

ART, FACT,
and
ARTIFACT
production

Design Research and
Multidisciplinary Collaboration

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ILNARI
design publications

A 37

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Introduction

The importance of design to society has surfaced at different points in the recent history of the Western world. In Britain in the 1830s and 1840s, with the advent of mechanization, design was seen as an issue of political importance and was the subject of three Parliamentary Select Committees.[1] During the 1930s, it represented the forces of social reform in Germany, an association for which it earned the antagonism of the Nazi government.[2] In the United States, during the 1940s and 1950s it played a key role in the representing the values and ideologies of the emerging American ethos.[3] In the 1990s, its strategic role within the emerging Information Society in the United States, was highlighted in a workshop sponsored in 1997 by the National Science Foundation.[4] During this time, its pivotal role in configuring the virtual dimension was pointed out by the Canadian theoretician Derrick de Kerkchove. He labeled it “the skin of culture.”[5]

Yet in spite of the role it may have had in promoting values and ideologies, there is still the pragmatic facet to design. As the practice concerned with the conceptualization and creation of artifacts, design touches every aspect of our human existence. The artifacts of culture created through the process of design can reflect not only the collective knowledge, but also the darker values of a given culture. And issues such as accessibility are as much related to ethical questions regarding fair distribution and opportunity, as they are to the benefits associated with the creation of new markets.

The concept of innovation and its function in the creation of novel artifacts is related to both the ideal and practical aspects of design. Innovation is defined as the introduction of the new. However, distinguishing between the new artifact that brings joy, and the unknown object that is the source of fear and frustration is a delicate task. It requires knowledge, experience, and understanding. Klaus Krippendorff has described this as an understanding that does not stop at the surface, but rather penetrates deep into the interior to reveal what is meaningful.[6] It is an understanding that requires knowledge of the interaction between form, surface, and volume. It is concerned with the ways in which people understand and identify these factors. It demands knowledge of the function of artifacts, not only of what they are made, but also, how they operate, as well as their effect on the environment. It desires a context, an identity, and a history. Bringing delight into novelty should be a matter of most serious concern in development and research agendas.

The desire, as well as the need, to find a way to integrate theory and practice, to bridge the gap between the ideal and the material realms, is not only a concern of design. It is the subject of an

intense search by many of the disciplines involved in the creation of infrastructure and services in the Information Society. This is a task that is complicated by the fact that, as Michael Polanyi pointed out, 'knowing' is more than what can be described through language.[7] An object of knowledge is personal, as well as collective. As objects of knowledge, design artifacts not only operate as recipients of the ideas and values of the community and culture that produces them, but also, as pointers. The artifacts of design are indices to spaces brought forth through the gestures of their makers, as well as of those who come to own them, cherish them, and in a certain sense, define them.

In spite of the significance and contributions of design to society, the institutionalization of the discipline is in its early stages. Though designer and artist have always engaged in some form of research, design research through academic venues is rare and limited to a few institutions worldwide. As a practice, itself, design research is a young newcomer struggling to develop a sense of identity as well as methods that can be consistently implemented within the activities of the discipline. Though, as part of their work, designers make use of data generated by social scientists, current research suggests that the application of this information to the conceptual and problem-solving aspects of the discipline is limited.[8]

Design itself can be described as being at a juncture. An evolving paradigm highlights the need for developing discourses and vocabularies that outline the boundaries of the discipline and cogently define the matter of design.[9] Like cognitive science, design is most concerned with ontology and epistemology. Whereas the former pertains to the realm of description and quantification, the latter deals with how we know what we know. The act of design, however, always goes beyond the quantitative to apprehend the qualitative dimension. In this realm it deals with dialogue, negotiation and the understanding of differences. Design knowledge is significant because it is a type of second-order knowledge through which theories and ideas re-enter the material realm via the artifacts produced.[10]

At the same time, the growing complexity and infrastructure of the Information Society has increased demand for design knowledge. As part of large multidisciplinary efforts, such as in the creation of information repositories, designers find themselves working alongside professionals from other academic disciplines. In this arena, design can offer invaluable assistance to the task of what Krippendorff has referred to as the understanding of the theoretical and practical basis of material culture.[11] As form-giving, design is concerned, not only with the shape of the object, but also with the context into which it is deployed, the meanings of which emerge from its interaction with the world. I may add that form, is not solely the realm of the visual. Textual artifacts, such as myth, oral narratives, and stories also have form. The role of design in this area

is only beginning to surface, as the new interactive technologies have made us aware of this issue. There is an acute need for tools, methods, and literary sources that ensure that the contribution of the designer will be communicated, reflected on, understood, and valued. There is a need to bridge the gap between the thinking-as-doing of design, and the describing of design.

These are some of the issues related to the main research question in this document: How can design knowledge be defined, articulated, and represented within the space of an academic collaborative endeavor? In the context of such a broad inquiry, the present work does not attempt to provide an all-encompassing answer. It is one example that includes the interaction of a designer, who is also an artist, with a community of archaeologists. In the context of this study, the question was elaborated initially through the work done in a professional project, and subsequently through this theoretical work that makes use of models and terminology from Activity Theory to describe how the object of knowledge is fashioned within the different disciplines that were involved in the project.

PROJECT DESCRIPTION

Illuminating History: Through the Eyes of Media, is a collaborative design research project that was conceived as an academic endeavor. The agenda of the project is outlined in the original proposal that is included in the Appendix section of this document. The original objectives were based on the idea of creating a project in which archaeologists from the University of Turku, and artists and designers, from the Media Lab, would engage in active collaboration. Within this framework, the project proposed to utilize the work being done as an opportunity to investigate the different modes of representation available to humanists through the use of new media and design. The project also proposed to examine areas of intersection between the Arts, as exemplified by disciplines such as Design, and the Humanities, as seen through the point of view of the discipline of Archaeology.

These objectives coalesced in a relatively ambitious joint proposal that was submitted to the Academy of Finland for the first phase of the Research on Information program. The final outcome, or objectives realized through the professional project, however, were not as had been projected, in the form of a CD-ROM, but rather, in that of a hypermedia archive. This archive primarily contains materials gathered by archaeologists during the course of excavations in a late Iron Age site in Southwestern Finland. Insofar as the archive reflects the activities and lives of those who engaged in its creation, it may say more about the practices of archaeology and art and design in Finland at the end of the 20th century.

The making of the digital archive from the materials of the excavation at the Mulli site was the practical component of the project. Among the reasons that the designer chose the format of an archive and the World Wide Web (WWW) as a method for delivery included a desire to provide media representations of archaeological materials that are closer to the concept of data. The objective of the designer was to use media to document, without imposing any overall narrative strategy or superseding, the labor of the archaeologists. Therefore, the format of an archive, with its emphasis on records created as the result of human activity, seemed like a natural choice.

The proposal included the necessary conditions to facilitate a robust multidisciplinary effort from all parties. Among the collaborative aspects included were joint educational programs that would facilitate a transfer of knowledge. The designer would impart education in areas related to digitalization and hypertext scripting. In return the archaeologists would contribute to the education of the designers and artists in areas such as archaeology, folklore, and history. Efforts to realize such collaboration were to a large extent handicapped by the fact that only the Media Lab portion of the proposal received funding. By curtailing Turku's possibility for involvement, the decision by the funding authorities had a deep impact on the overall structure of the project, as well as the feasibility of attaining the proposed objectives. As a result, a project that had been designed to operate as a large-scale collaborative effort was transformed into an individual project, in which the possibility to actually do work together occurred only at certain points in time. This individual project formed the platform from which the current doctoral dissertation was elaborated.

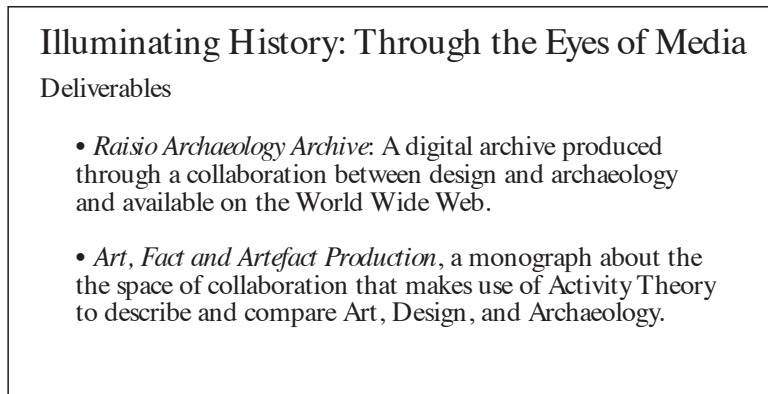


Figure 1: The results of the project *Illuminating History: Through the Eyes of Media*.

In the end, the cooperation between the archaeologists, as content producers, and the designer was facilitated by the involvement of the municipality under whose jurisdiction the archaeology site of Mulli is located. From its inception, the education department at Raisio city hall became involved in the project. Aside from providing the funds that enabled the archaeology students to perform the excavations in the years 1994 to 1996, they also funded a series of scholarships that allowed the students to do the research to write the narratives included in the archive, and to work on the classification system. In the summer of 2000, Harkko, a museum and cultural institution that features an archaeology section, opened in Raisio. The digital archive created in this project is an integral component of the archaeology exhibition. The archive is expected to serve as a platform for the development of educational materials that can be used in secondary-level instruction.

DESCRIPTION OF THE STUDY

Figure 2, below, illustrates the structure of this study as well as the different themes that are covered in it. The current chapter presents some of the larger issues involving the design-research and the production of artifacts. It also includes a description of the project that served as platform for this study, as well as a description of this document itself.

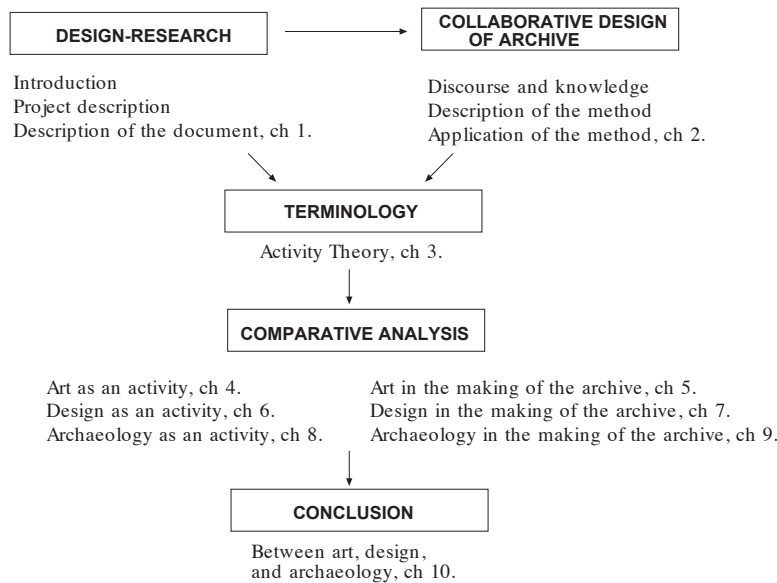


Figure 2: The Structure of the Study.

The second chapter, Discourse and Knowledge, reviews some of the discursive formations that have shaped, and continue to influence disciplines as producers of knowledge. Particular attention is focused on the notion of artifacts, not only as material but also as ideal entities. The material aspects of artifacts, the networks of relations that interact in their creation as well as their distribution, is important to both design and archaeology. Describing, understanding, and making them is of principal interest to design. In the case of archaeology, depending on the school of thought, the identity and presence of the maker, the hypothetical function of the item, the context in which it was found--as well as that in which it may actually have existed—can be of importance. The chapter also reviews some of the conflicting discourses in design with regard to the notion of knowledge. Is design science, or art, or both? Why is it important to think about this? The importance of how this translates into design practices is related to how, in a pragmatic discipline such as design, theoretical frameworks re-enter the practice in the form of artifacts. Designed artifacts can be fashioned to accommodate a multiplicity of users. As the result of hegemonic agendas designed artifacts can also obscure diversity and promote consensus.

The third chapter provides the reader with an overview of the vocabulary and concepts of Activity Theory, as well as with an introduction to the three-tiered hierarchy of artifacts proposed by Marx Wartofsky. The emphasis is on the diffracted view of the activity and its components that is afforded through the use of the models developed by Yrjö Engeström and Kari Kuutti. The use of these models as sighting devices allows for a systematic comparison of three distinct fields of practice, namely art, design, and archaeology. This type of comparison could not have been possible without the theory, given the differences that exist between these three areas of human activity. Because it allows us to elaborate on the different roles, as well as the tools utilized, this type of comparison can be helpful in establishing the space for multidisciplinary collaboration. The three-tiered hierarchy can be useful in managing the design of complex information artifacts that embody the multiple practices of those involved in their creation.

The fourth chapter, *The Activity of Art*, provides an analysis of the practice of art from the point of view of this framework. There are several reasons why this approach has been selected. One of the goals is to compare disciplines that in the real world exist quite apart from each other. The hope is that this will lead to a better understanding of the elements and forces that exist in the space of collaboration. Another important objective is to highlight art as a facet of design that deals not only with issues of aesthetics, but also with cognition, as well as ethics. An attempt is made to sidestep culturally and historically situated definitions regarding the meaning of art, and focus on the form of the activity itself. It is argued that the term of art, how it is used, and by whom, has changed throughout history. However, the basic activity of art as one concerned with the act of expression has remained the same. The terms of *expressive artifacts* and *artifacts of expression* are introduced as a typology that can allow us to speak about the collective as well as the personal aspects of artifacts that are also art objects.

It is clear that the approach used here is, to a certain degree, reductive. Nevertheless, it represents an attempt to try to understand how knowledge is created in fields that are heavily involved with what has been labeled as tacit knowledge. A practical approach, such as the one advocated in this study, can allow one to begin to clear the space and enable a discussion about the *form* of the design practice in general. This is not always possible when the discussion is centered on the potential meaning and interpretation of art, aesthetics, and design.

