Discourse and knowledge

ART AND FACT IN ARCHAEOLOGY

In the 20th century, what characterizes the object of knowledge of a given discipline was the subject of much scrutiny. When referring to historical knowledge, the archaeologist and art historian George Kubler remarked that "knowing the past is as astonishing as knowing the stars."[1] The metaphor describes how, like astronomers, historians are used to experiencing only the old light of dead and distant stars. The metaphor manages a delicate balance between poetic sensibility and scientific discourse. A connection is made between the imagination thus evoked, and the formidable nature of the task at hand. The rhetorical power of this statement lies in the ability to evoke the vast space that exists, between us and the past. This is a wide expanse that is by no means empty. Though there is no text that we can consult or which would provide us with a clear and unbiased account of the past, there are the ancestral stories and myths, the broken tablets, the old monuments and the abandoned ruins. Threading all the shreds into the fabric of history constitutes a changing horizon affected by each successive shift in boundaries. The temporal discontinuity between one scrap and the next is but a strange attractor pulling each fragment through a process of interpretation and transformation: from instance, to moments, to events, into memories, and into history.

This stands in stark contrast against the reality of the past as something that does not become by itself. The past as something that has to be recalled, or the past as something that has to be worked for. A myriad of entities participate and are employed for this purpose. Among the most basic ones are biological and artificial processes of the human body, such as memory. From an archaeological perspective, memory has been defined as "the act of recalling from the viewpoint of a subsequent time."[2] Events from the past are weaved together from the interpretation of remnants of fossil records, of artifacts left upon refuse heaps, graveyards, and abandoned cities. But history is not only about an interpretation imposed by subsequent generations. History is also made in the present. This may be why Michel Foucault described history as "one way in which a society recognizes and develops a mass of documentation with which it is inextricably linked."[3]

Still, it can be argued that a large part of our knowledge of the past results from circuitous observations of permanence and change; that is, through interpretation. In the 20th century, this realization ushered in yet another transformation whereby the supremacy of the text was questioned. History was deemed to have no reference to an external reality. Historical narratives

came to be regarded by many as fictions, the contents of which were as much invented, as they were found:

> "There was a time when archaeology, as a discipline devoted to silent monuments, inert traces, objects without context, and things left by the past, aspired to the condition of history, and attained meaning only through the restitution of a historical discourse; it might be said that in our time, history aspires to the condition of archaeology, to the intrinsic description of the monument."[4]

Thus, the practice of the historian shifted from an emphasis on central institutions as providers of the guiding thread to how a historical narrative should be constituted. Also the material basis of culture came to be regarded as a source of data that can reveal aspects about the mentalities of societies. In this context, items from material culture such as art became important sources for the reconstruction of past mentalities and modes of thought.[5] This may be one of the reasons why the task of the historian was depicted by George Kubler as an endeavor of transposing, reducing, composing, and coloring the *facsimiles* that describe the shape of time.[6] Foucault also described it as an activity that involves the use of artifacts and tools for recognizing key elements, fixing boundaries, creating objects, such as narratives, with the intention of revealing relationships that illustrate time.[7] In the words of cognitive psychologist Alberto Rosa:

> The task of the historian is to constitute events from the past from the remnants s/he has access to, and to attribute a meaning to them by employing their verbal description of what happened and an explanation of why it happened.[8]

The historian achieves his objective in many ways and by engaging in a multitude of tasks. The most well-known object that the historian produces is the narrative description that depicts what a particular moment in time may have looked like. In order to do this, he may organize a series of events into meaningful sequences. These sequences, in turn, are the result of analysis in which diverse data is brought into a common context and synthesized. In this manner, congruent narrative threads and patterns are established. At the same time, the historian may provide significant insights. When gathered together, these might engender new discoveries. Through these tasks, the historian molds the form that history assumes.

The task of writing history, however, does not fall exclusively into the hands of the historian. For if describing the form of time is the chore of the historian, it is the archaeologist who, in the process of obtaining information about a given civilization, extracts much of the raw materials that fuels our imagination with the scenes from antiquity. Whether interested in pre-historic,

industrial, classical or modern societies, archaeologists are concerned with discerning the interaction between humans and artifacts.[9] And archaeologists have defined the archaeological enterprise as "making sense of the material products of human activity".[10] Because the subject of their study centers on human agency, historians and archaeologists have always depended on the products of human industry. In seeking to reconstruct and explain the trajectories of past societies, anthropological archaeologists, for example, work within the boundaries of historical and scientific inquiry.[11] This is especially true in the case of pre-history, where textual records are non-existent and a large extent of the corpus of knowledge is based on the analysis and interpretation of found artifacts.

Presently, it is recognized that much of the knowledge used in the process of recognition and documentation that is history is based on remnants of material culture.[12] The written document is no longer regarded as the sole purveyor of data. The role of the artifact in the creation of knowledge in the archaeological record and in historical narratives has been brought to the forefront.[13] The notion that artifacts can literally be made to speak, to tell their story, has not only fueled the popular imagination, but also has influenced scholars in both archaeology and history. Cognitive archaeology, for example, aspires to create models, cognitive maps, or projected constructs, that gather and seek to explain the past experiences and world-views of ancient societies:

> "Cognitive archaeology is equivalent to the study of those preserved aspects of past material culture and of such of the activities of early societies as may allow us to make valid inferences about the cognitive maps of their inhabitants."[14]

Aesthetic elements of artifacts, such as for example style, are used as referents that provide information about their makers.[15] The current challenge may be to go beyond and seek for a reconstitution of human knowledge to the rich contextual framework in which it originates, that one of practice. In this perspective, the figure of the human actor, somewhere back in the past, acquires a new significance. The ceramist, the illuminator, the painter, the sculptor, the artist, the designer, enters into a dialogue. This is because material evidence cannot be separated from the action of making itself. And this is why the work of artists and designers is of prime importance to archaeologists, historians and scientists seeking to know how things come to be the way they are. This may also why the work of archaeologists and historians, of humanists, should be of concern to artists. Among the questions that come to mind are: How much of design goes into the construction of knowledge by the humanist? How is knowledge embodied in the artifacts created by artists and designers? And more so, what unexplored territories are yet to be

discovered in between the boundaries of these fields of knowledge? Why is it important to cross over?

