifestations of the ancient practices of craftsmanship—particularly where that narrative is educational in nature. While the historical narrative in regard to craftsmanship encompasses all of human history, it is that small portion of time associated with the writing of Vitruvius' *de Architectura* that I wish to fully engage at present as it is, I will argue, the *de Architectura* that bridges the ancient narrative with contemporary practices.¹ In an effort to establish this bridge, I will suggest a series of relationships that both ground and allow for my arguments. In the Western tradition, the narrative of design practices first manifests itself in the allegorical stories of early Greek mythology; a collection of stories that can be viewed as ontological explanations of the complex dimensions of human relationships with the natural world. Several of these stories, particularly those of Pandora, Prometheus, Arachne, Hephaestus, and the Daimona Tekhne, begin to establish the practices of craftsmanship as practices of technological innovation—they originate the skill of *technê*; a skill associated with the *tecton*, the maker or craftsperson whose task it was to bring forth, to innovate.

The ancient concept of *technê* was further developed and refined by the Greek philosophers; particularly in Plato's *Republic* and Aristotle's *Nicomachean Ethics*. In these works, *technê* is generally translated as craft, as the practice of skill as opposed to the knowledge of theory. In the Greek context, knowledge of theory—a "knowing *that*" which was distinguished from the "knowing *how*" of *technê*—is that form of knowledge referred to as *epistêmê*. While these distinctions seemingly mirror our contemporary assumptions about theory and practice, Greek philosophers did not generally hold *technê* and *epistêmê* in strict opposition; they describe them as having positive relationships (Parry, 2014). For the ancient Greeks, in order to bring forth, to innovate, there was a required reciprocal relationship between *technê* and *epistêmê*. Frampton suggests that this creates a "state of affairs in which knowing and making are inextricably linked; to a condition in which *technê* reveals the ontological status of a thing through the disclosure of its epistemic value" (Frampton, 1996, p. 23). As such, *technê* can be seen as the primary trait describing the practices of the craftsperson; the skill of deliberately bringing forth, of innovating, of creating physical artifacts that we can call technologies. In this sense, the craftsperson, the Greek *tecton* practicing her *technê*, enacts a system of beliefs about

¹ While Vitruvius called himself an architect and discussed architectural education, I argue that he should be more accurately thought of as a designer—a technologist creating artifacts that mediate human experience with the natural world—and that the *de Architectura* should be read more broadly as an introduction to the discipline of design and the education necessary to produce capable and competent designers.

the world, a technological bias that exists differently than the knowledge of *epistêmê*; a technological bias that mediates our relationships with the natural world and that differentiates human striving from the forces of nature. The Greek *architecton*, or master craftsperson, was; therefore, the embodiment of that person at the pinnacle of her craft and, as such, personified this technological bias. The Greek term *architecton*, in this capacity, acts to inform the Latin *architectus*, and resultantly, the contemporary term architect.

While the age of mythology sets the scene for basic Western conceptions of the origin and role of design as a practice of technological innovation—concepts that were further developed in the works of the Greek philosophers—it is the era of Roman Imperialism that gives us the first written treatise that can be considered a guide to design education. In *de Architectura Libri Decem (On Architecture in Ten Books)*, written by Marcus Vitruvius Pollo—commonly known as Vitruvius—we find a text that begins to unite our contemporary understanding of design with the Greek conception of the practices of craftsmanship. Vitruvius describes the profession of architecture as concerning the design and construction of buildings, of aqueducts, and of machines (Schofield, 2009). The *de Architectura* illuminates those practices, and the educational requirements necessitated by them, that we might think of as describing the skills and knowledge required of both the master craftsperson personified in the Greek *architecton* and our more contemporary practices in design.

It was near the end of his professional and military service to the Roman Empire, that Vitruvius composed the *de Architectura*. He devoted these practical volumes to Caesar Augustus and conceived of them as providing “recommendations so that by examining them, you yourself may become familiar with the characteristics of buildings already constructed and of those which will be built; in these books I have laid out all the principles of the discipline” (Book I, Introduction, 3). As this treatise also contains detailed accounts of technologies and other machines, it can be assumed that the term ‘architecture’ for Vitruvius—derived from the Greek *architecton*—included all design fields—those dealing with the practical and appropriate creation of an artefactual world. As such, the *de Architectura* can be positioned as the first text concerning the discipline of design: the first document that designates an epistemology of design practice and design education.