The *Art in Illuminating History*, the fifth chapter, introduces a new format in the style of the document. In sections of the text, the typeface changes to indicate a shift in the exposition from a narrative to a reportorial style. In this section, information is supplied about concepts, methods, and artistic approaches that influenced the creation of the different components of the Raisio

Archaeology Archive. Among the concepts discussed is that of the notion of page format as comprising a 2D space and how this is challenged through the use of new media technology. The use of hypertext and hypermedia as a way to gather together diverse information formats in one artifact of knowledge, or information repository, is also presented. How the information objects in the archive can be arranged in a continuum between documentation and interpretation is discussed. The tension that exists between interpretation and documentation is explored, via the objects of the archive and how they have been organized in separate sections. This is a separation that reflects assumptions regarding how different disciplines develop specific practices when dealing with matters of interpretation and description of the objects of research. Still, it is maintained that there is always a certain amount of pre-processing, and the distinction between documentation and interpretation refers more to an ideal rather than to a real practice.

As was done earlier with art, Activity Theory is used in chapter six, Design as an Activity, to provide an analysis of the activity of design. An attempt is made to describe the role of the designer and the tools that are used in the production of design artifacts such as design representations. This is done from the point of view of the designer as one concerned with pre-visualization and translation. Translation here not only involves a transfer between diverse representational formats such as textual and visual, but also communication, interpretation, and negotiation. The connection of design with art is again discussed. It is argued that the link is important if design is to develop and maintain an identity as the field of knowledge concerned with a dialogical understanding of material culture, or of artifacts that are physical as well as ideal entities. The object of the activity of design is presented as a communal artifact. This artifact is shared by all of those—including the designer—that have a stake in the outcome of the activity. Because of this notion of stakeholders, it is argued that the designer operates at several levels that include the fashioning of objects not only in the material realm but also in the realm of ideology.

Design in Illuminating History constitutes the seventh chapter and, like the earlier chapter on the application of art elements in the creation of the Raisio Archaeology Archive, it introduces a new format in the style of the document. In sections of the text in this chapter, the typeface has been changed to indicate a change of expository style from the form of a narrative to that of a report. In this section, information is presented about the different components of the archive and how they have been assembled.

Following the same process applied to earlier sections on art and design, the eight chapter, Archaeology as an Activity, uses Activity Theory to describe the practice of archaeology. The chapter is not meant to provide an all-encompassing account of the practice of archaeology, but rather one that is based on the work of one particular designer involved in a collaborative

endeavor with a particular community of archaeologists. The extent of this interaction was defined by the scope and objectives of the project, as well as by the identity of the parties involved. This is reflected in the materials presented as well as by the limited view of archaeology that focuses on aspects, such as excavation. In the following chapter, *Archaeology in Illuminating History*, the participation of the archaeologists in the creation of the materials in the Raisio Archaeology Archive is described.

As a conclusion to this study, the tenth chapter *Between Art, Design, and Archaeology*, attempts to bring together diverse aspects from the three disciplines examined. The objective is to highlight differences and similarities with the hope that by examining these, one can outline the diverging paths as well as the intersections that hold promise of potential integration and multidisciplinary cooperation.

Notes to chapter one:

1. A. Forty, *Objects of Desire, Design and Society since 1750* (London: Thames and Hudson, 1986), 58.
2. J. Willett, *The Weimar Years, A Culture Cut Short* (New York: Abbeville Press, 1984), 77.
3. Forty, 245. Forty argues that: “No design works unless it embodies ideas that are held in common by the people for whom the object is intended.” According to Forty, designs help to build markets by striking a chord in the psyche of the target groups for which they are intended.
4. K. Krippendorff, ed. *Design in the Age of Information: A report to the National Science Foundation (NFS)*, Design Research Laboratory, North Carolina State University, 1997.
5. D. de Kerkchove, *The Skin of Culture: Investigating the New Electronic Reality* (London: Kogan Page Books, 1995).
6. Krippendorff, “Product Semantics: A Triangulation and Four Design Theories,” in *Proceedings of the Product Semantics Conference in 1989*, S. Väkevä, ed. (Helsinki: University of Art and Design Helsinki/UIAH, 1990), 4.
7. M. Polanyi, *The Tacit Dimension* (Gloucester, Mass.: Peter Smith, 1983).

8. J. Melican, "Describing User-Centered Designing: How Design Teams Apply User Research Data in Creative Problem Solving" Ph.D. diss., Illinois Institute of Technology, 2001.

9. Krippendorff, "Redesigning Design: An Invitation to a Responsible Future," in Design – Pleasure or Responsibility? P. Tahkokallio and S. Vihma, eds. (Helsinki: University of Art and Design Helsinki/UIAH, 1995). This essay is a call and proposal for the development of discourses and vocabulary that is explicitly pertinent to design.

10. Ibid., "A Second-order Cybernetics of Otherness," in Systems Research, Vol. 13, No. 3 (1996): 312.

11. Ibid., "Redesigning Design," 3–4.

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 adaptation⁴¹: 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-poiesis (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 thinking⁶⁶ 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)

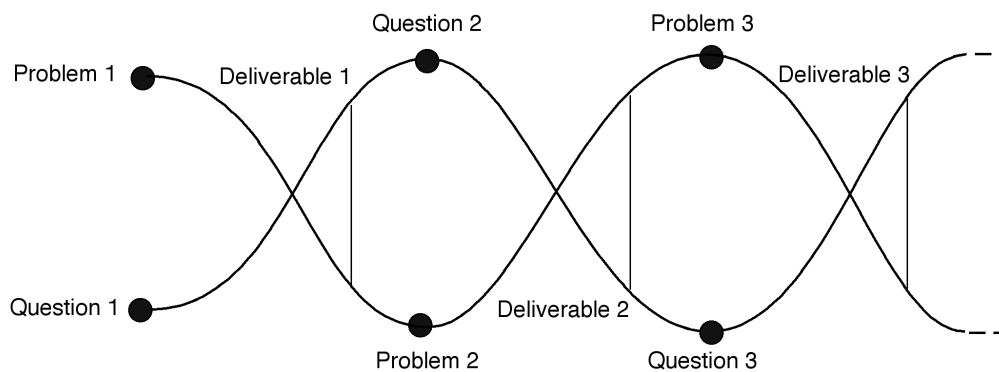


Figure 4: Visualization, by the author, of the project-driven method in action. Different strands represent different actors working together in the design process.

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 of 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 advocates 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 its 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.

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- ¹¹ . Schiffer, M.B. The Material Life of Artifacts, Routledge, London and New York, 1999. P., 7.
- ¹² . Kubler, G., The Shape of Time, p., 13. Kubler defines it as “visual evidence of physical and biological duration.”
- ¹³ . See M.B. Schiffer and A.R. Miller, The Material Life of Human Beings, Routledge, London and New York, 1999.
- ¹⁴ . Renfrew, C. and E.B.W., Zubrow eds., The Ancient Mind, Elements of Cognitive Archaeology, Cambridge University Press, 1994.
- ¹⁵ . See DeBoer, p. 82 and Taylor, p. 252.
- ¹⁶ . Foucault, M., The Order of Things, An Archaeology of the Human Sciences, 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., Aesthetics, Method and Epistemology, Essential Works by Foucault 1954-1984, 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”, Useful and Critical, The Position of Research in Design, 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” Design Issues, Volume 11, Number 1, Spring 1995. P., 50.
- ²⁰ . In Friedman, K., “Theory in Design”, The Position of Research in Design. International Conference Proceedings, 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., Painters, Medieval Craftsmen, 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”, Art Bulletin, Vol. LXXXII, No. 2, June 2000. P., 299.
- ²⁴ . Greenhalgh, P., “The History of Craft” in P. Dormer, ed. The Culture of Craft, Manchester University Press, Manchester, UK, 1997. P. 39.
- ²⁵ . Vasari, G., 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, 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., Vasari on Technique, Introduction, p., v.
- ²⁷ . Vasari, G., Vasari on Technique, p., 207.
- ²⁸ . Vasari, G., Vasari on Technique, p., 207.
- ²⁹ . Vasari, G., Vasari on Technique, p., 207.
- ³⁰ . Vasari, G., Vasari on Technique, p., 205.
- ³¹ . Vasari, G., Vasari on Technique, p., 205.
- ³² . Wittoker, R., The Artist and the Liberal Arts, p. 4.
- ³³ . Wittoker, R., The Artist and the Liberal Arts, 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 California Press, Berkeley, CA, 1969. P., 2.
- ³⁴ . Vasari, G., Vasari on Technique, p., 206. See also, McCullough, M. Digital Craft, The Practiced Digital Hand, 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”, The Culture of Craft, 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., Objects of Desire, Design and Society since 1750, Thames and Hudson, London, UK, 1986. P. 7.
- ³⁹ . Friedman, K., “Theory in Design” Useful and Critical, The Position of Research in Design, 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”, The Idea of Design, A Design Issues Reader, p. 14.
- ⁶⁸. Buchanan, R., “Wicked Problems in Design Thinking”, The Idea of Design, A Design Issues Reader, p. 14.
- ⁶⁹. DeKerckove, D., In the sense of the Classical 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” The Art of Human Computer Interface Design, B. Laurel, ed., Addison-Wesley Publishing Company, Inc., Reading, MA, 1990. P. 34.
- ⁷¹. Kuhn, T.S., The Structure of Scientific Revolutions, 2nd edition, University of Chicago press, 1970. PP. 23-34.
- ⁷². Buchanan, R., “Wicked Problems in Design Thinking”, The Idea of Design, A Design Issues Reader p. 15.
- ⁷³. Buchanan, R., “Wicked Problems in Design Thinking”, The Idea of Design, A Design Issues Reader p. 16.
- ⁷⁴. Krippendorff, K., “Re-Designing Design, An Invitation to a Responsible Future”, in Design, Pleasure or Responsibility?, 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.

Activity Theory

A FRAMEWORK OF KNOWLEDGE

Activity Theory is a framework of knowledge that seeks to explain the unity and inseparability of doing and thinking. It does so by focusing on the idea of the indivisibility of organism and environment, of the individual as inseparable from the social context within which s/he exists.

This is a notion that coalesced into its present form during the 19th century. It went hand in hand with new theories in philosophy, the natural sciences, and the social sciences which focused on the role of material productive activity. These new modes of thinking were themselves related to the rise of capitalist society and the development of global commerce and production.[1]

According to Yrjö Engeström, this focus is evident in philosophy, the natural sciences, and the social sciences. In philosophy, for example, the German philosopher G.W.F. Hegel proposed a “theory in which human consciousness is formed under the influence of knowledge accumulated by society and objectified in the world of things created by humanity.”[2] In the natural sciences, the work of Charles Darwin laid the foundations for a natural scientific conception of man.

These two viewpoints were synthesized in the writings of Karl Marx and Frederick Engels, whose work in the social sciences put forth the notion that humankind was not only a product of evolution and an assimilator of culture, but a creator and transformer as well:[3]

Organism and environment, man and society, were no more seen as separate entities, but as integral systems within which retroactive causality and internal transitions prevail. These breakthroughs meant that man and society could no longer be understood as stable, unchanging entities but only as something characterized by qualitative transformations requiring a historical perspective.[4]

As a framework, however, Activity Theory not only proposes a view of the human as a systemic and historical being, but also, attempts to model the basic structure of human activity.

In Activity Theory, the basic unit of analysis is the activity itself. This later is defined as the “smallest unit that still preserves the essential unity and quality behind any complex activity.”[5] The term seeks to describe the relationship between the actor and her objectified motive, or “the way in which the subject sees her practice.”[6] Activity is not static, but rather, is constantly changing. The models utilized must be able to depict the dynamics and transformations of the system.[7] This system that activity forms is tightly integrated in the system of societal relationships. This is why the models have to focus on the relationships between the individual

and the outside world.[8] This may be why activity has been described as a prism “through which our interaction with the world is reflected in inner and outer processes.”[9] Activity, however, is not an ordinary prism. As a result of the process of learning, activity is a prism that changes all the time.

Activity Theory is concerned with learning as the creative expression of human behavior. The theory seeks to address basic questions such as: How can a structure generate another structure that is more complex than itself? How can the development of complex structures be accounted by mechanisms that are not themselves highly intelligent or richly endowed with knowledge?[10] Learning is important because, at the most basic levels, and in the earliest learning experiences, it is a manifestation of the creative spirit in humankind. One of the forms that learning assumes is the process of internalization of external activity whereby cultural and social artifacts, such as tools and signs, come to influence the mental processes that subsequently develop. Lev Vygotsky, of the cultural-historical school in psychology and one of the earliest contributors to the theory, proposed that the psychological structure of basic processes, such as for example memory, are affected by such operations:

...the beginning of writing and simple memory aids all demonstrate that even at early stages of historical development humans went beyond the limits of the psychological functions given to them by nature and proceeded to a new culturally-elaborated organization of their behaviour.[11]

To the extent that they allow for the incorporation of artificial and self-generated stimuli, artifacts, such as signs, extend the operation of the organism beyond its biological dimensions. At the same time, though, in the process of mediation these artifacts are themselves transformed. This concept of *mediation*, as it is referred to, is one of the cornerstones of Activity Theory. It underscores the potential of mediating artifacts, such as tools and symbols, to change human activity. From the cultural historical point of view, Activity Theory seeks to understand the emergence of learning activity as a potentially expansive form of human behavior. Learning need not be limited to reactive tasks that occur in preset environments, but rather can, and should, include the possibility of finding and creating new contexts.[12]

The triangle in Figure 5, depicts the notion of mediation as conceived by L. Vygotsky. In the model, connecting lines describe relationships that should be understood as mediated relationships. According to Vygotsky, symbolic operations among humans are not direct, but rather mediated by signs.[13] For Vygotsky, the very essence of human civilization rested on this active capacity to manipulate use artifacts.[14]

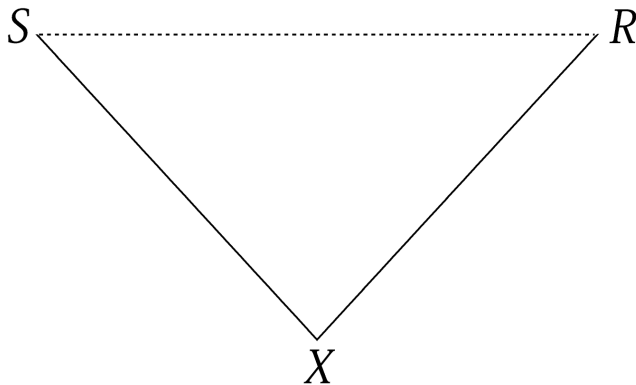


Figure 5: Diagram of the Stimulus-Response relationship by Lev Vygotski

The model used throughout this work, is a descendant of this triadic configuration. This model of the Activity System can be described as a sighting device, or artifact. As such, it possesses its own history:

In 1930, Vygotsky sketched his idea of mediation as a triangular structure where the Stimulus Response relationship (S-R) makes use of the sign as an intermediate link. This intermediate link is a second-order stimulus that is drawn into the relationship between terms S and R.[15]

The model presupposes an active engagement in the establishing of such a link. Because the sign possesses the characteristic of reverse action, it operates on the individual and not the environment:

Because of this function of reverse action, it transfers the psychological operation to higher and qualitatively new forms and permits humans, by the aid of extrinsic stimuli to control their behaviour from outside. The use of signs leads humans to a specific structure of behaviour that breaks away from biological development and creates new forms of a culturally-based psychological process. The tool's function is to serve as the conductor of human influence on the object of activity...[16]

Vygotsky's model, has been subsequently extended by Yrjö Engeström.