These questions of legitimization and boundary definition are not uncommon in the currently shifting base of knowledge production. New disciplines, such as artificial intelligence, cognitive science, cybernetics, human computer interaction (HCI), computer supported cooperative work (CSCW), and design-research are being created. At the same time, older ones are redefining their scope and extent of reach. History, as a professional discipline within the humanities, and with claims to the possession of a certain scientific rigor is a relatively new practice. Professional archaeology also a relative newcomer, having been institutionalized in the 19th century, borrowed heavily from other disciplines such as geology, and art history. As one traverses the topography of the space of knowledge, one becomes aware of the constantly changing configuration of its coastlines, of its borders. In this diverse and shifting landscape Michel Foucault suggested that the institutionalization of knowledge operates through the constitution of artificial grids that delimit the position, interaction, and discourse production.[16] The configuration of these grids can be discerned by examining how discursive formations come together and are actualized within a common space:

> "The unity of discourse is wrought not by the permanence and singularity of an object, but rather, by the common space in which diverse objects stand out and are consciously transformed."[17]

In the context of this work, which deals with the creation of design artifacts through collaborative endeavor, the issue of how is the object of knowledge constituted in design is of prime importance. Where are the boundaries between the collaborators when together they fashion the digital artifacts in an archive? Where does archaeology end and design begin?

The value of this knowledge resides in what it can reveal to us about the hand, the heart, and the mind that made the artifact. It is also a knowledge that can tell us much about the discipline itself. In what contexts does the discussion on What is design arise? Is it in the context of an institutionalization of the applied arts as legitimate professions? What are the conditions that facilitate at a given point in time the appearance of descriptions about design, with their corresponding artifacts? Why the drive to delimit and try to define what is design and what it is not, as well as the appearances of its codified practices, or methods?

ABOUT THE MANY WAYS OF DESIGN

There is no single solid discursive foundation to design, but rather, the landscape is one of fluctuating positions, representing discursive formations, in the process of negotiation. Among these different threads weaving themselves into the fabric of an academic design discipline, however, there are enough similarities so as to allow one to conceive of tendencies, inclinations. Among these, there is a tendency that conceives of design as a discipline that can make use of methods from the social sciences. Then there is the tendency to conceive of design as science. This latter approach also emphasizes the view of design as the discipline concerned with the creation of the artificial, and the exploration of the new.[18] From the point of view of method, according to Alain Findeli, the dilemma is related to the quest for objective basis of knowledge: Can you explain a phenomenon analytically from the outside? Can you understand a phenomenon intuitively, from the inside?[19]

In either of these stances, there does not seem to be too much concern for striving towards a better understanding of the role that art has had, and can still have, in design. From the point of view of this author, a state of affairs that obviates the contribution of art to design is unlikely to have positive results in the long run. For one, it renders as useless a large section of the history of design. In doing so, it neutralizes important aspects inherited from art, such as aesthetics, craft, tacit knowledge, and the role they may play in artifact production.

Design and planning

The scholar, Ken Friedman, for example, has proposed a view that emphasizes design as a discipline concerned with planning and management. His analysis focuses on the etymology of the word *as a verb* that entered the English language in the year 1548. According to Friedman, though archaic and subsidiary definitions involve physical artifacts, the primary definitions of the term emphasize planning and strategy.

> **1. a:** to conceive and plan out in the mind **b:** to have as a purpose: intend, to excel in his studies **c:** to devise for a specific function or end **2** archaic: to indicate with a distinctive mark, sign or name **3a:** to make a drawing, pattern or sketch of **b:** to draw the plans for **c:** to create fashion, execute, or construct according to plan.[20]

Forty years later, in 1588, when the use of the term *as a noun* appears, it is in the context, of naming and classifying. These activities, in Friedman's opinion are primarily related to planning, thinking and management. By this time, the visual aspects of the practice have been relegated to a

secondary role of denoting "a preliminary sketch or outline showing the main features of something to be executed."[21] I would argue that Friedman's proposition of how the origins of the term are probably more related to aspects of planning may be accurate. This fact, however, does not annul or diminish the relationship between art and design. Also, Friedman's definition does not preclude designers from utilizing the aspects of art and aesthetics to integrate beauty and skill together. Nor does it subtract from the ability of artists to make use of design in the creation of objects of art.

By researching into the history of art, for example, one can learn about the meticulous attention devoted to planning by masters in the execution of great works of art. Even when dealing with lesser-known practitioners, there are indications that, throughout the history of painting, there had been a tradition of planning and management.[22] The use of templates during the Middle Ages and of prospectuses during the Renaissance, for example, is testimony of a type of professional behavior that went beyond the basic organization of artisan guilds. These prospectuses were neither preparatory studies, nor blueprints that had to be followed with absolute fidelity. They were finished drawings that artists submitted to patrons as a means of securing approval for their design. They were also used as a tool for communication between the patron and the artist throughout the different stages in the planning and execution of a work.[23] Using design representation as instrument for communication may not only be a practice that reflects the heritage of art in design, but also, one that continues in the present.

Design and art

The historian Paul Greenhalgh, has pointed out that the contemporary term design comes to us from the Italian (Latin) word used to designate an object of drawing, or *disegno*.[24] I believe that traces of this influence can be discerned already in the 16th Century. In the 1568 edition of his work, *Vasari on technique*, the Renaissance painter and architect Giorgio Vasari described design as the depiction, through drawing, of concepts and ideas originating in the intellect.[25]

Vasari's almost modern terminology is as peculiar as the manual itself. According to Baldwin Brown who wrote the introduction to the first English translation, unlike other art treatises written earlier in history, Vasari's text was not solely concerned with knowledge of materials and processes. Neither was it really concerned with the metaphysical aspects of art. Vasari's treatise was a survey of the manual activities during the late Renaissance from the point of view of a *practicing professional*.[26] In architecture, for example, the lines in a design, or drawing, were of essence to the architect, since they are what defined his art, "for all the rest, which is carried out

with the aide of models of wood formed from the said lines, is merely the work of carvers and masons."[27] The treatise also introduced the notion of design and of the artist's ability to visualize the work as a whole prior to execution. For example, in sculpture, drawing and design was of service because it allowed the sculptor to see different views of the forms he sought to shape, before working them out on the material of choice.[28] In painting, design was of use because it helped the painter to give the forms the right proportions *before* they were filled with color or light and shadow effects.[29] Therefore, in anticipation to many of our contemporary ideas regarding design, *Vasari on Technique* placed emphasis on planning, on results, and how materials are to be manipulated to produce desired effects:

> "Seeing too that from this knowledge there arises a certain conception and judgment, so that there is formed in the mind that something which afterwards, when expressed by the hand, is called design, we may then conclude that design is no other than a visible expression and declaration of our inner conception and of that which others have imagined and given form to in their idea."[30]

Vasari also referred to design as the "parent of the three arts of architecture, sculpture and painting."[31] In alluding to these three, Vasari in effect conjured the legacy of antiquity embodied in the system of classification of knowledge of the ancient Greeks. In this system, which was passed on to the Renaissance via Roman translations of Greek texts, the term *ars* was used to denote theory, and knowledge was classified into two separate branches, or categories. Of these two, the preferred one was the Liberal Arts. These seven liberal arts comprised all the theoretical knowledge necessary to understand the structure of the world.[32] The other category of the Mechanical Arts included painting and sculpture. Because these were regarded as manual occupations, they were not considered part of the Liberal Arts.[33] The invention of perspective during the early Renaissance forever altered the relationship between art and theoretical knowledge. Perspective gave the artist, and specifically the painter, the ability to quantify and rationalize his work. From being a manual worker, the artist rose to become an intellectual worker.