Vitruvius’ *de Architectura* can be read as the first significant treatise concerning the broader concept of the design professions and the related education of the designer. It provides a first glimpse into a portion of the historical record that can link the innovative practices of craftsmanship to the innovative practices of design. As such, the text of the *de Architectura* can be interpreted as having the potential to support a philosophy of design education. The *de Architectura* very clearly illuminates what Vitruvius considered to be the necessary components of the theoretical education of the *architectus*—the education of Aristotelian *epistêmê*—but, also, provides fertile grounds for an interpretation of what might be thought of as the foundational explanation of her education in craftsmanship; in *technê*.² In

² Vitruvius uses the term *theoria* as that form of knowledge contrasting the knowledge of *technê*; however, I hold that this term is just a finer parsing of Aristotle’s *epistêmê*. Vitruvius appears to consider both *technê* and *theoria* as forms of *epistêmê*, thus, Vitruvius uses the more specific term *theoria* in contrasting *technê*.

accepting this interpretation, the *de Architectura* can be understood as having been composed in order to both educate Augustus about the buildings (cities and their civic and private buildings), devices (sundials, water screws, aqueducts), and machines (siege and other military weapons) of the Roman Empire and, additionally, to provide the foundational structure of the various disciplines associated with design.

Like many other ancient texts, the *de Architectura* was lost to history until its rediscovery in the Renaissance. Its fifteenth century rediscovery, and extensive dissemination, insured that Vitruvius' text would not remain an historical footnote. This Renaissance revival of Vitruvius was primarily focused upon architectural practice and, as such, has shaped all subsequent conversation in Western architecture; providing the epistemic foundation for architectural education, for architectural practice, and for all subsequent discussion of architectural methodologies (Tavernor, xiii). As architecture became an academic discipline, it was Vitruvius' theories, terminology, and principles that acted as a foundation for all architectural curricula—a Classicist understanding of architecture. Resultantly, Vitruvius' work has generally been considered highly discipline specific and has not been viewed as having a significant impact on theories of design education that exist outside the discipline of architecture. It has certainly not been explored in relation to more general theories of educational practice. Resultantly, very little has been written concerning Vitruvius' commentary on educational theory and practice as presented in Book I, Chapter I of the text. In re-visioning Vitruvius' work as more broadly related to design as a practice of technological innovation, I suggest that Vitruvius also be considered an educational theorist; particularly as a theorist of design education.

For Vitruvius, *architectura*—what I will call the technological innovation of design practices—necessitates knowledge of *epistêmê* and the knowledge of *technê*. He states:

So architects who have struggled to achieve practical proficiency without an education have not been able to achieve recognition commensurate with their efforts: by contrast, those who have relied only on theory and book-learning were evidently chasing shadows rather than reality. But those who have mastered both, like men supplied with all the necessary weapons, have achieved recognition and fulfilled their ambitions more quickly (Book I, Chapter I, 2).

This combined knowledge of theory, of practical application, and of material practice defines the knowledge of the craftsperson, the knowledge necessary to the practice of the Roman *architectus* and, if we broaden the scope of what that *architectus* might be, it is also encompasses the forms of knowledge necessary to what in contemporary language we call a designer.

Book I, Chapter I of the *de Architectura*, titled "The Education of the Architect" begins to lay out Vitruvius' theory of design education. He explicitly identifies the educational subjects that one must master in order to become an architect. In theorizing the education of the *architectus*, Vitruvius appears to have modeled his curriculum upon the Greek model of education described by Marcus Terentius Varro in his *Disciplinae Libre Novem* (Tavernor, xvii). In the nine books of the *Disciplinae*, Varro describes education as consisting of the *trivium*—grammar, logic, and oratory—and the *quadrivium*—geometry, arithmetic, astronomy, and music. It is from the *Disciplinae* that future educational theorists derived the seven classical liberal arts (Lindberg, 2007). Vitruvius builds upon

Varro's work as he describes the specific disciplines and fields of knowledge in which the *architectus* must have competency. Vitruvius asserts that an architect:

should have a literary education, be skillful in drawing, knowledgeable about geometry, familiar with a great number of historical works and should have followed lectures in philosophy attentively; he should have a knowledge of music, should not be ignorant of medicine, should know the judgments of jurists and have a command of astronomy and of the celestial system (Book I, Chapter I, 3).