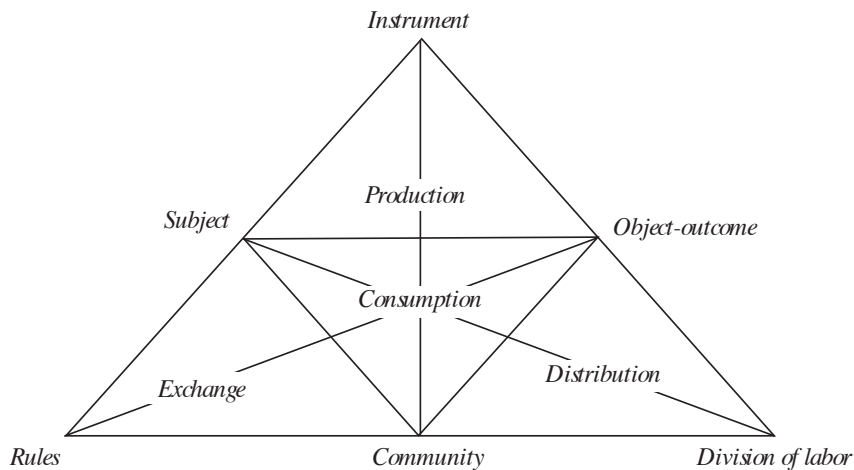


Figure 6: Diagram of the concept of activity by Yrjö Engeström

The triadic structure that Engeström presents illustrates individual action that is at the front, or most visible part, of a collective activity. The bottom part is occluded from immediate observation. This part consists of the community sharing the same general object, the division of labor between the members of the community, and the rules regulating the actions legitimately taken by the actors.[17] Engeström's model brings together the subject, the object, and the instruments into a unified whole. Because of the notion of mediation, the elements depicted in the model can be regarded as parts that are in interaction with each other. Throughout these interactions, which effect changes in the object, the elements are themselves transformed. The object constitutes the raw material and the problem space--at which the activity is directed--but which is also transformed. The instruments are devices of mediation. They are tools that carry within them the cultural heritage of the situation.[18]

The model provides a geometry that allows for visualization of complicated structures in a comparative manner and from different points of view. Through the use of the concept of mediation, the model also offers the diffracted perspective necessary to visualize the structuring of symbolic operations involved in knowledge production across diverse disciplines. Diffracted geometries and optics that consider the relations of difference have been proposed as alternatives to hierarchical domination, incorporation of parts into wholes, or symbiotic fusion. As Donna Haraway has noted:

Diffraction is a mapping of interference, not of replication, reflection or reproduction. A diffraction pattern does not map where the differences appear, but rather, maps where the effects of differences appear.[19]

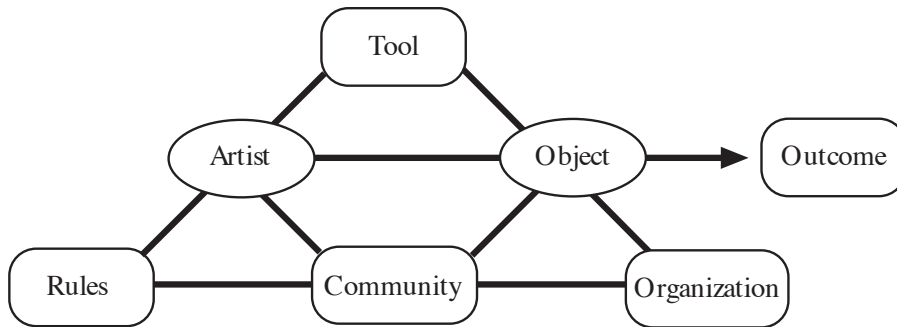


Figure 7: Diagram of the concept of the activity, by Kari Kuutti

The model, used throughout this work, is based on Kari Kuutti's adaptation of Yrjö Engeström's model of the concept of activity.[20] Like Engeström's, Kuutti's model depicts artifact-mediated action. Like Engeström's, the model contains the mutual relationships represented by a subject, tool, and object. In the model, for the sake of clarity, many of the systemic aspects of activity have been simplified. The model also depicts the basic units of the subject and object. The relationship between these two is of a reciprocal nature. It is a relationship that is mediated by tools.

The use of the model throughout this work is an attempt to illustrate and compare the similarities and differences (if any) among the activities of art, design, and archaeology. At the most basic level, these activities are distinguished from each other according to the objects that they produce. They also make use of artifacts and occur in collective environments. The artifacts that they use, the collective environments in which they occur, and the conditions that enable their production of discourses, are historically and culturally influenced. Among the issues that this work focuses on is that of how the space for potential collaboration among disciplines comes to be. Are there any aspects of the practice that they share in common? How are the actors defined? What constitutes the object of the activity? How are the tools created? Are the tools they use similar in any respect? What are the differences and how are they articulated?

THE ACTIVITY

As the basic unit, activity is a multifaceted concept that aims to cover all aspects of human practice. As a process that involves the individual actor, activity focuses on the relationship between the subject and the motivations and intentions that guide him through the forging of the object. The cognitive aspects of the human organism, such as perception, recognition, attention, memory, thinking, emotion, and imagination are not merely derived from activity, but rather, are interpreted as forms of activity.[21] From this point of view, activity can provide a glimpse into how the subject sees his/her practice. The subject, however, is not alone but operates as part of a community. Activity is, therefore, affected by the subject's participation within his/her community. The division of labor, or how the community is organized to achieve a common objective, influences the subject's relationship to the object of activity.[22] Thus, in the process of making, activity forms a system that is itself, at least partly, embedded in an already existing system of societal relationships.[23]

How these relationships weave themselves into a whole can be discerned by examining the object of activity and how it varies from one activity to another. In the sections ahead, for example, I will present the different ways in which graphic artifacts, such as drawings, are created in different disciplines such as art, design, and archaeology. The variations that exist among these is in accordance with the proposition that the object of the activity, how it is defined, manipulated, and transformed is what distinguishes one activity from another:

An activity is a form of doing directed to an object, and activities are distinguished from each other according to their objects.[24]

THE OBJECT AND THE ARTIFACT

In Activity Theory, the object is a transitional entity. It is the transformation of the object into an outcome, according to Kuutti that motivates the existence of an activity.[25] In the opinion of this author, an artifact is a conceptual structure used by scholars from diverse disciplines and which allows them to speak about how a multiplicity of influences of a cultural, social, and individual nature can converge in items that are created by human beings. For example, when speaking about artifacts as the artificial, manufactured objects created by humans, Herbert Simon did not distinguish between physical objects and immaterial items, such as symbol systems. He did, however, define a boundary between the inner environment as that which comprises the substance and organization of the artifact. The outer environment consisted of the surroundings

in which the artifact operated. According to Simon the interface was the meeting point between these two realms.[26] This author's opinion is that Simon's view reflects a problematic common to the use of instruments, namely that of where the boundary marking the place where the body ends and the tools begin?

Another interesting elaboration of the concept of the artifact can be seen in the three-level hierarchy developed by the philosopher Marx Wartofsky. For Wartofsky, the notion of artifact encompassed all sorts of mediating instruments such as technical tools, signs, and reflective thought. Man's incorporation of nature into the sphere of cultural constructions, for example, involved more than the cultivation of the land. Through cognitive artifacts, such as reflective thought, nature becomes transformed into an arena for action so that the forest itself becomes an artifact.[27]

Wartofsky's model was concerned with the historical development of both the concepts of perception and representation. As can be seen in Figure 8, below, he proposed a three-level hierarchy of primary, secondary, and tertiary artifacts. Primary, or first-level artifacts are artificial entities created by humans that allowed them to alter the nature of their environment. Primary artifacts are those used directly in production, such as axes, clubs, computers and telecommunication networks. Secondary, or second-level artifacts consist of representations of primary artifacts and of the modes of action using them. Examples of second-level artifacts are pictures, representations and the different modes of action that enable humans to transmit skill and information and to reflect upon their activities. Tertiary, or third-level artifacts consist of a class of artifacts that can come to constitute a relatively autonomous "world" in which the rules, conventions, and outcomes no longer appear directly practical in nature. Such imaginative artifacts can influence the way we see the actual world, acting as tools for changing current praxis. Examples of third-level artifacts are works of art, myths, visions, worldviews, and theoretical models.

Primary artifact	Pencil, hammer, computer
Secondary artifact	Alphabets symbol systems
Tertiary artifact	Artworks scientific paradigms

Figure 8: Visualization of Marx Wartofsky's three-tiered hierarchy of artifacts.

Following this historical approach, the psychologist and communications scholar Michael Cole, has further extended the scope of the term so as to include both the ideal and the material realms of culture. Cole has noted how artifacts embody in them the successful adaptations of earlier times (in the life of the individual who made them or in earlier generations). According to Cole, "in coming to adopt the artifacts provided by their culture, human beings simultaneously adopt the symbolic resources that they embody." [28]

In archaeology, the concept of the artifact has been a subject of much debate. A recent proposal by Michael Shanks contends that artifacts are active agents with their own life cycle:

The life cycle of an artifact is accompanied by physical changes and processes. An artifact wears in its use and consumption. Marks upon it attest to events it has witnessed, things that have happened to it. It can deteriorate. The artifact ages. [29]

When speaking about design artifacts, Adrian Forty argues that artifacts do not have a life cycle of their own, but that their existence is determined by the people and industries that create them, as well as by the relationship of these people and industries to society. [30] Throughout this work, I will propose that the artifact is a concept that can be used as a tool to reveal the indirect, and incidental, connections between the different aspects that come together in its creation. This is a view that is necessary when confronted by the fact that the meaning of an object cannot be fully explained through its technological specifications. The tool embodies the traditions and history resulting from the fact that the activity is a form of collective action. These traditions and history are, in turn, also embedded in the object of the activity and its resulting outcome. It may be possible, if only briefly, to have a glimpse of that boundary territory where culture, community, and artifact come together.

THE TOOLS

A tool is type of artifact. However, not all artifacts are tools. A tool is an artificial entity created for the purpose of changing the environment and facilitating adaptation and survival. According to Stephen Mithens, human tools differ from tools created by other species by virtue of their being systematically transmitted from one generation to another. [31] In Activity Theory a tool is defined as anything that is used in the transformation from object of the activity into an outcome. [32] The form that tools assume can be physical or nonphysical, internal or external.

Tools are both dependent on the object of the activity, and at the same time help to determine its final configuration:

Tool is both enabling and limiting: it empowers the subject in the transformation process with the historically collected experience and skill crystallized to it, but it also restricts the interaction to be from the perspective of that particular tool or instrument only...[33]

What tools are used, and how they are deployed, is related to what is the object of the activity. The presence of a tool does not indicate how it will be used. Tools are not only employed according to the nature of the object and the action to be performed on it. The selection of tools, how they come to be, is also molded by the discourses, the community, and the division of labour in which the activity takes place.[34]

Throughout this work, we will examine some of the tools and methods that archaeologists, artists, and designers use when creating the objects and artifacts of their activity.

RULES AND DISCOURSE

The individual's action towards the object of the activity is further affected by other factors. These include the explicit rules and laws that regulate the forms of interaction possible within the social setting in which the activity unfolds. In the opinion of this author, this aspect of the activity system can be extended to include the concept of discourse. Discourse is a term that was also used to by Michel Foucault to indicate, in space, the dimension where language and practice intersect, at a given point in history, and produce clearly identifiable ways of speaking, or depicting a given subject matter. According to Foucault, each period of history produced objects, subjects, and practices of knowledge.[35] Rules and discourse pertain forms of regulation that include practices that are implicitly accepted and which directly or indirectly promote, and enable, certain modes of action, or of speaking, while suppressing others.

For Foucault, discourse was instrumental not only in the construction of 'the topic,' but also, in the definition of the object of knowledge. As Foucault clarified through his concept of the episteme, at different points in history, there is an active set of relations that facilitates how knowledge is produced and rationally defined:

... [the] episteme may be suspected of being something like a world-view, a slice of history common to all branches of knowledge, which imposes on each one the same norms and postulates, a general stage for reason, a certain structure of thought that the men of a

particular period cannot escape—a great body of legislation written once and for all by some anonymous hand.[36]

Since discourse, in effect, regulates what rules and practices are deemed as meaningful, accurate, and true, it can also be said to influence the individual's action towards the object of the activity. The tools, and knowledge-building artifacts belonging to a given community, for example, can play an important role in defining the nature of the community, the extent of its boundaries, as well as the objects that it produces. In the case of archaeology, for example, particular vocabularies and methods may be institutionalized through the literature of the discipline. These in turn may play a significant role in determining the domain of knowledge, its form (or manner of expression), as well as how it is articulated in the object resulting in the outcome of the activity. The way the archaeologist uses these tools, in a sense, reflects and determines his/her membership and status within the community of archaeologists.