Thus, in addition to providing us with an explicit definition of design, Vasari's writing also offers us a glimpse of the ongoing attitudes regarding the value of art as knowledge, and the position of the artist as creator. Indeed, it is generally agreed that it was during the Renaissance that the intellectual separation between art and craft was further concretized. Within the widening schism that positioned the Liberal Arts at one of the spectrum and the Mechanical Arts at the other, there was an ambivalent attitude towards the value of design. In the end, Vasari straddles this

practice as stationed somewhere in the middle between craft and art, with the latter being attributed the higher, or nobler position. For according to Vasari, though through work and skill design can approach art, it is the hand of the artist that in the end "exhibits the perfection and excellence of the arts, as well as the knowledge of the artist." [34]

Vasari's account of the practices of art and design placed a premium on the importance of planning the execution of the work. During the late 19th and early 20th Centuries, with the increased interest in the role of arts and crafts in society, his treatise was brought back from oblivion. A desire to underscore the ancient connection of design with the fine arts, with all the connotations of high culture that such relationship may carry, may have contributed to this revival. Perhaps it is because of the influence of works such as Vasari's treatise, that throughout most of the European tradition, design has been used to indicate a preparatory drawing.

It is the case, however, that though their paths may have bifurcated, the activities of art and design have had much in common. They have shared a set of traditions and knowledge. Schools of design established in England, for example, have referred to design as "the idea of preparing a study or design of a finished piece of work."[35] And it was not until the late 19th Century, when industrial manufacturing became an established model for production, that the notion of design as the preparation of templates for longer runs of objects surfaced. This is a concept that further evolved during the 20th Century into the modern proposition of design as "a problem solving activity lodged somewhere between art and science".[36] According Greenhalgh, as part of these developments, there has been a re- classification of design as a practice firmly associated with industry, and clearly distinguished from art and craft.[37] This is also reflected in the words of Adrian Forty, another historian, who has sought to highlight the major distinction that exists between the artifacts that are art and those that are the result of design. In Forty's view, calling design 'art' suggests that designers always occupy a privileged role in production, "a misconception which effectively severs most of the connections between design and the processes of society."[38] Though Forty is referring specifically to objects of industrial design, I believe that a similar situation exists in large-scale information design projects involving the collaboration of multiple parties. Because of the complexity and diversity of tasks and objectives of these projects, the resulting artifacts cannot be seen as resulting solely from the creativity and imagination of one person. However, beyond those issues related to the activities of a practice, there are also questions regarding the taxonomy of objects produced by a discipline. In my mind, the issue of whether art is related to design, and whether a designer can also be an artist, is more related to how the institutions in our society help to forge a collective perception of what is art and who is an artist.

Design and science

The difficulties encountered when attempting to ascertain whether design is art also exist when dealing with the notion of design as science. The identity of design as residing somewhere between systematized knowledge and intuitive know-how resists formal classification schemas.[39] The answers to questions such as: What makes some designs and inventions better than others? Why artifacts designed for one use are successfully employed in other applications? elude us.

Throughout the 20th Century, the search for answers translated into a quest for the systematization of the knowledge of design. This drive becomes apparent when we look at some of the proposals to create new education methods and programs design. In the late 1960's, for example, Herbert Simon outlined a descriptive framework for a science of design. He established a basic distinction between the natural science and the science of the artificial. Whereas natural science pertained the natural objects and phenomena, artificial science was knowledge concerned with the world that could be and with the objects created by man.[40] According to Simon design was the science concerned with the *creation of the artificial.* The artificial were synthetic things that, while imitating in appearance things from the natural realm, lacked the reality of the latter. The artificial could be distinguished by its emphasis on function, goals and adaptation[41]: Design, as grounded on these premises was not concerned with the things of now, but rather, with how they *ought* to be. This signaled a new trend towards future-oriented analysis and modeling.

> "Artificial things are often discussed, particularly when they are being designed, in terms of imperatives, as well as descriptives." [42]

Herbert Simon's proposal also divided the scope of the discipline four major categories that comprised evaluation of the decision making process; heuristics, or experimentation; theory of structure and design organization; and representation of design problems. With the exception of the latter category of representation of design problems, all areas of study would be heavily informed by systems theory, as well as computational and statistic methods. The proposal excluded any artistic component. In my opinion, it was also quite divorced from the human context in which design and artifacts emerge.

Of particular interest to this work, is Simon's definition of the *artifact as interface,* or meeting point between an inner and an outer environment. Whereas the inner environment is the substance, the organization of the object itself, the outer environment is the surroundings in which the artifact operates.[43] Simon's view of the artifact can be applied to man-made things, such as computers and alphabets, as well as things from the natural world, such as the human brain, that have

resulted from a process of adaptation to some situation. Simon proposed that, like alphabets, computers are part of a family of artifacts called physical symbols systems. These symbol systems contain physical patterns, such as the marks on a surface that can occur as components of symbol structures. He referred to them as physical to remind us that *ideas exist as real world things.* Computers, according to Simon, brought to the foreground this material aspect to the world ideas:

> "Computers have transported symbols systems from the platonic heaven of ideas to the empirical world of processes carried out by machines or brains, or by the two of them working together."[44]

In Simon's view, as the science of the artificial, design would be considered a stand-alone discipline, firmly anchored within a scientific framework. In retrospect, the only area where there seemed to be an aperture for collaboration with other non-scientific disciplines was in the area of representation of design problems. In this context Simon remarked that, even though the importance of this topic had been noted, the scientific community was "still far from a systematic theory of representation."[45] Interestingly, this has been an area of intense research and production in design as well as in the arts and the humanities.