These subjects basically cohere to the two culture binary—elucidated by C.P. Snow—of education in the humanities and education in the physical sciences and, while describing an education in the knowledge of *epistêmê*, offer no meaningful assistance in establishing the educational concepts that would allow for an education in *technê*; in creating an educational theory necessary to understanding practical applications and material judgments. After outlining the theoretical knowledge necessary to the *architectus*, Vitruvius goes on to offer explanations as to why one must be proficient in these areas of epistemic knowledge in order to successfully practice in the disciplines that we associate with technological innovation.

Upon completion of his explanation of the educational necessity of theoretical knowledge, Vitruvius' text delves into the practical aspects of design; the principles and divisions of architecture as a tradition of building. His writing in Book I, Chapter I is generally thought of as concluding the discussion of the proposed subject matter necessary to the study of design; however, I suggest that it does not necessarily conclude his commentary on design education. Vitruvius clearly furthers Varro's model of education by insisting that the architect—or, by extension, any disciplinary specialist—combine the knowledge of theory with knowledge grounded in practice. He asserts that every discipline consists of two distinct aspects—the theory that is implicit in the work and the work produced (Book I, Chapter I, 15). The substance of any specific discipline cannot be found in theory alone, but must be fleshed out in practice; in *technê*. In this way, the liberal education—adopted from the work of Varro—in the *de Architectura* must be seen as only the initial starting point for a design education; one must gain experience through the practice of *technê* if she is to “reach the highest sanctuary of architecture” (Book I, Chapter I, 11).

While the remainder of the *de Architectura* catalogs the *technê* of design practices, the educational aspects of knowledge in *technê* are not clearly articulated by Vitruvius. He did define *technê* as consisting of “the ceaseless and repeated use of a skill by which any work to be produced is completed by working manually with the appropriate materials according to a predetermined design” (Book I, Chapter I, 1). This definition of *technê* does not; however, explain how we might view *technê* as knowledge that could be perceived of as educational; Vitruvius' educational theory remains incomplete without a theorization of the educational concepts that inform *technê*. Vitruvius did; however, create the potential for an educational theory of this second area of knowledge in design—an education in *technê*—in the skills associated with the craftsman; a theory that is supported by a knowledge of the practical application and material properties of things that constitute the use value and the physical materials of design artifacts. These concepts that provide the education of *technê* are what I want to think of as the practices of craftsmanship that can only be gained through the acts of bringing forth

physical artifacts and then making judgments about the effectiveness of those artifacts—a “knowing how” that parallels Aristotelian thought and the bringing forth of technological gifts that the Greek myths imply. In Book I, Chapter III, Vitruvius provides a means of understanding how a knowledge of the use value and material properties of things and the skills of material innovation—a physical bringing forth—might have educational benefit.

It is within the text concerning the divisions of architecture that we come to the most noteworthy of Vitruvius’ assertions and what I want to suggest as the basis of describing the educational value of craftsmanship. Vitruvius states that “all these buildings must be executed in such a way as to take account of durability, utility, and beauty” (Book I, Chapter III, 2). While this assertion appears particular to buildings, I would like to suggest that it is a more general statement of the necessity for material knowledge and for the skill of craftsmanship. In durability, utility, and beauty, we can find a pragmatic and objective educational philosophy to ground design education. This Vitruvian objectivity is not an objectivity of certainty but an objectivity of effectiveness, an objectivity of use; it provides the epistemic value of the thing produced, of the design artifact.

Vitruvius’ assertion that all buildings—all constructed technologies—must take account of durability, utility, and beauty places them as educational topics outside of the Classicist and historical contexts of the epistemic knowledge presented in the *de Architectura* and firmly associates them with the *technê* necessary to the craftsperson. This passage establishes use value and material knowledge that exists outside the canonical educational practices of *epistêmê*. These concepts provide the technical knowledge of craftsmanship from which use value and material judgments might be made; they create an objective means of discussing the practices of *technê*. Durability, utility, and beauty can be seen as the virtues of craftsmanship—the Vitruvian Virtues of *technê*—and should be considered as informing the second realm of knowledge that is required of the designer. The material implications of the Vitruvian Virtues of durability, utility, and beauty, in some way, act to re-establish a direct relationship between design practice, as mediating and innovative, and the physical attributes of the natural world. The Vitruvian Virtues objectively ground the technical knowledge of craftsmanship within a physical world where the pragmatic awareness of the appropriateness of particular materials defines the durability of design artifacts; the function of those artifacts—how they are appropriately used by humans—is a condition of their utility; and the particular aesthetic value we place on those material objects defines their beauty. Durability and utility can easily be recognized as pragmatic concerns related to the physical properties of artifacts and to the engaged practices of making and making judgments—the reciprocal practices of craftsmanship. Likewise, beauty acts to emphasize our aesthetic relations—psychological, emotional, and physical—to the artifacts of our design.