As we pointed out in the introduction, discursive practices also have a bearing on how disciplines, such as design, are defined within the larger context of institutionalized knowledge. The question of whether the activity and objects produced by the designer exist within the realm of art or science, for example, has a direct bearing on the acceptance or rejection of the outcome as an artifact of knowledge alongside other disciplines.

COMMUNITY

Communities exist by virtue of their memberships. Being part of a community is something that can occur by virtue of being born in a particular family, ethnic group, or nation state. Becoming a member in a community can also happen through a process that involves learning and participation. The scope, areas of knowledge, and the tasks that determine how the activity of design is practiced, differs widely among communities and from one context to another. Whereas the community is embodied by the set of relations among people doing things together, the activity itself, with its routines and exceptions is what constitutes the structure of the community.[37]

Learning, for example, can take many routes, including the securing of an education via enrollment in an institution, such as a university. It can occur through affiliation with professional forums designed to foster cooperation among participants in the activity. Or it can happen as part of the work experience, by being part of a professional institution, such as a company. It may even be the case that an entity, such as a community, is brought forth into existence solely for the purpose of creating the essence of the concept, product, or artifact being designed.[38]

Human beings are social beings, and human consciousness itself develops within a social setting. The individual performing an activity is never an isolated part, but rather is part of a community. Even in the cases in which an activity is performed in solitude, the social context of human activity is evident in the tools utilized. The activity itself is affected by the individual's participation within a community. This is because to realize the object or outcome of the activity, the goals that motivate the community must work alongside those of the individual. In addition, the individual brings into the activity a body/mind that feels, experiences, thinks and acts. These equip the individual with the ability to shape, and transform the activity.[39]

ORGANIZATION

The division of labor mediates the community's relationship to the object of the activity. That is, the organization of labor defines how an activity is distributed among community members, what the role that the individual plays in the community, the influence that their actions bear on the activity, as well as the tasks for which they are responsible. This relationship occurs because in order for the community to reach its common objective, communication among the different members must be coordinated, and the individual activities must be organized.[40]

SUMMARY

The concept of mediation is important to anyone whose work involves the creation and sharing of knowledge. This is true insofar as knowledge in a discipline is not simply the result of thoughts occurring up there in the mind, but rather it is the outcome of the interaction between all the different elements that constitute the practice. This includes an embodied actor, working with physical tools, moving in a real world, and made of communities organized around productive activities. Artists, designers and archaeologists, for example, make use of systems of representation as mediating elements to communicate information about their practice among themselves, and with the outside world. Design itself involves the processing of symbolic structures for visualization.[41] The technologies of communicative representation that the designer uses are also constructed from tangible matter, such as the letter of the alphabet, the basic shapes of Euclidean geometry, etc. They can be described as Secondary Artifacts that allow for dialogue and reflection of items that do not yet exist. Archaeologists also utilize similar technologies to present hypotheses and communicate ideas about an ancient artifact.

Another key point for the relevance of Activity Theory to the practice of design has to do with how the notion of the artifact can help to create a comprehensive collaborative framework with which to approach and compare the activities of different disciplines. Also, for the designer who is creating artifacts and systems of artifacts that will influence, delimit, or even cut across the practice of others, it is crucial to understand how others create and use the artifacts of their practice. And though it is true that research through observation, interviews, and the use of diverse ethnographic and participatory techniques can yield a general knowledge about the practice and use of artifacts by the members of a particular community, there is still a need for knowledge about how goals, agendas, and discourses motivate the behavior of the actor. There is a need for rich and systematic descriptions that go deeper and elucidate how members of a community make sense and bestow meaning to the artifacts of their culture and community. These types of descriptions, that allow us to appreciate better the use of artifacts, will not be possible until one understands all the elements that constitute the activities of different practices.[42]

Notes to chapter three:

1. Y. Engeström, Learning by Expanding (Helsinki: Orienta-Konsultit Oy, 1987), 37.
2. Ibid.

3. Ibid.

4. Ibid.

5. Ibid., 39.

6. E. Christiansen, "Tamed by a Rose," in Context and Consciousness, Activity Theory and Human-Computer Interaction (Cambridge, Mass.: The MIT Press, 1997), 176.

7. Engeström, 39.

8. Ibid.

9. Christiansen, 194.

10. Engeström, 27.

11. L. S. Vygotski, Mind in Society: The Development of the Higher Psychological Processes, M. Cole, V. John-Steiner, S. Scribner, and E. Souberman, eds. (Cambridge, Mass.: Harvard University Press, 1978), 39.

12. Engeström, 2.

13. Vygotski, 39.

14. Ibid., 51.

15. Engeström, 58.

16. Vygotsky, in Engeström, 58.

17. Engeström, "When is a Tool? Multiple Meanings of Artifacts in Human Activity," in Learning, Working, and Imagining: Twelve Studies in Activity Theory (Helsinki: Orienta-Konsultit Oy, 1990), 171.

18. Engeström, “Developmental Studies of Work as a Test Bench of Activity Theory: The Case of Primary Care Medical Practice,” in Understanding Practice, Perspectives on Activity and Context, S. Chaiklin and J. Lave, eds. (Cambridge: Cambridge University press, 1993), 65.

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23. Christiansen, 176.

24. Kuutti, “A Framework for HCI Research,” Context and Consciousness: Activity Theory and Human-Computer Interaction, B. Nardi, ed. (Cambridge, Mass.: The MIT Press, 1996), 27.

25. Ibid., 27.

26. H. Simon, The Sciences of the Artificial, 3rd edition (Cambridge, Mass.: The MIT Press, 1996), 6.

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30. A. Forty, Objects of Desire: Design and Society since 1750, (London: Thames and Hudson, 1986), 9.
31. S. Mithens, The Prehistory of the Mind: The Cognitive Origins of Art and Science (London: Thames and Hudson, 1996), 76–77.
32. Kuutti, "A Framework for HCI Research," 27.
33. Ibid.
34. Engeström, "When is a Tool?" 189.
35. S. Hall, "The Work of Representation," in Representation, Cultural Representation and Signifying Practices (London: Sage Publications, 1997), 46.
36. M. Foucault, The Archaeology of Knowledge and the Discourse on Language (New York: Pantheon Books, 1982), 192.
37. G. Bowker, and S. L. Star, Sorting Things Out: Classification and its Consequences (Cambridge, Mass.: The MIT Press, 1999), 294.
38. M. Heidegger, "The Question Concerning Technology," in Basic Writings, D. F. Krell, ed. (London: Routledge, 1993), 319. The term bringing forth is used in the Heideggerian sense: "This revealing gathers together in advance the aspect, the matter...with a view to the finished thing envisaged as completed and from this gathering it determines the manner of its construction."
39. V. Kaptelinin, "Activity Theory: Implications," in Context and Consciousness: Activity Theory and Human-Computer Interaction, B. Nardi, ed. (Cambridge, Mass.: The MIT Press, 1996), 107–108.

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42. Christiansen, 177.

The Activity of Art

ART AS AN ACTIVITY

According to the philosopher Arthur Danto, art is an activity that is done “through the mediation or the knowledge of art.”[1] The activity of art involves the creation and transformation of an object towards a desired state, direction or status, whereby it is clearly identifiable as ‘art’. An activity, in turn, has been defined as “a form of doing directed to an object.”[2] Activities are distinguished from each other according to their objects. In the case of art, an object can be a material item, as is the case with paintings and photographs. It can also be less concrete, such as in conceptual art works, and it can also be totally intangible, as is the case with works produced in performance art. The objects within an activity are shared, manipulated and transformed by the participants in the activity.[3] The object that is the focus of an activity is manipulated within limits set by the tools and through methods employed by the participant actor (or subject) that in the case of art is called the artist. (See Figure 9.) The processes involved in creation and transformation of the object into art are also affected by diverse parameters that are defined in the context of a given community. Such a community can be circumscribed, but need not be limited, for example, to an Artworld.[4] In a community, such as an art world, there are other actors, like critics and art historians. Together with the artist, these actors participate in creating the object of art.

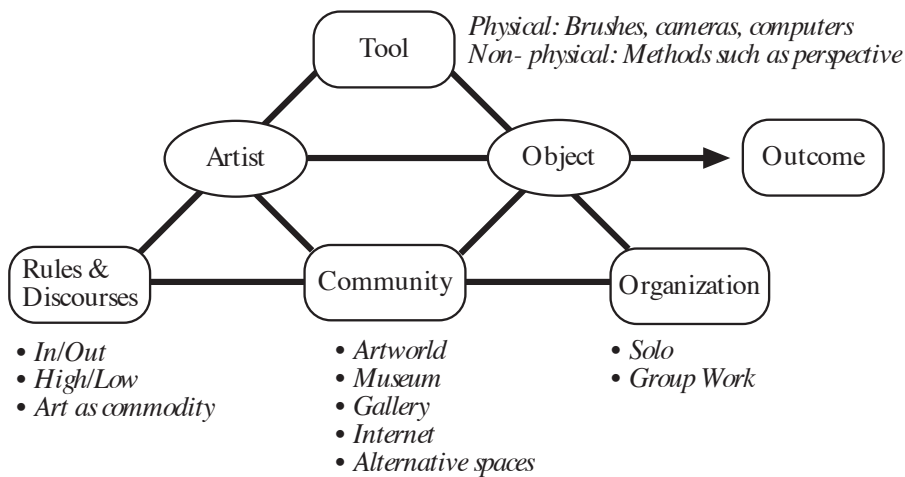


Figure 9: Visualization of the activity of art.

The activity of art comprises an interaction with and among many artifacts. An example of this are the instruments used in a medium, the methods employed to execute a particular work, and the form of work organization, which may, or may not, involve the artist working independently or as part of a group. The tools, or artifacts, developed and manipulated during the course of an activity carry with them the cultural and historical residues of such transformation.[5]

The relationships within the art practice are not direct, but rather are mediated through culturally and historically constituted concepts such as artifact, tools, media and methods. Or as Danto states: “There is no art without knowledge, without skill, without training.”[6] Conceptually and physically these intermediate terms carry with them the histories of the relationship between the different components of the activity. Thus, the brush, the pigment, and the support surface can be seen as the tools that mediate between the painter and the object of art. These instruments and methods, in turn, reflect the changing nature and idiosyncrasies of the art practice.

Though we may be accustomed to think of art in terms of a physical interaction with materials and media, the object that results from the activity of art can also be the product of an intellectual engagement with discursive practices. This was the case with many of art objects produced throughout the 20th century. Beginning with Marcel Duchamp’s ‘Readymades’ in which the artist made use of already existing objects, the focus of art was removed from the realm of the craft to that of discourse. In doing so, Duchamp propitiated the birth of the conceptual movement in art. This in turn raised, once more, that timeless question of wherein the essence of art lies: Is it form, function or conception? All three? Duchamp proposed that the essence of art was in art itself. In this context, the relevance of the artist’s work exists only within the language of art, and as a proposition to art.[7]

It could be said that contemporary art in the West is not as concerned as it once was with the interaction between the cognitive and manual aspects of the creative process. The emphasis has shifted to an idea of art as a way of interpreting things, centered, and solely dependent, on a notion of the artist as the absolute individual. The work of art proper, so to speak, is not circumscribed to physical objects but rather exists within an aesthetic and intellectual experience that is defined *a priori*. [8] Foucault defined the *a priori* as a condition of the reality of statements. For him the interesting question was not about rediscovering what legitimized an assertion, but rather what propitiated the condition for the emergence of statements, how they coexist with each other, their specific mode of being, how they survive, become transformed, or disappear. In the West, regardless of the skill involved in the creation of the art object, if someone with the proper authority and credentials calls something art, and if it is shown in the context of art—in a

gallery, a museum, or an art happening—it is art. This is why it has been remarked that, in order to understand a work of art, one must consider it as an artwork in advance.

This proposition would seemingly conflict with Danto's statement that knowledge, skill, and training are a prerequisite for the creation of art. It is possible that what Danto is referring to is how, in contemporary art, the explanation about the work--and the subsequent dialogue it generates--can be of more significance than the work itself. Participation in such dialogue requires preparation, probably an education, or at least knowledge of the codes and language used by those involved in the activity of art.

Increasingly removed from craft, is art turning into philosophy? Or is it that art is perhaps claiming for itself that discarded territory wherein meaning and ethics once converged, and that used to be the province of philosophy? And indeed, it has been noted that theoretical discourse of the fine arts has become "one of the most potent areas of discourse in twentieth century European and North American literary culture."^[9]

But art is also a collective phenomenon. According to Howard Becker, its participants are not limited to artists, but include a gamut of professionals working in diverse disciplines such as art history, cultural history, philosophy, and museum studies.^[10] These subjective actors understand and help delineate the motives behind the activity. In the case of contemporary Western art, for example, Danto has identified museum and gallery personnel, connoisseurs, and critics as the "make weights" of the Artworld. Within their ranks one will find those who create the artistic theory that defines what a work of art is, and that, therefore, makes art possible.^[11] And then, there is the artist and the forces that motivate him/her to create art. These are shaped as much by the inner emotions, needs, and objectives that feed his/her final goals as by the social forces that mold the milieu in which he/she operates.

As an activity, the practice of art can also be examined as having evolved over time, that is to say, as a historically developing phenomenon. Its participants, the role and identity attributed to them, as well as how the actual tasks are defined, change through time. This change can be observed by examining the tools used by the participants engaged in the activity. Classification systems, for example, are tools used by art critics and art historians in the conceptualization and institutionalization of art. As societies change through history, so do the modes of thought that feed these systems.

These changes are reflected in the culturally produced systems of meanings that form the basis of classification systems. Ultimately these changes are also reflected in the culturally produced

systems of meaning that form the basis of real world institutions. Thus, what is classified as art in the present, may not have been so in the past. The reverse situation also holds true: that which may have been considered art in the past may no longer be regarded so.[12] Glass painting, which used to be considered a heavenly art, has now shifted in position and occupies a space closer to the realm of craft. And he/she who, as an artisan, may have engaged in an activity such as painting, is now considered to be an artist. Conversely, the activity that is now performed by someone labelled an artist or a designer may have, in the past been executed by someone called a scribe.