The integration of art and science in design

Another effort to create a more institutional base for design attempted to synthesize knowledge from both the artistic and scientific disciplines. In the original Bauhaus this notion of synthesis was present through the active attempt at integration of art and technology. The school also distinguished itself by its motivation to forge partnerships with industry. Though it ceased to exist in 1933—the school was closed by the Nazi regime—the artifacts and policies developed during the time of its existence have had a lasting influence cultural and historical influence.[46]

This vision was carried on through Lazlo Moholy-Nagy's North American formulation of the New Bauhaus. Implemented at the Illinois Institute of Design, Moholy-Nagy's pedagogic method utilized the Foundation coursework to integrate scientific methods and art practices within a framework that included aesthetics and ethics. The basic curriculum was divided into three parts: Basic design workshop included the study of materials with an emphasis on issues related to volume, space and kinesthetics; Analytical and constructive drawing, modeling and photography with special attention to proportion and representation; Scientific subjects that included instruction in the physical sciences as well as the life sciences.[47]

"By transforming the art/technology polarity into the ternary system of art/science and technology, Moholy-Nagy tried to confer a scientific profile on the design process. According to this model, design ends up being the result of a dynamic relationship between art and science, revealed and materialized through technology."[48]

The notion of *biotechnique*, or the art of adapting the forms and processes of natural structures to technical artifacts, was an under current in Moholy-Nagy's vision who saw nature as "the grand designer".[49] Standard forms of nature would be analyzed with the hope of leading the student to the discovery of elementary forms that could later be incorporated freely in new designs and compositions. In spite of his interest and devotion to science and technology, Moholy-Nagy was committed to preserving the role of art in design. He recognized that the artist/designer, as purveyor of tacit knowledge, was pivotal to the integration of art and science through technology:

"Not everything that we know or feel can be verbalized by a language that uses logic and reason as its main characteristics. A number of intuitive assurances may be better expressed by the artist. In this way, his influence is direct because his language infiltrates into the channels of emotions without needing to be consciously analyzed for rational contents."[50]

The importance that he placed on the role of art in design can be perhaps discerned in his insistence on hiring only teachers who were also artists, the reasoning "being that the teacher had to be familiar with the intuitive process, which is indeed inherent in the art practice".[51] In addition Moholy-Nagy's vision of the designer placed a particular emphasis on the role of ethics and the moral obligation of the designer towards society.[52]

Design and language

In spite of the polemics of whether it is art or science, design education is still primarily offered in the context of art institutions. In this context, the dichotomy between art and design becomes most pronounced when we consider the status of research in design. If design is an art-related field, what does it mean to do research in design? What type of knowledge is it that can be derived through the practice of design in the context of art institutions? How can designers do research? Is not design after all, a practical discipline concerned more with the appearance of objects? As a newcomer, design research struggles to develop not only a sense of identity and belonging, but also a set of methods, tools, and literature that can be consistently used by designers within the activities of the practice of design. Then there is the gap between practice and theory. As has already been noted, generally speaking, though designers are praised a lot for their doing, they are not necessarily credited for their thinking.[53] This is not a new problem. Nor

is it peculiar to the discipline of design. It is part of the baggage of our Western tradition, with its established divisions between logos and praxis.

While art and design share a common, and rich, history that is visible in many of the tools that they use, such as drawing, visualization, and the making of models, it is not completely clear how these instruments may come to form a part a knowledge-building activity, such as design research. This is why one of the objectives of this work will be to reveal how artists, designers, and scholars such as archaeologists make use of these tools for representation. It will be argued that these tools are part of the way in which knowledge is created and communicated. That is, they are used as part of research and data gathering activities and processes involving conceptualization that ultimately lead to the creation of knowledge.

An approach which, in my opinion, is very much in accordance with a view of design as an activity involved with understanding and describing, is the so-called Product Semantics approach advocated by Klaus Krippendorff. Like Friedman's, this is an approach that leans towards a systematic formulation of the practice. In the spirit of Vasari and Friedman, Krippendorff also refers to the etymological origins of the term design. He points out that the term is derived from the Latin *de + signare*, and it means to indicate, and to distinguish. Design is about *making sense*. This is a paradoxical proposition, which according to Krippendorff, implies innovation, or the creation of something new, while at the same time invoking the recognition of already accepted culture-specific, situated meanings.

Figure 3: Photograph of late Iron Age artifact from the Mulli site excavation.[54] The artifact has been classified according to the ornamental marks it bears. From the Latin *de + signare*, to design is to **indicate** with a distinctive mark, sign or name.

Product semantics is based on the premise that "people surround themselves with objects that make sense to them."[55] Product semantics proposes the development of design as a second-order science that allows for the systematic exploration and analysis of the diverse ways in which people interact with artifacts.[56] This approach also calls for the development of methods that assist the design process and provide compelling justifications for the outcome. In product semantics, the old adage of *Form equals Function* translates to *Form equals Meaning*. Objects and artifacts always exist within a context. Meaning does not stem from the object itself, but rather, from the way that artifacts are embedded into contexts of understanding.[57] Context is a historically and culturally situated entity that includes the interaction of the user with the artifact, other human beings, and their world. Context can also be seen as a cognitively constructed relationship in which features, real or imagined, are brought together into a coherent unity. This relationship is one that can be constructed from a linguistic perspective, and through the use of tools, such as classification, and metaphoric devices.

Product Semantics does not advocate a theory of meaning. Instead it proposes the mapping of a viable topography to encompass the different ways in which objects might be attributed meaning, or made sense of. These are the operational, socio-linguistic, genesis and, ecology Contexts. While the operational context focuses on how people interact during their everyday life with artifacts, the socio-linguistic context is more concerned with how people communicate with each other about artifacts and their uses. The context of genesis, in turn concentrates on how the different stakeholders, such as designers, producers and users participate in creating and consuming artifacts. According to Krippendorff, the ecological context is concerned with how populations of artifacts interact with one another, thus contributing to an auto-poesis (self-production) of technology and culture.[58]

Collaborative endeavors involving technology and the participation of diverse disciplines can successfully make use of an approach like Product Semantics. In the current work, the influence of Product Semantics can be seen in the use of metaphoric thinking. Many of the concepts presented, such as artifact, boundaries, disciplines, space of collaboration, operate at the metaphorical level through language . These concepts do not exist as entities in the real world. In addition, there is nothing essential about them. They are tools that are defined and implemented within the context of a project

In the end, however, to fully understand the potential role of design, there may be a need to follow Michel Foucault's advice—as articulated in the Archaeology of Knowledge--and try to release our selves from a mass of notions each of which, in its own manner, diversifies the theme of continuity.[59] Therefore, although it is indeed probable that, whereas certain aspects of a

changing design practice may have proceed from art and craft, others were derived from methods more related to scientific work. This later may be especially true, with regards to certain types of applied work where there already existed a more formal association between design and science. And though, as we shall see later, design makes use of representational tools inherited from the art practice, it still remains primarily a conceptual activity mostly concerned with ordering. It may not be necessary to renege the connection with art, or to try to ascertain a point of origin. Regardless of its configuration, knowledge is not a stable mass of data that is accumulated through a process of accretion.