Utility, durability, and beauty, questions of judgment, represent an Aristotelian accounting of what is produced. They provide the conceptual language of *technê*—the knowledge necessary to the fulfillment of mastery in any trade. As Aristotle said, the craftsperson who attains *epistêmê* in regard to her trade is wiser than the person of experience because she knows the causes of her making; she has knowledge of the reasons that things are done (981a30-b5). In this way, it can be concluded that the craftsperson who has mastery of her *technê* is on equal footing with that person who has attained knowledge of *epistêmê* outlined in the theoretical virtues of Varro’s liberal arts; both forms of knowledge allow their possessors to make objective judgments. In the case of mastery in the knowledge of *technê*, these

objective judgements are a form of practical objectivism that is necessary to giving designers the ability to know the causes of their decisions.

In this Vitruvian triad of durability, utility, and beauty one can theorize a practical objectivism; whereby production is no longer the desire of the subjective but a reciprocal bringing forth of physical artifacts that craftspeople intend to meet particular needs in relation to human interactions with the natural world. These technical virtues, coupled with the theoretical, complete the educational needs of the designer and, as such, provide for a renewal of practices in design education that reunite the designer with the physical world of lived experience and the physical properties of materials that exist in the natural world. These virtues, the virtues of craftsmanship, are the deliberate and normative standards that describe a particular way of being in the world and act to populate the knowledge that should be at the core of design education; they enact the “knowing *that*” (*epistêmê*) and “knowing *how*” (*technê*) that can objectively ground design education. In asserting that Vitruvius’ *de Architectura* is describing the practices of what we would now call a designer and that these practices are related to practices in craftsmanship—in technological innovation—an examination of the origins and philosophy of craftsmanship provides an ontological basis for an educational philosophy of design; it provides an historical and philosophical framework upon which design curricula can construct and evaluate themselves.

Although it is primarily understood as a treatise on architecture and has been highly influential upon design education, the *de Architectura* has not been of direct consequence to general education. A neo-Vitruvian educational theory that establishes the objectivity of the *technê* of craftsmanship can, however, be applied to general education. While based upon the work of Varro and the seven liberal arts, Vitruvius’ assertion that education must combine theory and practice elevates any educational practice beyond a purely intellectual endeavor and firmly situates it as a practical pursuit grounded in the realm of lived experience. His call for learning through doing—*technê*—foreshadows the later theories of Johann Pestalozzi, Friedrich Fröebel, John Dewey, Maria Montessori, and Jane Roland Martin. Additionally, a Vitruvian influence can be seen in Alice Waters’ *Edible Schoolyard*, in Matthew Crawford’s *Shop Class as Soulcraft*, and in the contemporary Maker and DIY movements. Certainly Pestalozzi’s motto “Learning by head, hand, and heart” aptly describes the educational practices encouraged by a neo-Vitruvian theory of education.

Further, this neo-Vitruvian theory acts to differentiate and legitimate knowledge in design from knowledge in the sciences and knowledge in the humanities. It dismantles the binary established by C.P. Snow and, possibly, begins to destabilize the hierarchy apparent in common perceptions of knowledge. Vitruvius’ *de Architectura*, coupled with the Greek myths associated with Pandora, Prometheus, Arachne, Hephaestus, and the Daimona Tekhne, allows for a re-visioning of design education and design practice that places that education within a knowledge community associated with creativity, with innovation, and with an objectively realized material knowledge (*technê*) that would suggest its inclusion in any conversation about STEM education.

References

1. Aristotle. (2004). *The Metaphysics*. Translated with Introduction by Hugh Lawson-Tancred. New York: Penguin.
2. Frampton, K. (1996). *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*. Edited by John Cava. Cambridge, MA: MIT Press.
3. Lindberg, D. (2007). *The Beginnings of Western Science*. Chicago: The University of Chicago Press.
4. Parry, R. (2014). "Epistêmê and Technê." *The Stanford Encyclopedia of Philosophy*, Fall 2014 Edition, Edward N. Zalta (ed.). Retrieved from <http://plato.stanford.edu/archives/fall2014/entries/episteme-techn/>
5. Tavernor, R. (2009). Introduction. In *Vitruvius', On Architecture* (pp. xiii-xliv). New York: Penguin Classics.
6. Vitruvius. (2009). *On Architecture*. Translated by Richard Schofield. New York: Penguin Classics.