THE ARTIST

In the activity system, as we are applying it, the first component is the individual or subgroup whose agency is chosen as the point of view for the analysis. In the present example, the point of view chosen is that of the artist. The definition of artist has been sociologically applied to those who comprise a professional group of people who practice one of the fine arts.[13] What the fine arts consist of and how this relates to what the artist actually does, is certainly a complex matter that varies throughout history and within diverse cultural settings.[14] A minimal qualifier would be that the artist as actor is an active participant who engages in a series of actions that ultimately yield an art object.[15]

As noted earlier, the artist is not by himself. The sociologist Howard Becker proposed that the artist works at the center of a network of people who collaborate and whose work is essential to the final outcome.[16] Along with other participants in the activity, such as art critics and gallery owners, the artist forges the object of art, its reception, and ultimate consumption. In Becker's analysis what made an art world, and what constituted art, was determined by involvement. This involvement stemmed from an acceptance of the artist's production by the art world.[17]

Becker further expanded on the notion of the artist by proposing a classification system structured along an axis of degrees of involvement. This classification included four types: professional artist, maverick, folk artist and, naïve artist. At one end of the spectrum, and with the most degree of direct involvement in an art world, are the professional artists. These were artists who, working within the confines of an art world, operate within a shared tradition of problems and solutions. Next in line are mavericks, or professionals who had training in the arts but have renounced or separated themselves from the art world. These mavericks do not heed the conventions of the art-world, but rather follow their own norms. Folk artists follow the

canon of a tradition and produce their work as part of a well-organized community. This community, however, is not structured along the same lines as that of an art world, but is rather made of, for example, household units.[18] Naïve artists are those who, without training or connections to an art world, manage to produce their own class of art works. Becker cites this last group as potential source of innovation, since their work might be imitated by art-world participants, and thus generate new categories.[19]

Becker's analysis may be regarded as narrow and, aside from the point of view of the curator in a gallery or a museum, unable to capture the multiple perspectives that forge the identity of the artist. He cannot really describe the rich network that weaves around the artist's intentions and motives for creating art. For example, in the case of artists who make folk art, such as quilt artists, the question of why quilts are made is answered in terms of its utilitarian aspect: "Because someone needed them." It is possible that the notion of art as a functional object cannot fully explain the role of art in communities and how, or why, it changes. Why is it that indigenous arts, and folk arts are now the subject of much attention? Why is it important now to have national museums devoted to the gathering of craft item collections? In answer to such a question, it is possible that the interest in cultural diversity is generated by affective connections that are not completely explained in terms of the functional aspects of an object.

A conscious realization of the existence of these positions and exchange networks prompted artists in the professional art world to question the situated nature of art and art production. Art discourses and the networks of relationships that they produce have become both the subject and object of art. This has been the case with the work of *Group Material*, twelve young artists who came together in New York City's lower east side during the 1980s. *Group Material* is a collective entity that sought to create art to support a more democratic vision of art, and promote an art of social change. It has done this by working on the notion of the art exhibition as a political issue:

In most dictionaries the word *curate* is solely defined as a noun referring to a cleric. But since 1980, the collaborative *Group Material*, has done much to transform the notion of exhibition curator into a verb by treating the installation of art viewing as an artistic medium in itself. And in the process they have challenged the Modernist characterisation of 'art for art's sake' adopted by most presenting institutions.[20]

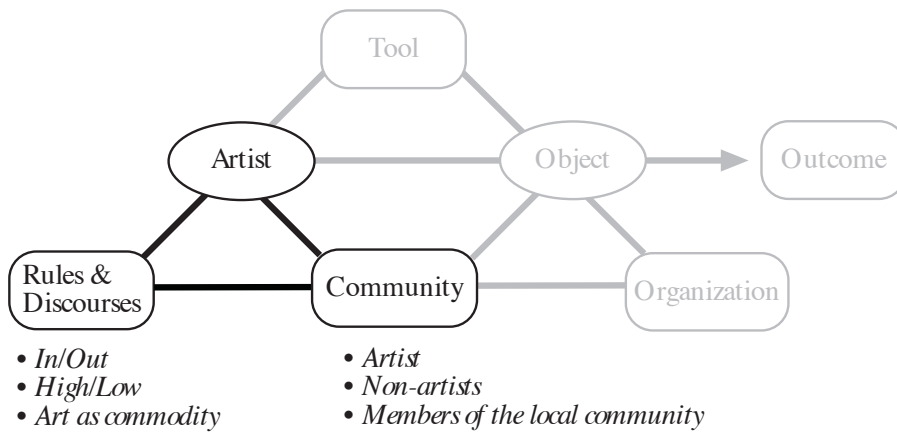


Figure 10: Visualization of *Group Material's* work with the notion of Community to critique Art World discourses.

Early on they recognized that, in order for the work to be considered art, they had to resemble a 'real' organised gallery.[21] So they rented a space and made it into a gallery. *Group Material* used the idea of gallery as a tool to generate discussions such as: What role does the notion of a 'gallery' space play in the creation of the art object? What is the role of the artist in creating such artifacts? Who deserves to be called an artist? Why? What are the particular discourses involved in the exhibition of art objects? How do the demands of the art market affect the form and content of art? *Group Material* addressed these questions in many ways. As the diagram in Figure 10 shows, to challenge the notion of the artist as 'star,' or as the sole repository and enabler of art, the exhibitions produced did not showcase artists as singular entities. The themes focused on social issues such as Alienation, or Gender. Artists' and non-artists' work was brought together into exhibitions designed to raise consciousness about these issues. An example of this practice was *The People's Choice*, an exhibition that combined artists' work with art produced by members of the households in the block where the gallery space was located:[22]

Our exhibitions and projects are intended to be forums in which multiple points of view are represented in a variety of styles and methods. We believe, as the feminist writer Bell Hooks has said, that we must focus on a policy of inclusion so as not to mirror oppressive structures. As a result, each exhibition is a veritable model of democracy. Mirroring the various forms of representation that structure our understanding of culture, our exhibitions bring together so-called fine art with products from supermarkets, mass-cultural artifacts with historical objects, factual documentation with homemade projects. We are not interested in making definitive evaluations or declarative statements, but in creating situations that offer our chosen subject as a complex and open-ended issue. We encourage greater audience participation through interpretation.[23]

How successful *Group Material* has been in creating art objects of relevance to the artworld can perhaps be judged by its ability to act as a catalyst in raising social consciousness, as well as by the subsequent ascent of its members within the hierarchies of the art-world. For example, the group has shown and worked in such art-sanctioned spaces as the Dia Art Foundation galleries in New York City. In 1995 former member Felix González-Torres was granted a retrospective exhibition in the Guggenheim Museum of modern art.

THE TOOLS

The second component of the model is the set of instruments, or tools, used by the actor in the activity to transform the object. These can be of a tangible nature, as are the brushes, pigments and canvas used in a medium like painting. They can also be of an immaterial nature such as is the case with methods that are learned through education. An example of one such method is that of representation through perspective, or more specifically, central perspective.

Central perspective was a system of representation developed in Europe primarily during the Renaissance. It has been proposed that central perspective emerged from the desire to find an objective basis for the depiction of visual objects, a “method independent of the idiosyncrasies of the draftsman’s eye and hand.”[24] Such a method was actualized in the notion of the visual pyramid developed by Leon Battista Alberti in his treatise of 1453 *Della Pittura*. The treatise illustrated how to establish a new relation between the eye of the observer and the object being represented. In this new relationship, the object being represented could be precisely framed in space and time. This was achieved through the use of a series of vector lines, in the form of a pyramid. These vector lines emerged from the object’s frontal surface and converged in the viewpoint held by the observer’s eye. A glass pane, perpendicular to the line of sight, intersected the pyramid. Tracing the outline of the image as it appeared on the glass pane could record an exact duplicate of the image, as it appeared from the point of view of the observer.[25] This procedure could be used to obtain the correct projection and foreshortening in geometrically simple, as well as in intricate environments.

Central perspective provided a standard convention for pictorial representation of three-dimensional objects in which the ambiguity of object size and location was eliminated.[26] At a deeper level, it has been proposed that it propitiated a so-called rationalization of sight. This is because it is a system of visual representation in which space is delineated first, and then the

objects of the world to be represented are arranged within it in accordance with the rules it dictates.[27]

The use of central perspective in the representation of space in painting is an example of a conceptual tool that produced material results in an activity like art. Space and its representation, although an abstract notion that depends on cultural and historical factors, is made visible, or concrete, in the manner in which the artist uses his/her tools:

The pervasive notion of artworks as rare and valuable commodities notwithstanding, pictures are generally, and simply areas containing information of a different sort. . . Each picture records traces of the situation of artistic production, including aspects of an artist's physical and intellectual state translated through a brush, knife, or other tool into material features on the *picture surface*. [28]

At the individual level, what tool is employed physically and conceptually alters the constituency of the final object. Nevertheless, tools are not only used and elicited according to the nature of the object and action to be performed. At the collective level, the continuous repetition of certain methods utilized for visual representation in a particular domain can increment their influence to the point that they become embedded in a particular way of seeing. Svetlana Alpers has described this situation in terms of the formation of a *visual culture*, or a “way of seeing that simultaneously both reflects and shapes how members render the world.” [29] In the context of Activity Theory, this could be interpreted as how the selection and formation of tools is also influenced by the rules and discourses of institutions of the activity system in which the action occurs. [30] In ancient Egyptian art, for example, the representation of three-dimensional space was done in a manner that, at the present, seems two-dimensional to us. The method used was a type of orthogonal projection that utilized a single plane, and avoided foreshortening of the forms rendered. The canonical guidelines were related to the use of symmetry to produce as undistorted illustration as possible of the different forms represented in pictorial space. [31] And though Egyptian art may seem unnatural to our eyes, it is not less objective than the three-dimensional space within a window resulting from a rendering of perspective. One could argue that in Egyptian art, the way the artist used the tools was the result of procedures that were informed by different standards. [32] In the West, there are standards, too. These have changed in response to historical variations. As Victor Burgin has noted:

Space, then, has a history. It is not as Kant would have it, a product of *a priori*, inherently Euclidean categories. It is a product of representations. Pre-modern space is bounded; things within it are assigned a place along a predominantly vertical axis—heaven-earth-hell, or the

chain of being, extending from God down to stones. Modern space (inaugurated in the Renaissance) is Euclidean, horizontal, infinitely extensible, and therefore in principle, boundless. In the early modern period it is the space of industrial capitalism, the space of an exponentially increased pace of dispersal, displacement and dissemination of people and things. In the Post-modern period it is the space of financial capitalism—the space in the process of imploding or unfolding...[33]

The analysis of the invention of perspective, and its development and implementation can reveal much, not only about the history of art, but also about the history of ideas in the West. The notion of Cartesian space, for example, has been heavily influenced by Central perspective. As Erwin Panofsky maintained in his seminal essay on *Perspective as a Symbolic Form*:

It is not too much to claim that a pattern of tiles used in this sense represents the first example of a coordinate system: for it illustrates the modern systematic space in an artistically concrete sphere, well before it had been postulated by abstract mathematical thought. And in fact the projective geometry of the 17th Century would emerge out of perspectival endeavors: this too like so many sub-disciplines of modern science, is in the final analysis a product of the artist's workshop.[34]

The discovery of perspective, and the process of rationalization that followed the invention of this tool, forever altered the place of art within the hierarchies of knowledge. It gave the arts the firm theoretical foundation that allowed the artist to rise from the status of craftsman to one who works with theoretical knowledge.[35] It created a system of understanding that provided the artist, specifically the painter, with a formal descriptive apparatus like that one of a sentence:

The formal apparatus put in place by the perspective paradigm is equivalent to that of the sentence, in that it assigns the subject a place within a previously established network that gives it meaning, while at the same time opening up the possibility of something like a statement in painting.[36]

It could be argued that in this manner, perspective operates as a second level artifact. From this point of view, it allows for the transmission of skills with respect to forms or representation in art practice.

Perspective has also been analyzed as a paradigm, or a model of scientific practice that is considered as normative. From this point of view, perspective not only informs our perception, but it is so embedded in our thinking that it constitutes the *reason* for our perception.[37] While

perspective drawings are no longer used in scientific endeavours—they are deemed as inaccurate—perspective has a place in scientific inquiry.[38] In computer science, for example, through the implementation of virtual reality models based on Cartesian space, perspective continues to inform the understanding and representation of space. From this point of view, I think that perspective can also be described as a boundary object. It is the type of artifact that can satisfy the information requirements of several communities.

RULES /DISCOURSES

In the activity system, the third component are the rules and discourses, the norms and policies and, to a large extent, the discursive practices that regulate the flow of the activity. The art world can be described as an instance of a community that is constituted through discursive practices. The artist exercises his/her choices within the scope of a community that shares the activity of making art. The actions of all members from this community upon the final art object occur within the field of discourse. The term discourse is used in a Foucaultian way to indicate how explicit and implicit *rules* and *practices* are used in the production and regulation of knowledge in a community. Rules, for example, may advocate particular ways of representing a given subject, and promote the exclusion of others. In the case of art, we have already noted the importance of the presentation of the art object in a context that is recognized and accepted as an art context. Art that is not shown in a gallery space, for example, may not be understood to be art. Practices can include the ways in which a given subject matter is personified, or how a particular topic acquires authority and is institutionalized in a given historical moment and within a given community. In the case of contemporary art, we have already noted how dialogue and theoretical discussion plays an important role within the community of the art world, and in the institutionalization of art.