Considering the existence of a mixed repertoire, it may be more productive to study power relations and how the changes brought about by communities and groups seeking to institutionalize their knowledge base are reflected in the tools such as classification systems: Who is he who is called an artist? Why By whom? Who is the designer, or the humanist? Can a practice be defined purely as art, design, or archaeology? If philosophy and mathematics borrowed from the system of perspective invented by artists of the Renaissance can we conclude that knowledge produced through art has had a definite impact on the scientific knowledge in the West? Is the opposite true? For the polemic regarding what is knowledge, how it is created, by whom, and under what circumstance continues to be an ongoing controversy. And though it seems that, the basic activities of the practice have changed very little— visualizing, planning, rendering, creating—the networks of relations, and the terminology used in labeling the product and the agent that produces has varied.

RESEARCH METHOD: A PROJECT-DRIVEN RESEARCH METHOD

Description of method

The Raisio Archaeology Archive and this monograph were completed within a framework created by the designer. This framework was derived from the project-driven method as outlined by Alain Findeli. In the descriptions of his method, Findeli proposes that a theoretical, or epistemological, inquiry in design research can be realized through the work carried on as part of a professional project. This approach requires the practitioner be well versed in aspects of production, as well as be willing to engage in theoretical inquiry and writing. Therefore, two major components make up the work performed for the dissertation. The practice-based, professional, component is the digital archive that is located on the WWW. The theoretical part, that includes an analysis of the potential applications of Activity Theory to collaborative design, is included in the present monograph. The monograph also aims to bring together basic research in the areas related to the work done in the professional project.

It could be said that, when adopting this method, the designer engages in dialectic between theory and practice. In this dialectic, aspects of the practice—or key problem areas—pose questions regarding the theoretical knowledge. Theoretical knowledge, in turn, informs the way in which material artifacts being created. The involvement and compromised position, of the designer is an important and peculiar aspect of the method.[60] According to Findeli, by reversing the position of the designer from observer to involved actor:

> "...no matter how deep and sincere his/her involvement, the researcher is always held accountable only as a scientist, since he/she remains a research expert. Project-driven research proposes to *extend* this involvement even further to the research that would be accomplished in the course of an actual research project. In this case the researcher must be considered *accountable* for the outcome of both the scientific project and the professional project, the latter constituting his/her research terrain. The idea of applied theory (or model) is thus transformed into the idea of a theory or a model that is *involved*, *situated*, and *embedded* into a project."[61] (Italics not in the original text.)

The project-driven methodology creates a situation similar to that one which participatory methods aspire. The participatory aspect in design inquiry is of particular relevance in projects and situations where the need for social change is a recognized and accepted objective. Participation presupposes the fostering of dialogue and the voluntary involvement of people in the development of themselves, their lives as well as their environment.[62] Pelle Ehn has addressed this issue from a point of view of design as a discipline concerned with understanding the understanding of others.[63] When speaking about the role of theories in determining the voice of others, Klaus Krippendorff proposed the development of a second-order cybernetics of otherness.[64] In my opinion, among the questions that arise is that one of how are the conditions for dialogue that in turn engenders self-determination brought forth? Or What type of an "I" is it that pre-supposes reflective thinking? I believe that the stress on the notions of *professional accountability* of project-driven methodology can propitiate a much sought after change in the attitude of the designer. Questions related to ethical issues, for example, can be brought to the foreground as intrinsic and necessary considerations of the practice.

Project-drive methodology does not aspire to produce monolithic truths. Like in other methods, the focus is on processes that facilitate the work and objectives being pursued. Since the work was being produced in a collaborative framework, the method focused on developing a second-order knowledge or an understanding of the understanding of others. Because of the involvement in the object, it is expected that the designer/researcher will raise new questions,

discover novel approaches, and perhaps even produce fresh proposals for new theoretical models.[65] The method operates in a bottom up manner, since the research questions are determined and originate as the result, of the work that is done in the project. The subjective base, which is after all a part of all inquiry, remains an obstacle to be transcended.

Application of the method

Figure 4 below, illustrates how the method was utilized in this project. Research questions, created by the designer, were inserted into the problem space of the project. The problem space in a collaborative endeavor corresponds to what Rittel labeled as the *wicked problems* in design thinking[66] and which Buchanan extended to include the notion of the indeterminacy of design problems.[67] According to Rittel, wicked design problems are:

> "…a class of social system problems which are ill formulated, where the information is confusing, where there are many clients and decision-makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing."[68]

Multidisciplinary collaboration falls into this type of problem area because different disciplines have different thinking styles, values, and goals. According to DeKerkchove, the issue of diversity of thinking styles, values and goals among the disciplines has been a topic of discussion throughout the centuries.[69] In the context of collaborative work, Kim has noted the fact that disciplines themselves are by definition rigid entities that safeguard their boundaries.[70] Also, this question of rigidity is handled differently by different disciplines. In science the issue of rigidity relates to the form of scientific theory as an artifact of precision. According to Thomas Kuhn, a theory must be precise enough to allow for testing.[71] In my opinion, in art, that rigidity might be better discerned by looking at the force of tradition in relation to artifacts produced according to the manner of styles and schools.

Project-driven method
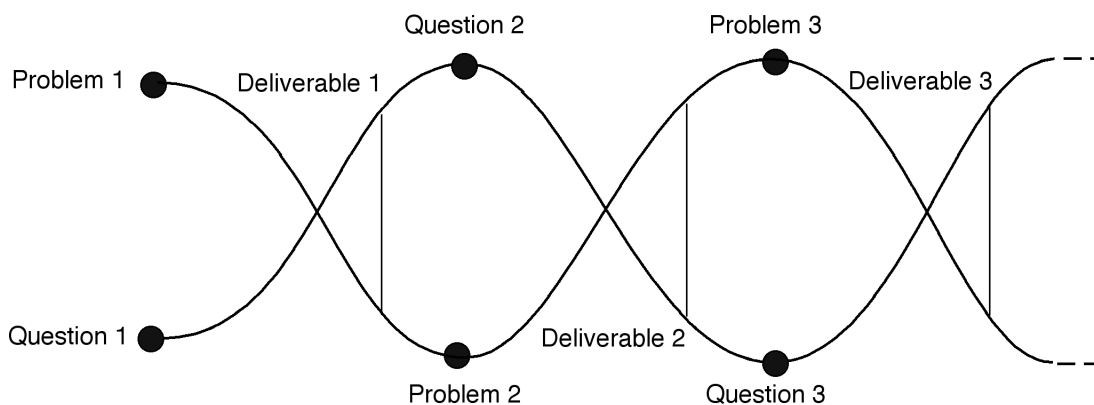(*Proposal for a model*)

Figure 4: Visualization, by the author, of the project-driven method in action. Different strands represent different actors working together in the design process.