Discursive practices and the composition of communities vary and change according to historical conditions. So does the organisation, or division of labour, in an activity. In this context, the art historian Svetlana Alpers has pointed out how the notion of authority of the maker and the concept of uniqueness of the individual work of art are ideas that do not originate in the art practice itself. Alpers claims that they arise from ideologies of individualism and ownership that have been worked into the *study* and classification of Western art. In Alpers' opinion, this conceptual approach is problematic since it removes the object of art from its historical context.[39]

Art works, according to Alpers should be treated as historic *events* themselves. The activity of art can be seen as part of a social network. In this manner, the way the practice is articulated, the habits of vision, modes of cognitive perception, as well as social practices and historical conditions, become relevant to the understanding of art. From this point of view, the elements of the visual culture in which an art object has been produced, such as the physical features of the object, the materials used in its creation and why they may have been employed, the site of exhibition and the constraints it may have placed on the creation of the work, would be regarded as significant.[40] These factors exert an influence on the artist. Also, they afford him/her opportunities for expression. An example of this situation is the famous painting of *The Ambassadors* by Hans Holbein. In this work, the painter used the method of central perspective to render an anamorphic projection of a distorted human skull in the foreground. However, the distortion of the skull corrects itself when the viewer is gazing at the painting from a particular point of view. Art historians and critics have pondered whether the effect was the result of a conscious analysis by the painter of the conditions in which the painting was going to be exhibited.[41] Because switching the point of view from which the painting is observed triggers a different narrative, one can also consider that the painting has been provided a visual field, or representational framework, for a certain form of type of pictorial *ekphrasis*. [42]

Looking at art objects as historical events themselves can yield information about how collaborative efforts at different times, and in different communities, have resulted in different notions of art. Since the focus is on the relationship between the individual and the community, this approach can potentially reveal the submerged history that is unspoken, untold, and virtually unsuspected either by its observers, or its participants.[43]

As a historic event, a work of art can also be seen as an attempt to elucidate, to clarify, or as George Kubler pointed out:

Every work of art can be regarded both as a historical event, and as a hard-won solution to some problem. It is irrelevant now whether the event was original or conventional, accidental or willed, awkward or skilful. The important clue is that any solution points to the existence of some problem to which there have been other solutions, and that other solutions to this same problem will most likely be invented to follow the one now in view.[44]

Kubler's approach attempted to restore the passage of time to art. It also aimed to describe what he labelled the manifold shape of time. This shape of time could be explained in terms of sequences. A sequence was a serial ordering of proposed solutions to a problem. A new problem or question signalled the beginning of a new sequence in art.[45] In this serial arrangement,

actuality was the now, a lighthouse in the dark between flashes. It was the void between events. The past was made of signals of *then* to be recovered. Primary signals were the signals closest to the event itself. As historical events that emit signals, every artwork was made of self-signals that constitute the mute existential declaration of being, and adherent signals that are related to interpretation. In proposing that artworks were as tertiary artifacts, Marx Wartofsky indicated that in imaginative praxis, “the perceptual modes are derived from and relocated to a given historical mode of perception.[46]

COMMUNITY AND CONTEXT

In order to describe the relationships between the individual and institutionalized knowledge that is transformed into the art object, we need the component of community. This component seeks to describe a collective entity that shares particular codes for communication, and that participates in the production and consumption of meaning. The art-world has already been cited as the term used to define the different communities engaged in activity with the objective of producing art. A large part of the codes that define what can be considered as art is defined by an art-world:

Wherever an art-world exists, it defines the boundaries of acceptable art, recognizing those who produce the work it can assimilate as artists entitled to full membership and denying membership and its benefits to those whose works it cannot assimilate.[47]

Meaning, as embedded in the codes of communication, is produced and negotiated via the discursive practices of networks of communities, such as the art world. In the case of Western contemporary art, the codes that help to build and sustain the meaning of the art objects are quite restricted. This may be why it has been noted that in order for an object to be seen as art, an understanding and consideration of it as an art object is necessary, prior to its viewing. The meaning of the art object depends on its existence in an art space.[48]

As we have seen, the work of *Group Material*, for example, seeks effect a change in the context of how art is exhibited. The art context is created through references to the discourses that create the framework that is the exhibition space.

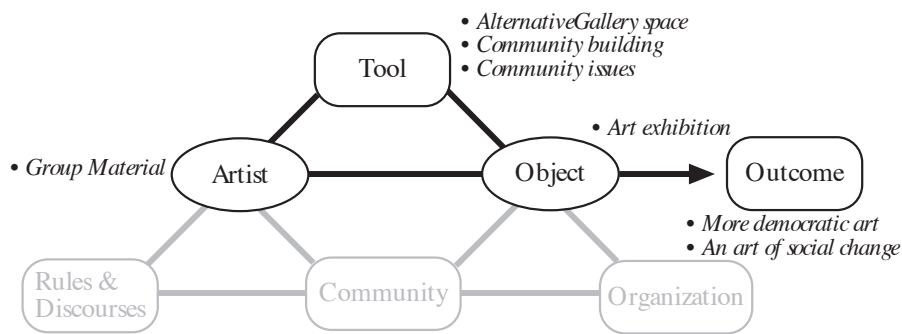


Figure 11: Group Material used an alternative gallery space as a tool to generate critique and reflection.

Whether it is in a gallery, or in a museum, a public space that is dynamically configured for the purpose of showing art, or the electronic spaces of the Internet, exhibition spaces are not neutral grounds. They constitute within their topologies social institutions. As such they embody the contradictions and competing interests of these institutions. In the case of the art gallery, there is the reality of business interests and how these may integrate, or collide, with the economics of the art world. In the case of the public institution of the museum, for example, there is the problematic of dialogue and participation. How does the museum preserve its authority role as the institution of knowledge regarding matters of culture heritage, while at the same time becoming more inclusive and responsive to the society that supports it? How do we reconcile the fact that exhibitions are systems of signs that express meaning about the worlds that they depict with the stark reality that museum collections are made of articles that are no longer part of the life cycle that created them? The case of the Internet, with the encompassing global presence that it entails, has yet to be fully analyzed and documented. Will the traditional relations of power be transferred to this arena?

The notion of discourse allows us to examine how context is defined, how this influences the way in which the object is produced, and how the outcome is, in turn, reintegrated into the system. We can follow, for example, the effect that the mode and venue of an exhibition has on the work of the creator. In the case of art, the system of gallery exhibitions that is a staple of the art world, creates a community, a set of habitual behaviors, and a system of exchange. The contemporary idea of the artist as star, for example, emerges as a context to support the staging of media events with corporate and private sponsorships that fetch high prices for the items produced by the artist. In the case of the museum, the concept of authenticity as used to define the rare and the scarce is the context for exhibitions that ensure long lines, revenue, and prestige for the institution.

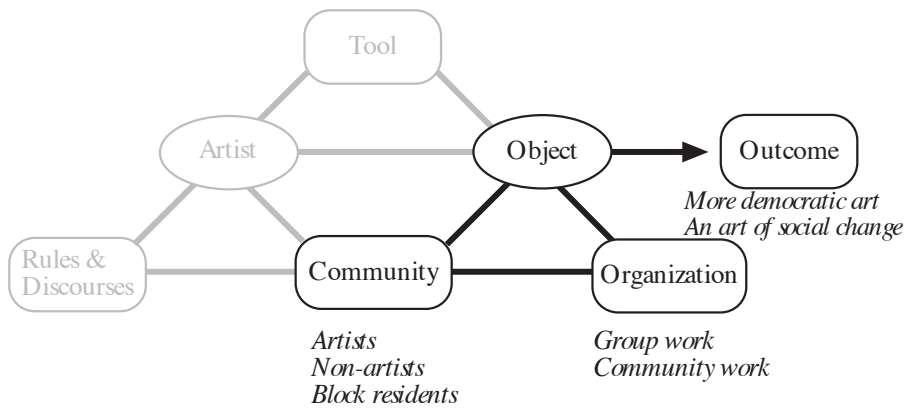


Figure 12: By working with non-artists, and block residents in their art exhibits, *Group Material* redefined the notion of art community.

In the case of the Internet, at least superficially, the trajectory follows an opposite path: the object can exist in multiple spaces of distribution. Still, the aim is for controlled dissemination of the exclusive rights, of the original copy.[49] The work of *Group Material* is successful because it is relevant in the context of critical art practices seeking to subvert the current state of affairs. By re-creating the venue—or the exhibition space—under different parameters, it reveals how the elements in the system operate. How the context of an exhibition enframes the art and its appreciation is restructured under more inclusive parameters.

THE OBJECT OF ART

Defining what constitutes a work of art is a difficult matter. The aesthetic experience resulting from exposure to a work of art, for example, is an internal experience. At the same time, what art is seems to be a constantly changing notion that varies according to historical conditions. In seeking to define what *differentiates* art objects from other artifacts, Danto proposes that art is “a logically open set of things that share no common feature in order to be a member of the set.”[50] In this sense, artworks can be seen as a class of objects sharing so-called family resemblances. That is, members of a set so constituted may resemble one another in various ways, and there need not be a single collection of properties shared by all members.[51] Furthermore, there are no fixed boundaries in the category of artworks. This class can, and is extended, so as to include new artifacts, as the need arises.

While category schemes resulting from traditional methods based on formal logic have, at least in principle, clear boundaries and common properties, categories assembled from family resemblances can take into account the activity as a whole. In this way, what defines the category can be understood as a structured understanding of the activity as it unfolds.[52] That cognition can follow these patterns has been demonstrated empirically through experiments with perceived similarities between representative and non representative members of categories. Cognitive reference points, and prototypes have been identified as category members that have special cognitive status—that of being a ‘best example.’[53] In the same manner, the understanding of art is also a cognitive response involving a complexity wholly different from basic categorization schemas.[54]

Art objects express, according to Danto, because one of the main goals of art, “may be precisely not to represent the world, but to represent it in a particular way, or to cause it to be viewed with a certain attitude and with a special vision.”[55]

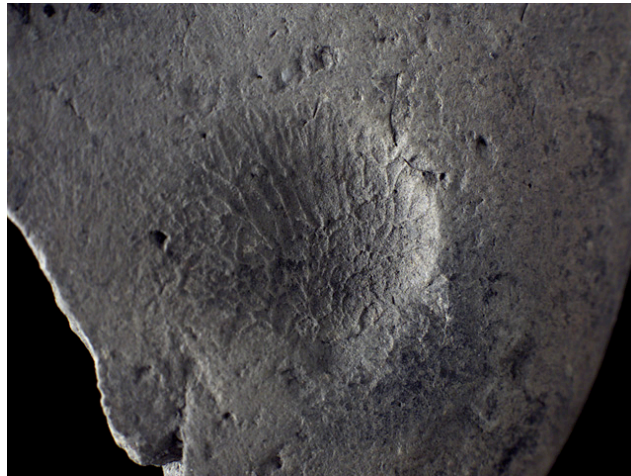


Figure 13: Late Iron Age artifact from the Mulli excavation site. It is presumed to be a loom weight in the form of a disk which bears the mark of an ancient fingerprint. In contemporary art, the object of art is evidence of the presence of the artist.

Contemporary art objects are closely linked to the idea of the presence of an artist. The vision that is presented through art is the way that the artist sees the world. For this purpose, art objects make use of communication devices, such as rhetoric, to influence the opinion of the audience in order to take a certain inclination toward the subject being spoken about with the intention to cause that subject to be seen in a certain light. The art object expresses what the artist wishes to communicate. In terms of history, the life of an artist can be viewed as an interaction with the shapes of time. The artifacts that he creates either add to already existing sequences, or propose new ones.

Danto suggests that the structure of art works is, or is very close to, the structure of metaphors. The potential for expression of metaphors is tied to the fact that they are not mere representations. Their structure is related to features, rather than to the content of representation. For example, metaphors might make use of intensional contexts in which, according to Danto, descriptive terms refer “to the form in which the things ordinarily referred to by those words are represented.”[56] The power of expression of metaphors is tied to the form of presentation, which is in turn tied to meanings and associations in the social and historic conditions of the times.[57] This thereby seems to imply that the mode of presentation presupposes the accessibility to concepts out of which the metaphors themselves are created.[58]

This view of art is in agreement with Marx Wartofsky’s concept of the artifact presented earlier. On this view, art objects are tertiary artifacts that result from imaginative praxis in which mimetic re-enactment does not operate as a direct imitation.[59] Wartofsky wrote concerning the role of representation in imaginative praxis that:

...representation becomes a receptacle for the expression and re-enactment of a wider range of cognitive and affective needs, intentions, and values.[60]

An imaginative praxis produces artifacts that operate as autonomous worlds. The rules and conventions constitute an arena of nonpractice, play or game activity.[61] According to Wartofsky, by presenting us with a possible world, different from that which is culturally dominant at a given time, the role of the artist is to re-educate us perceptually.[62] Hans Holbein's painting of the Ambassadors mentioned earlier in the text, illustrates these conditions. It is an example of an autonomous world in which the narratives, and even the visual representation, vary according to the position of the viewer with respect to the work.

Expressive Artifacts

The concept of expressive artifact has been used in archaeology to refer to "artifacts that in many cases were intended to communicate, to generate a response in the viewer." [63] In this work I want to use the term 'expressive artifact' to underscore the high degree of motivation involved in the creation of art objects. Art objects do not merely happen. These are created through the intentions of actors operating with instruments within specific communities. Their features reflect the activities that lead towards their realization. As expressive devices, art objects are forms that encapsulate expressions of an emotional state or idea.[64] Artifacts created through engagement in technical pursuits, such as craftwork, and that produce pleasure in the maker, can be viewed in this manner [65]

As expressive artifacts, the objects of art are partly the result of the intrinsic motivation that arises from within the individual who is fashioning the object. Similar to other artifacts, they are influenced by external forces, such as history and culture. The structuring of the mediated relationships between the object and its maker is dependent on at least two factors. One of them is a type of active reflection that manifests itself in the engagement between the mind and the body. The goal, objective, or vision of the completed artifact guides the flesh in the activity of making.[66] The other is a process of interiorizing whereby processes external in form, and carried on with external materials, are transformed into equivalent processes that also occur in the mind, at the level of consciousness.[67]

Franz Boas presented an example of this type of artifact when he described a bead legging, or ornamental item made of leather and beads, that is worn on the legs. In this item, the intricate pattern and symmetry in the arrangement of the beads, was not evident when the item was used.

The making of the bead legging was an individual action involving one person. Its distribution into the community through its use in an activity such as dancing, however, was not. The activity of making the legging drew into itself the community. Thus Boas argued that the aesthetic experience was present for the *maker while she was making* it but not necessarily when the artifact was worn.[68]

This is consistent with an observation made by the archaeologist Colin Renfrew. He pointed out that when we isolate artifacts taken from other cultures and admire them as art, it is important for us to realize that “while the early craftsmen made these works, it is we who have made them ‘art.’”[69] It is also in accordance with a view of art as an activity whose objects are produced in the context of a community that is a historically developing and changing phenomenon. How we regard the object of art might say more about ourselves and our communities.

Another example of the art object as an expressive artifact includes art objects that allow access to information about the unconscious. As an expressive artifact, the work of art is an externalization of the artist’s consciousness. It is “as if we could see his way of seeing and not merely what he saw.”[70] At the same time, as David Aldridge has remarked that “art has the ability to express the fact that we are dealing with *the interface* between unconscious and conscious material.”[71] That is, when we see an artist’s representation of a sunset, such as in J.W.M. Turner’s depictions of sunsets in Venice, we do not confuse these with the actual world. We understand that through these representations the artist sought to communicate something to us about his feelings and interpretation of these phenomena.

Artifacts of Expression

As artifacts of expression, art consists of materials or media that support, convey, allow or carry through an act of expression. Expression hereby involves not only emotion, but also an action and its result. John Dewey outlined the conditions, by which expression and emotion are crystallized in the work of art. Dewey noted that emotion and expression are defined by parameters such as causality, information and the passage of time. Causality manifests itself as activity, in the carrying forward into development and completion in the act of expression.[72] This is not an *ad hoc* activity, but rather it is informed by reflection that takes into account, for example, the value of past experiences. The activity of expression is a transformation by the gestures and representations brought into existence for the purpose of communicating something.[73] Time is the development of these events. The work of art, Dewey asserted, is “a

construction in time,” the result of “a prolonged interaction” in which emotion acts as “an informing and orderly principle.”[74]

As artifacts of expression art objects reveal how mechanisms of extrinsic motivation operate within the activity. The structuring of mediated relationships between object and maker is, in this case, dependent on how the process of interiorization manifests itself externally. In order to have a community, for example, it is necessary to have an already established set of internal parameters. These parameters are like concepts and values, implicitly accepted by the group throughout their interaction. Symbolic communication is only possible among members of a group who possess a set of preformulated concepts. Works that operate through language to comment, question, and define what art is, are art objects, or artifacts of expression. The work of Joseph Kosuth, which consists of using categories from the thesaurus to represent the multiple aspects of the idea of something, illustrates this notion:

I changed the form of presentation from the mounted photostat, to the purchasing of spaces in newspapers and periodicals (with one work sometimes taking up as many as five or six spaces in that many publications—depending on how many divisions exist in the category)... The work is not connected with a precious object—it is accessible to as many people as are interested, it is non-decorative—having to do nothing with architecture; it can be brought into the home or museum but was not made with either in mind... My role as an artist ends with the work's publication.[75]

In this example, the function or nature of art, if there is one, can exist only in an art context that is established *a priori*. The viewer must be aware of Joseph Kosuth, the artist. From among all the other images and advertisements printed in the newspaper, he must recognise his work. “But is it art?”, one might ask. Kosuth’s reply will emphasise how the aesthetic dimension is not of essence, since works of art are defined as analytic propositions that, when viewed within their context—as art, provide no information whatsoever about any matter of fact. According to Kosuth, the value of contemporary art is to question the nature of art. “Artists question the nature of art by presenting new propositions to art.”[76]

As an artifact of expression, art objects factor in the point of view of an observer, as well as that of the artist as observer of himself as he is engaged in the activity of art. As material manifestations of human action, artifacts of expression and expressive artifacts operate as external “webs of significance.”[77] They are not exclusive of one another, but rather point to the dual nature of artifacts and human culture as simultaneously internal and external, individual and collective, public and private, sacred and secular.

ART AND THE SHAPE OF HISTORY

It is this author's opinion that art is not a Stimulus-Response reaction but rather, a higher order process concerned with the structured and informed expression of feeling. Feeling in turn, does not refer to an emotional state, for not every emotion results in expression. Trying to understand how something like the expression of feeling is organized, re-directs us to what is referred to as inner knowledge, intuition, subjectivity and other forms of cognition that exceed the boundaries of conventional categorization.[78] In what sort of shapes do these forms of cognition manifest themselves? As a form of cognition that is grounded on sensory perception, the art practice remains beyond the scope of analysis by methods that ignore the role of the body and sensory perception in the construction of knowledge. As we shall present in a later section, knowledge can be efficiently structured using non-hierarchical classification systems and categorization schemas that allow for the metaphorical projection of the senses. This is of relevance, not only for the knowledge of what it can yield about the art practice, but also in furthering the study of increasingly important areas such as tacit knowledge and emotion research.

The creation of art, however, not only involves expressive behavior, but also, its reception by an audience.[79] And though we cannot say much about the audience of the past, especially in those cases where there are not written records, this does not preclude us from discussing how a present-day audience receives and interprets objects from the past. And there is a special quality to the artifacts that are created by artists. We witness how they undergo a privileged process of transformation whereby, having once been domestic utensils, perhaps furnishings, or graphic marks wrought with delight, they become coveted items sought after and given privileged places of honour in public institutions such as museums.[80]

The past is gone, but the artifacts and objects remain. This is a paradoxical state; a "duality of autonomy and dependency." [81] Its material existence is evidence of a heterogeneous and mysterious origin. The object is autonomous. However, once divested from the networks of knowledge in which it was produced, the object also reveals its vulnerability and dependency, for content, on its original maker. According to the archaeologist Michael Shanks, there is here a tension between the expressive (or significative) character of the object and its materiality:

If it were back in the workshop where the [artifact] was made, we might have a good awareness of its meaning. If we were the ones who actually made the [artifact] it would be very much dependent on us.[82]

This break between the physical existence of the object in time and whatever its original meaning was, can only be bridged through research and interpretation: Ancient artifacts, have a post-history that is created by art historians and archaeologists using tools such as classification systems. To portray time is the goal of the historian, regardless of his/her knowledge or area of speciality. Through this work, s/he creates history:

The aim of the historian, regardless of his speciality in erudition, is to portray time. He is committed to the detection and description of the shape of time. He transposes, reduces, composes and colors a facsimile, like a painter, who in search for the identity of the subject, must discover a patterned set of properties that will elicit recognition all while conveying a new perception of the subject... Unless he is an annalist or a chronicler the historian communicates a pattern which was invisible to his subjects when they lived it.[83]

Once assigned the label of art, the artifact is deemed as timeless. The context in which it may have existed is restricted within the walls of the gallery, or to the display case in the museum. The function and purpose it may have fulfilled in the society that created it is no longer a necessary referent. Given that there is more than one history, how are the different histories of objects and artifacts constructed? As audience and observer, how do we recognize when we are leaving the realm of the ruined artifact, the fragment, the pre-history, and entering that of interpretation, or post-history? Can we identify discursive practices that affect how our appreciation of ancient artifacts is constituted? In what ways do they operate? Given the role of interpretation in these practices, how do they differ from the creation of art? In what ways are they similar? Will our knowledge of these facts alter our sensitivity and valuation of the objects themselves?

SUMMARY

The subject of art is of relevance to design and design research. To say the least, art and design share a historical trajectory, which although at the present is not necessarily the same, is reflected in the tools that they utilize. Creating artifacts of expression and expressive artifacts is among the tasks of the artist. Through this emphasis on expression, art can offer the designer knowledge about the processes involved in the creation of form.

The creation of art objects, even of conceptual art, is a subject that need not be off-limits but can be approached through the use of sensible methods. In the West, the activity of art exists within a set of discourses that influence the role of the artist and the acceptance of the object as art. It can be argued that these discourses form part of the episteme of a given historical moment. They are part of the structural conditions and discursive formations that enable the distribution of power in a particular direction that in turn influences the organization of individuals into communities. The artist does not work alone but within a society comprised of diverse communities that influence his/her practice. *Group Material's* exhibitions make sense in the context of a critical art practice that questions the commodification of the art object.

Activity theory can allow us to ponder about the activity of art while at the same time preserving the unity of historical conditions, such as discursive practices and context in which the object of art is produced. An issue such as perspective can be discussed from the point of view of material culture. Questions regarding the particular forms that visual culture assumes can be approached from a historical point of view. The idea of how an object of art is made is of less relevance than whether it is accepted by an art community. This issue can be revisited in light of what the role may be that art objects fulfill in communities.

Notes to chapter four:

1. A. C. Danto, *The Transfiguration of the Common Place: A Philosophy of Art* (Cambridge, Mass.: Harvard University Press, 1981), 201. This book is a philosophical inquiry into what distinguishes art from everyday objects.

2. K. Kuutti, "A Framework for HCI Research," in *Context and Consciousness: Activity Theory and Human-Computer Interaction*, B. Nardi ed. (Cambridge, Mass.: The MIT Press, 1997), 27.

3. Ibid.

4. Danto, "The Artworld," The Journal of Philosophy, Vol. LXI, No. 19 (October 15, 1964), 571–584. Danto proposes that "...To see something as art requires something the eye cannot decry—an atmosphere of artistic theory, a knowledge of the history of art: an artworld," 580.

5. Kuuti, "Identifying potential CSCW applications by means of activity theory concepts: a case example," Proceedings of the Conference on Computer-Supported Cooperative Work (CSCW) (New York: ACM Press, 1992), 235.

6. Danto, The Transfiguration of the Common Place, 201.

7. J. Kosuth, "Art after Philosophy," in Theories and Documents of Contemporary Art: A Sourcebook of Artists' Writings, K. Stiles, and P. Selz, eds. (Berkeley and Los Angeles: University of California Press, 1996), 843; according to Kosuth, "All art [after Duchamp] is conceptual [in nature] because art only exists conceptually."

8. M. Foucault, The Archaeology of Knowledge and the Discourse on Language (New York: Pantheon Books, 1972), 126–131.

9. P. Greenhalgh, "The History of Craft," in The Culture of Craft, P. Dormer, ed. (Manchester: Manchester University Press, 1997), 41.

10. H. S. Becker, Artworlds (Berkeley and Los Angeles: University of California Press, 1982). The book is a sociological study on the different actors and communities involved in art production.

11. Danto, "The Artworld," 582–584. Danto suggests that the possibilities for works to become 'art' are constituted through a matrix defined by the available styles and the active critical vocabulary. Whereas an artistic breakthrough consists of perhaps adding possibilities to the columns in the matrix, ignorance results in the reduced ability to participate.

12. T. A. Heslop, "How Strange the Change from Major to Minor: Hierarchies in Medieval Art," in The Culture of Craft, P. Dormer, ed. (Manchester: Manchester University Press, 1997), 55.

13. R. Wittoker, The Artist and the Liberal Arts, inaugural lecture delivered at University College London (Edinburgh: Constable Ltd., 1952), 3.

14. Ibid. According to Wittoker, though the word *ars*, means theoretical knowledge, the seven liberal arts refers exclusively to the Greco-Roman model that includes arithmetic, geometry, astronomy, music, grammar, rhetorics, and dialectics. Until the invention of perspective in the Renaissance, the fine arts were considered applied knowledge.

15. G. Bowker and S. L. Star, Sorting Things Out: Classification and its Consequences (Cambridge, Mass.: The MIT Press, 1999), 298: “Something actually becomes an object in the context of action and its use; it then becomes as well something that has force to mediate subsequent action.”

16. Becker, 25.

17. Becker, 226. Becker finds it paradoxical how certain works of art that are similar get accepted as art, whereas others are not. He concludes that the distinction between what is art and what is not art must lie in the ability of an art world to accept the work, and its maker, as art produced by an artist.

18. Ibid., 254.

19. Ibid., 262.

20. Franklin Furnace web site: <http://www.franklinfurnace.org/flow/gpmat/bush.html> (September 21, 2000).

21. *Group Material*, “Caution! Alternative Space!” in Theories and Documents of Contemporary Art: A Sourcebook of Artists’ Writings, K. Stiles and P. Selz, eds. (Berkeley and Los Angeles: University of California Press, 1996), 894.

22. Ibid.

23. Franklin Furnace Online Archive, <http://www.franklinfurnace.org/flow/gpmat/gpmattf.html> (November 24, 2001).

24. R. Arnheim, The Art of Visual Perception: A Psychology of the Creative Eye, The New Version (Berkeley and Los Angeles: University of California Press, 1974), 283.
25. Ibid., 284.
26. E. Ferguson, "The Mind's Eye: Nonverbal Thought in Technology," Science, Vol. 197, No. 4306 (August 1977): 831.
27. J. White, The Birth and Rebirth of Pictorial Space (Cambridge, Mass.: Harvard University Press, 1987), 124.
28. L. B. Molyneaux, "Representation and Reality in Private Tombs of the Late Eighteenth Dynasty, Egypt," in The Cultural Life of Images: Visual Representation in Archaeology, B. L. Molyneaux, ed. (London: Routledge, 1997), 110.
29. S. Alpers, The Art of Describing, as cited in K. Henderson, On Line and On Paper: Visual Representations, Visual Culture, and Computer Graphics in Design Engineering (Cambridge, Mass.: The MIT Press, 1999), 26.
30. Bowker and Star, 189.
31. Arnheim, 113. According to Arnheim, since it has been shown that sideviews of the human shoulder occur in Egyptian art as early as the Sixth Dynasty, this choice is not the result of an inability to deal with the problem of foreshortening.
32. Ibid. The maintenance of symmetry and an objective depiction of the size of the objects represented are examples of possible standards that inform this type of representation.
33. V. Burgin, "Geometry and Abjection," Art and Architecture Files #15 (1989): 36.
34. E. Panofsky, Perspective as Symbolic Form, Christopher Woods, trans. (New York: Zone Books, 1997), 58.
35. Wittaker, 6.
36. H. Damisch, The Origin of Perspective (Cambridge, Mass.: The MIT Press, 1995), 446.

37. Ibid., 33.

38. Henderson, 32.

39. S. Alpers, "Is Art History?" *Daedalus*, Vol. 106 (Summer 1977): 1.

40. Ibid., 2.

41. Panowsky, *Galileo as a Critic of the Arts* (The Hague: Martinus Nijhoff, 1954), 13–14. According to Galileo, anamorphoses have been used to create images that "show a human figure when looked at sideways and from a uniquely determined point of view but, when observed frontally as we naturally and normally do with other pictures, display nothing but a welter of lines and colors from which we can make out, if we try hard, semblances of rivers, bare beaches, clouds, or strange chimerical shapes."