This issue of the rigid nature of boundaries between disciplines is of extreme importance to designers. This is partly due to the peculiar nature of the subject of design as indeterminate, or

lacking definitive conditions. The subject matter of design is potentially universal in scope given that it can be applied to any area of human activity. At the same time, in the process of working, the designer must discover or create "a particular subject out of the problems and issues of specific circumstances."[72] The current work proposes that the subject matter of a design inquiry can be articulated in the form of the research questions that are posed by the designer. Richard Buchanan has suggested that this approach might allow for the definition of a scientific basis for design that does not reduce the discipline to yet another science:

> "…the designer establishes a principle of relevance for knowledge from the arts and sciences, determining how such knowledge may be useful to design thinking in a particular circumstance without immediately reducing design to one or another of these disciplines."[73]

For example, one of the first problem areas to be addressed by the designer in the project proposal (Problem 1) was the lack of avenues for communication between those who work in art-oriented disciplines, such as design and those who work in disciplines based in the humanities, such as archaeology. This condition can be seen in how scholars, such as archaeologists who utilize artifacts to learn about the past, and designers who produce the artifacts in today's world rarely share knowledge and expertise. Among the research questions (Question 1) that emerged, in the designer's mind, from examining such situation were: When archaeologists look at, and for example, illustrate pottery, how does his practice differ from that one of the ceramist or the artist? Can the archaeologist's work benefit from understanding the point of view of the artist, and the designer, in issues such as style and form? Can the designer in turn make use of knowledge from archaeology in her practice? Can art produce history? These questions informed the guidelines that designer gave the archaeologists. These guidelines included specifications for the creation of the taxonomies and naming schemas for the artifacts included in the archive. They also included directions on format, style and point of view for the different narratives created by the archaeologist. After much discussion amongst the group, they translated into the tangible deliverables (Deliverable 1) produced jointly by designer and archaeologists: That is, the digital representations of virtual culture heritage materials with an emphasis on archaeology and the museum that are included in the archive.

Another of the problem areas (Problem 2) that was explicitly included by the designer in the project proposal was that one of how collaborative endeavors can make better use of the skills and resources of individuals from different disciplines. This is a problem area that touches directly on the question of the contribution of artists and designers working with new media to the Information Society. On a concrete level, information and content are the raw materials that the new media artist or designer utilizes. At a more abstract level, artists are trained in the

cognitive skills involved in pattern recognition and synthesis of forms and structures required to produce not only logical, but also, effective information and communication products. In terms of research, the question (Question 2) that the designer focused on was that one of whether the skills of the artist and designer be used to achieve new mappings that in turn result in new representations and interpretations of content in the humanities? The tangible deliverables (Deliverable 2) that resulted from this inquiry were the creation of an ontology that describes the materials that are presently in the archive, as well as those that may be added in the future. This ontology is implemented in the form of the controlled vocabulary and classification system that operates as a type of interface and allows for navigating and searching through the materials of the website.

The ontology was co-designed between the archaeologists from Turku and the designer. The designer and Janne Pietarila, a software engineer at the Media Lab, implemented the concept of the ontology. Other examples of how co-design was used in the project include: data acquisition in the form of documentation of the work of archaeologists, production of the html documents, co-design of the basic documentation templates, as well as the controlled vocabulary and classification system.

Another problem (Problem 3) area identified by the designer and addressed in the project was the variations that occur in interpretation and use of representation from one discipline to another. This was of particular importance, given the fact that the project was defined as a collaborative endeavor. Artists, designers, and archaeologists—all humans—have different world-views regarding what is the object of knowledge. An artist might produce representations that are used by art historians, archaeologists and historians as basic data. But when the artist is producing the actual object, this is not necessarily considered to be knowledge, but rather 'know-how'. In the research done by the designer, this situation was addressed by posing questions (Question 3) such as: How is the object of knowledge defined and by whom? Can the artist produce knowledge, and if so, what type? Is the object of knowledge something that varies historically and across disciplines? If classification systems are the physical manifestations of these variations, are the changes they exhibit related to changes in the institutional base of knowledge? In this area, is there a difference between the arts, the humanities, and the sciences? The tangible deliverables created by the designer (Deliverable 3) are the present monograph, and the basic authoring tool that allows the visitor to select and display the materials that she desires. The tool displays the selection in the form of a 3D gallery structure that the visitor can navigate. It is possible to save the selection to an HTML document that allows for further annotation.

Among other deliverables that resulted from the application by the designer of this method was the use the triadic structure and other concepts from Activity Theory as a framework that weaves together the different viewpoints of the disciplines represented in the collaboration. In the current work the author advocate the development and use of models based on Activity Theory as tools that can help to visualize collaboration among the different disciplines. This proposal is the result of the professional work done on the field, and not of any *a priori* formulations. The role of method, in a sense is to operate as part of the aesthetics of practice and not as the shackles binding us within a chain of empiricism. In the end, the thoughts included in this monograph can also be described partly as being part of the documentation of the project, and partly as a process of self-reflection on the part of the designer.

It could be argued that the development and use of methods, such as project-driven research, reflect the continuing push by academic sectors in design towards a transformation into a more rationalized, scientific, discipline. The question that arises, though, is whether design can (or should) be made to fit neatly into the rationalized constructions of scientific logic. Aside from a need to understand the applications of design within different knowledge frameworks, there may also be a need to develop a way of *knowing* the world that is neither art, nor science, but that integrates aspects of both. It must be based on the experience that emerges from what design is and has been. As such, it should emphasize the human involvement and situated nature of the activities encompassed in the practice of design, as well as the integrative aspects of the discipline.[74]

Notes to chapter two:

[1]. Kubler, G., The Shape of Time, Remarks on the History of Things, Yale University Press, New Haven, CT, 1962. P., 19.

[2]. Shanks, M., "Photography and Archaeology", The Cultural Life of Images, Visual Representation in Archaeology, Molyneaux, B.L., (ed.), Routledge, London and New York, 1997. P., 88.

[3]. Foucault, M., The Archaeology of Knowledge and the Discourse on Language, Pantheon Books, New York, NY, 1972. P., 7.

[4]. Foucault, M., The Archaeology of Knowledge, p., 7. Ferdinand Braudel's book on the History of the Mediterranean, with is emphasis on *longue duree*, is representative of this notion.

[5]. Iggers, G.G., Historiography in the 20th Century, From Scientific Objectivity to the Postmodern Challenge, Wesleyan University Press, Hanover and London, 1997. P. 59. Foucault for, example, stressed how the idea of one history is a modern invention.

[6]. Kubler, G., The Shape of Time, p., 19.

[7]. Foucault, M., The Archaeology of Knowledge, p., 7. According to Foucault, recognition presumes the identification or acknowledgement of something that is previously known. From this point of view, the task of the historian is one of rearranging something that already exists.

[8]. Rosa, A., "Production of Meaning and Historical Understanding", Proceedings of the 16th Scandinavian Conference of Linguistics, Special Session on Activity Theory, Junefelt, K., Ed., Göteborg, 1995. P., 93.

[9]. Schiffer, M.B., The Material Life of Artifacts, Routledge, London and New York, 1999. P., 7.

[10]. Renfrew, C., "Hypocrite voyant, mom semblable... Viewpoint: Is there a Place for Aesthetics in Archaeology?" Cambridge Archaeological Journal, 4:2, 1994. P., 264.

[11] . Schiffer, M.B. <u>The Material Life of Artifacts</u>, Routledge, London and New York, 1999. P., 7.

[12]. Kubler, G., <u>The Shape of Time</u>, p., 13. Kubler defines it as "visual evidence of physical and biological duration."

[13] . See M.B. Schiffer and A.R. Miller, <u>The Material Life of Human Beings</u>, Routledge, London and New York, 1999.

[14]. Renfrew, C. and E.B.W., Zubrow eds., <u>The Ancient Mind, Elements of Cognitive Archaeology</u>, Cambridge University Press, 1994.

[15] . See DeBoer, p. 82 and Taylor, p. 252.

[16]. Foucault, M., <u>The Order of Things, An Archaeology of the Human Sciences</u>, Vintage Books, New York, 1994, ed., pp. 346-348. Foucault's text refers to the so-called "human sciences", however, in the opinion of this author, the discussion can be extended to include the field of design.

[17]. Foucault, M., <u>Aesthetics, Method and Epistemology, Essential Works by Foucault 1954-1984</u>,J.D. Faubion, ed. , paul Rabinow, Series, ed., The New Press, New York, 1994. P. 313.

[18]. Wolfgang, J., "On the Foundations of a Science of the Artificial", <u>Useful and Critical, The Position of Research in Design</u>, Proceedings from International Conference, The University of Art and Design Helsinki UIAH, Sept. 1999.

[19]. Findeli, A., "Design History and Design Studies: Methodological, Epistemological and Pedagogical Inquiry" <u>Design Issues</u>, Volume 11, Number 1, Spring 1995. P., 50.

[20]. In Friedman, K., "Theory in Design", <u>The Position of Research in Design. International Conference Proceedings</u>, The University of Art and Design Helsinki/UIAH, 1999. P. 1. According to Friedman, this is the definition of the term as it appears in the 1990 version of the Merriam Webster dictionary.

[21]. Idem.

[22]. Binski, P., <u>Painters, Medieval Craftsmen</u>, The British Museum Press, London, UK., 1991. P., 56.

[23]. McGrath, T., "Color and the Exchange of Ideas between Patron and Artist in Renaissance Italy", <u>Art Bulletin</u>, Vol. LXXXII, No. 2, June 2000. P., 299.

[24]. Greenhalgh, P., "The History of Craft" in P. Dormer, ed. <u>The Culture of Craft</u>, Manchester University Press, Manchester, UK, 1997. P. 39.

[25]. Vasari, G., <u>Vasari on Technique, Being the Introduction to the Three Arts of Design, Architecture, Sculpture and Painting, Prefixed to the Lives of the Most Excellent Painters, Sculptors and Architects</u>, Baldwin Brown, ed., Dover Publications, Inc., New York, 1975. P., 205: [Design] "...is not other than a visible expression and declaration of our inner conception and of that which others have imagined and given form to their idea."

[26]. Vasari, G., <u>Vasari on Technique</u>, Introduction, p., v.

[27]. Vasari, G., <u>Vasari on Technique</u>, p., 207.

[28]. Vasari, G., <u>Vasari on Technique</u>, p., 207.

[29]. Vasari, G., <u>Vasari on Technique</u>, p., 207.

[30]. Vasari, G., <u>Vasari on Technique</u>, p., 205.

[31]. Vasari, G., <u>Vasari on Technique</u>, p., 205.

[32]. Wittoker, R., <u>The Artist and the Liberal Arts</u>, p. 4.

[33]. Wittoker, R., <u>The Artist and the Liberal Arts</u>, p. 3. The Liberal Arts dealt with language and mathematics. They were: grammar, rhetoric, dialectics, arithmetic, geometry, astronomy, and music. According to Rudolph Arnheim, they were so-called because "they were the only worthy of being practiced by a free man." Visual Thinking, University of Califormia Press, Berkeley, CA, 1969. P., 2.

[34]. Vasari, G., <u>Vasari on Technique</u>, p., 206. See also, McCullough, M. <u>Digital Craft, The Practiced Digital Hand</u>, The MIT Press, Cambridge, MA, 1996. P., 12: "At least in Europe, the Renaissance introduced an intellectual separation of practical craft and fine art. Art came to be held in a higher esteem."

[35]. Greenhalgh, P., "The History of Craft", <u>The Culture of Craft</u>, P. Dormer, (ed.) Manchester University Press, Manchester, UK, 1997. P., 39.

[36]. Greenhalgh, P., "The History of Craft", p., 40.

[37]. Greenhalgh, P., "The History of Craft", p., 40.

[38]. Forty, A., <u>Objects of Desire, Design and Society since 1750</u>, Thames and Hudson, London,UK, 1986. P. 7.

[39]. Friedman, K., "Theory in Design" <u>Useful and Critical, The Position of Research in Design</u>, Conference Proceedings, University of Art and Design Helsinki, Finland, 1999. In this essay Friedman proposes that the contemporary notion of design is more based on the natural and social sciences than on craft.

[40]. Findeli, A., "Will Design Ever Become a Science? Epistemological and Methodological Issues in Design Research, Followed by a Proposition" in No Guru, No Method, Conference Proceedings, P. Strandman (ed.), University of Art and Design Helsinki/UIAH, 1998. P., 66.

[41] Simon, H. A., The Sciences of the Artificial, The MIT Press, Cambridge, MA, 1969, 1998 (ed.). P., 5.

[42]. Simon, H.A., The Sciences of the Artificial, p., 5.

[43]. Simon, H.A., The Sciences of the Artificial, p., 6.

[44]. Simon, H.A., The Sciences of the Artificial, p., 23.

[45]. Simon, H.A., The Sciences of the Artificial, p., 131.

[46]. Willett, J., The Weimar Years, A Culture Cut Short, Abbeville Press, NY, NY, 1984. P., 77. There was a notion in Bauhaus that the partnership of design and industry could bring benefits to society at large. An example of this can be seen in how the designed built-in kitchen furniture that we take for granted nowadays, was productized so that it became available to all strata of society.

[47]. Passuth, K., Moholy-Nagy, Thames and Hudson, London, UK, 1987. P., 347: Geometry, Physics, Chemistry, Mathematics, Biology, Physiology and Anatomy were the scientific subjects which complemented the Basic Design Workshop and the Drawing, Modelling and Photography module.

[48]. Findeli, A., "Moholy-Nagy's Design Pedagogy in Chicago (1937-46)" in The Idea of Design, p. 29. Moholy-Nagy himself was an artist working with technology-derived media such as photography, film, and electronically driven light sculpture. He had been an integral part of the original Bauhaus.

[49]. Findeli, A., "Moholy-Nagy's Design Pedagogy in Chicago (1937-46)", p., 35.

[50]. Passuth, K., Moholy-Nagy, p., 355.

[51]. Findeli, A., "Moholy-Nagy's Design Pedagogy in Chicago (1937-46)", p., 38.

[52]. Findeli, A., "Moholy-Nagy's Design Pedagogy in Chicago (1937-46)", p., 43.

[53]. An antithesis to this may be the work of Buckminster Fuller and the work of Victor Alexander.

[54]. Clay-Disk with Circular Cross Impression, TYA631-1514, Illuminating History. An artifact found at the Mulli excavation site, and presumed to be a loom weight. The diameter of the clay-disks of Mulli is 9–14 cm and the weight is 300–1100 g. There are several kinds of ornaments in the disks, like circular crosses, stick impressions, finger impressions, cord impressions and hole impressions.

[55]. Krippendorff,K., "On the Essential Contexts of Artifacts or on the Proposition that "Design is Making Sense (of Things)", The Idea of Design, A Design Issues Reader, Margolin, V., and R. Buchanan, (Eds.) The MIT Press, Cambridge, MA, 1996. P., 158.

[56]. Krippendorff, "On the Essential Contexts of Artifacts or on the Proposition that "Design is Making Sense (of Things)", p., 158.

[57]. Krippendorff, K., et. al. Design in the Age of Information, Report to the National Science Foundation (NFS), Design Research Laboratory, North Carolina State University, Raleigh, North Carolina, 1997., p., 42.

[58]. Krippendorff, K., "On the Essential Contexts of Artifacts or on the Proposition that "Design is Making Sense (of Things)", p., 162.

[59]. Foucault, M., The Archaeology of Knowledge and the Discourse on Language, Pantheon Books, New York, 1972. P., 21.

[60]. The word compromised is used to point towards the urgency for involvement and responsibility.

[61]. Findeli, A., "Will Design Ever Become a Science?", No Guru, No Method, Proceedings of the International Conference, University of Art and Design Helsinki, Finland, 1996. P., 68.

[62]. Mikkelsen, B. Methods for Development Work and Research: A Guide for Practitioners, Sage, New Dehli. Quoted in M. Southwell "Participatory Research: A Developmental Model Applied to Design" Paper presented at The Challenge of Complexity, 3rd International Conference on Design Management, University of Art and Design Helsinki/UIAH, Helsinki, 1995.

[63]. Ehn, P., "On the Collective Designer", Keynote lecture given at the Cultural Usability Seminar, University of Art and Design Helsinki, Finland, April 24, 2001. See web site for abstract of the lecture: http://www.mlab.uiah.fi/culturalusability/papers/Ehn_paper.html, (Feb 8, 2002)

[64]. Krippendorff, K., "A Second-order Cybernetic of Otherness", Systems Research, Vol. 13, No. 3, 1996. P. 311.

[65]. Findeli, A., "Will Design Ever Become a Science?", No Guru, No Method, Proceedings of the International Conference, p. 68.

[66]. Church West, C., Management Science, Vol. 4, no. 14, December 1967. As cited in Buchanan, R., "Wicked Problems in Design Thinking", The Idea of Design, A Design Issues Reader, V. Margolin & R. Buchanan, (Eds.) The MIT Press, Cambridge, MA, 1996. P. 14.

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[67]. Buchanan, R., "Wicked Problems in Design Thinking", <u>The Idea of Design, A Design Issues Reader</u>, p. 14.

[68]. Buchanan, R., "Wicked Problems in Design Thinking", <u>The Idea of Design, A Design Issues Reader</u>, p. 14.

[69]. DeKerchkove, D., In the sense of the Classsical Trivium, the situation presented in this work could be perhaps seen as an example in which the study of sensory parameters belongs to the arts, whilst the use of a grammar and words, belongs to archaeology. Design is the discipline that binds them, by allowing one to create structure that brings them together. Personal communication, June 19, 2001.

[70]. Kim, S., "Interdisciplinary Collaboration" <u>The Art of Human Computer Interface Design</u>, B. Laurel, ed., Addison-Wesley Publishing Company, Inc., Reading, MA, 1990. P. 34.

[71]. Kuhn. T.S., <u>The Structure of Scientific Revolutions</u>, 2nd edition, University of Chicago press, 1970. PP. 23-34.

[72]. Buchanan, R., "Wicked Problems in Design Thinking", <u>The Idea of Design, A Design Issues Reader</u> p. 15.

[73]. Buchanan, R., "Wicked Problems in Design Thinking", <u>The Idea of Design, A Design Issues Reader</u> p. 16.

[74]. Krippendorff, K., "Re-Designing Design, An Invitation to a Responsible Future", in <u>Design, Pleasure or Responsibility?</u>, P. Tahkokallio & S. Vihman, (Eds.) University of Art and Design Helsinki, Finland, 1995. PP. 138-162. In this essay, Krippendorff argues about the need of designers to take the responsibility of developing the discourses of the discipline further.