42. *Ekphrasis* [Gr., pl. *ekphraseis*; Lat. *descriptio*]. Technical term of ancient rhetoric: teachers of rhetoric defined it as a vivid description intended to bring the subject before the mind's eye of the listener. The composition of an *ekphrasis* was one of the most advanced of the graded preparatory exercises (progymnasmata) designed to teach basic rhetorical skills to schoolboys. These texts suggest persons, places, events, and times of the year as possible themes for *ekphrasis*. In practice, however, paintings, sculpture, and buildings came to be popular subjects for Greek rhetoricians from the 2nd century A.D. onwards. *Ekphrasis* of works of art and buildings survived throughout the Byzantine Middle Ages and reached the West during the Renaissance. Artnet.com Research Library <http://www.artnet.com/library/02/0257/T025773.ASP> (November 11, 2001).

43. F. Braudel, as cited in S. Alpers, "Is Art History?" 8.

44. G. Kubler, *The Shape of Time: Remarks on the History of Things* (New Haven, Conn.: Yale University Press, 1962), 33.

45. Ibid.; in the context of art, Kubler notes how "as the solutions accumulate, the problem alters," 33. And later: "The nature of artistic invention therefore relates more closely to invention by new postulates than to that invention by simple confrontation which characterizes the useful sciences," 70.

46. M. Wartofsky, "Perception, Representation, and the Forms of Action: Towards an Historical Epistemology," Models: Representation in Scientific Understanding (Dordrecht, Holland: D. Reidel Publishing Co., 1979), 209.

47. Becker, 244.

48. V. Aconcci, "To the Viewer," K. Stiles and P. Selz, Theories and Documents of Contemporary Art: A Sourcebook of Artists' Writings (Berkeley and Los Angeles: University of California Press, 1996), 764. Aconcci discusses the issue within the context of the art object in performance art and how it differs from art in a theater performance.

49. W. Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in Illuminations (London: Fontana Press, 1992). This seminal essay treats the subject of the aura of an object in relation to authenticity and how duplication affects the existence and essence of the work of art. In terms of the Internet and the Information Society, the issue of authenticity translates to issues pertaining to Intellectual Property Rights (IPR) and the profits that can be made through marketing.

50. Danto, The Transfiguration of the Common Place, 58.

51. G. Lakoff, Women, Fire and Dangerous Things: What Categories Reveal about the Mind (Chicago: University of Chicago Press, 1987), 16.

52. Ibid., 21.

53. Ibid., 42.

54. Danto, The Transfiguration of the Common Place, 174.

55. Ibid., 167.

56. Ibid., 181.

57. Ibid., 165.

58. Ibid., 175.

59. Wartofsky, 207.

60. Ibid.

61. Ibid., 209.

62. Ibid., 207.

63. C. Renfrew, “Hypocrite voyant, mom semblable” [Viewpoint: Is there a Place for Aesthetics in Archaeology?], Cambridge Archaeological Journal, Vol. 4, No. 2 (1994): 266.

64. F. Boas, Primitive Art, (1927; reprint, New York: Dover Publications, 1971), 14.

65. Ibid., 349.

66. A. N. Leontjev, Activity, Consciousness and Personality (Englewood Cliffs, N.J.: Prentice Hall, 1978), 35. Leontjev used the concept of perceptive action to explain that psychic reflection involves not only the mind acting on an object, but that the senses are participants, anticipating and acting as well.

67. Ibid., 58.

68. Boas, 29. A bead legging is an ornament, made of leather and beads, that is worn on the legs.

69. Renfrew, 266.

70. Danto, The Transfiguration of the Common Place, 164.

71. D. Aldridge, Music Therapy and Practice in Medicine: From Out of Silence (London: Jessica Kingsley Publishers, 1996), 97.

72. J. Dewey, “Art as an Experience: The Live Creature,” in Philosophies of Art and Beauty: Selected Readings in Aesthetics from Plato to Heidegger, A. Hofstadter and R. Kuhns, eds. (Chicago: University of Chicago Press, 1964), 604.

73. Ibid., 58–81.

74. Ibid., 75.

75. Kosuth, “Untitled Statement” in Theories and Documents of Contemporary Art: A Sourcebook of Artists’ Writings, K. Stiles and P. Selz, eds. (Berkeley and Los Angeles: University of California Press, 1996), 840.

76. Kosuth, “Art after Philosophy,” 843.

77. M. Cole, “Putting Culture in the Middle,” in Cultural Psychology: A Once and Future Discipline (Cambridge, Mass.: Belknap Press, 1996), 124.

78. Aldridge, 94.

79. T. Taylor, “Excavating Art: The Archaeologist as Analyst and Audience” [Viewpoint: Is there a Place for Aesthetics in Archaeology?], Cambridge Archaeological Journal, Vol. 4, No.2 (1994): 250.

80. Dewey, 3–13.

81. M. Shanks, Classical Archaeology of Ancient Greece: Experiences of the Discipline, (London: Routledge, 1996), 125.

82. Ibid., 125.

83. Kubler, 12–13.

The Art in Illuminating History

ART, ARCHAEOLOGY, AND HISTORY

What can be the contribution of art to a research project that dealt primarily with design and archaeology? After all, creative practitioners such as artists and designers do not usually write books about these subjects, but rather limit the scope of their practice to creating art objects. Also, as a general rule, outside the realm of the studio the artist has very little to say in terms of how a given work is interpreted, or received. And it could be said that even in discursive practices about art itself, this voice of the artist is for the most part constituted outside the realm of the practice. It is the domain of scholars working in areas such as art history, cultural history, and philosophy. One of the explanations that is often cited for the lack of theoretical production is that the artist's work is not the product of methodic, scientific inquiry, but rather that it is created and exists outside the realm of the objective. It has been noted, however, that this assumption is left over from a Romantic legacy that views art and artist's work as subjective, based on intuitive reasoning, and thus irrational.[1]

Then there are the somewhat ambiguous boundaries that surround art. As Danto has noted, the same discourses that define art, or that make it possible, are also those that separate it from that which is not art:

But telling artworks from other things is not so simple a matter, even for native speakers, and these days one might not be aware he was on artistic terrain without an artistic theory to tell him so. And part of the reason for this lies in the fact that terrain is constituted artistic in virtue of artistic theories, so that one use of theories, in addition to helping us discriminate art from the rest, consists in making art possible.[2]

An added complication to the discussion is how the multiple definitions of art vary throughout history and according to the community engaged in its creation and consumption. As Figure 14 depicts, from the production of mimetic art, such as pre-historic cave art, to the reframed commodities such as the Campbell soup cans of Pop Art, ancient figurines, ritual objects and 3D spaces, there is a flow of material culture in perpetual motion. It is a flow that does not stop at the doors of the gallery, the museum, or at the edges of the art world. For aside from the display case, there are other uses for the material culture that is art. There is the art that can be one link in a chain of evidence, tying the fieldwork of the archaeologist to the narrative produced by the

historian. Once produced, now discovered in the excavation or in the archive, art items can become the raw materials for narratives produced by historians and archaeologists.[3]



Figure 14: What is art? Clockwise, from left to right, “Radiant Baby” 1980 graffiti figurine by Keith Haring; late 19th-century reconstruction of cave art in pastel and pencil by the L’abbé Breuil, Caverne de Font-de-Gaume, France [4]; Cycladic figurine from 3000-2000 BC, National Museum of Archaeology in Athens, Greece; the Mulli site, 1725 3D world reconstruction; 1968 “Campbell Soup” painting by Andy Warhol; caryatids revealed at Chichén Itzá, hand colored photograph by Adele Breton, 1907, Museum of Art and Archaeology of the City of Bristol, UK.

Yet in the task of analyzing the remains of ancient cultures, the ceramist whose methods date back hundreds of years, is rarely consulted.[5] It is usually an expert outside the practice who, not only decides the items deemed as deserving the label of art, but who also articulates the agency of the artist. Artisan? Artist? Designer? Craftsman? These are terms used to establish parameters that, for the most part, have very little to do with the activity and practice of art.

But if the voice of the artist finds little occasion for use in its own discipline, what can be said about exercising it outside, and within the academic disciplines, such as history and archaeology? There is, after all, ample evidence that artists have been worthy collaborators in these fields.[6] Because their practice has been described by other experts as the setting down on paper of a

duplicate reality of that which they have witnessed, the labor of these individuals has not been seen as creative and artistic, but has been seen rather, as an act of recording and copying. Aside from invalidating the historical circumstances in which the works were created—many times these individuals were the first ones at the site of “discovery”—this point of view, assumes that the individual engaged in creating images operates within an autistic state. There is no thinking mind between the eye that sees and the hand that operates the tools, which together create the representation; such an individual is a mere conduit.

The use of graphic inscriptions to set down reality on paper as it unfolds in front of our eyes operates under principles that are very similar to those used in the act of writing. They both involve a translation, and interpretation, of what one sees. At the absolute or very minimum, they involve a selection of what is meaningful, or what to include, and what to leave out.[7] Relationships are created among the objects depicted in a scene. Certain items are highlighted at the expense of others. Methods and tools, such as perspective and systems of signs, for example, are used in the process. How these methods and tools are used determines whether the representation conforms to, or departs from, the standard or predominant style of a particular period.

In our present era, amidst the chaos and excitement of the “Information Society,” with its emphasis on instant communication through digital networks, interactive technologies, and ever-increasing memory capacity, the artist surfaces in the digital realm. The artist collaborates with the scientist and the humanist in creating our contemporary electronic agoras, the web sites, where knowledge is shared, made public, inclusive, archival and universal. In this context, the artist can operate as a catalytic agent, bringing diverse communities together to produce objects whose existence span across multiple realms, including that of art.

A HYPERMEDIA ARCHIVE

The Raisio Archaeology Archive is a hypermedia archive that primarily contains digital representations, or media objects, of the materials recuperated during an excavation carried on in an archaeology site called Mulli. The archive makes use of hypertext scripting techniques to gather these digital representation and media objects. Hypertext is a subset of the broader concept of hypermedia. First suggested by Vannevar Bush in 1945, the term hypertext was coined by Theodore Nelson in 1965, and implemented by Douglas Engelbart between the years 1962 and 1975.[8]

The term hypermedia has been used to denote the use of a combination of text, images and sound that is possible in digital, electronic publications.[9] To distinguish hypermedia from regular multimedia applications that also make use of sound and images, hypermedia has been further defined as: "...applications that allow users to forge their own non-linear trajectory through images, sound and text." [10]

However, the ability to move through information and media is not a complete representation of the possibilities available through the use of this technology. A hypermedia environment should also provide tools that enable the visitors to rearrange the material.[11] While the World Wide Web (WWW) has become a successful and globally accepted implementation of hypermedia, the ideals of hypermedia visionaries still remain to be implemented. The current state of tools, technology, and authoring concepts do not yet realize the full potential of hypermedia.

Some of the advantages attributed to hypermedia are an increase in potential for expression, as well the opportunity for an alternative model to the passive act of experiencing media through television. In the context of archives, a hypermedia application is a very natural proposition. For one, historical data rarely comes in the format of neatly written texts. Historical evidence is more a conglomerate of diverse types of artifacts and finds resulting from fieldwork and research. It may come in formats as varied as maps, illustrations, and fragments of material culture artifacts. Hypermedia provides the potential to accommodate disparate formats in one cohesive framework. In the case of the Raisio Archaeology archive, diverse types of data have been created or transferred from an analog physical format into a digital format, and then linked together using basic scripting techniques to create hierarchic structures.

The contents of the archive include documentary artifacts about the excavation or the site, interpretive artifacts that provide supporting narratives, art objects, and tools. The

documentary artifacts are similar to the primary sources in a traditional archive. They are those artifacts that are closest to the actual events that are documented in the archive. The documentary artifacts include the archaeological reports of the excavation done during the years 1994-96. Using a template provided by the designer, these documents were converted into hypertext format by the archaeologists. They have links that associate them to other sections in the archive. The documentary artifacts also include visual materials such as photographs, created by the archaeologists, that records the progress of their fieldwork; reproduction photographs, created by the design team of previously existing archival material such as historical maps dating back to the eighteenth century and the nineteenth century; aerial photographs, topographical maps, and satellite images of the landscape; and excavation panoramas and post-excavation photographs and panoramas of the finds, also created by the design team.

Among the visual artifacts used to provide supporting narratives and interpretation to the documentary artifacts are the panoramas and photographs representing the landscape of the archaeology sites throughout the seasons; post-excavation photographs that document many of the finds from previous excavations and research undertaken in other archaeological sites in the region, such as Kansakoulunmäki, Siiri, and the church of Raisio. These sites were considered by the archaeologists to be of relevance to the Mulli site, and therefore of relevance to the archive. Other interpretive visual objects include panoramas and photographs that document the reconstruction of ceramic artifacts and hypothetical production techniques proposed by the archaeologists; video documentaries of the reconstruction of building structures, textile and ceramic production techniques performed by the archaeologists.

Textual artifacts that operate as interpretive materials include general narratives about items in the archive written by the archaeologists, narratives about selected topics provided by specialists who have contributed to the project, and hypertext links created by the archaeologists that create associations between the different sections of the archive.

The archive also contains several art objects, such as the 3D interactive model, or world, that is based on an interpretation of the Map of Ihala from 1725, the representation of the 3D gallery, and the decorated initials and icons. These latter two items provide entry points to diverse sections of the archive, and expand the spatial representation of the content from the 2D format of a page to a navigable, interactive, 3D space. In addition, the archive contains some tools that include an ontology, or description of the materials in the archive, in the form of a controlled vocabulary that is also used as a classification system. An authoring tool allows the guest to create an interactive 3D gallery. The gallery is built dynamically to display items from the archive

gathered by the guest. The representation of the gallery is based on the designer's interpretation of the landscape of Finland during the winter season.

Artistic tools such as traditional media in the form of paper and pencil drawings were used in the creation of the archive. These tools were utilized for making the conceptual representations that guided the production of the first prototype of interface design of the archive. The drawing in Figure 15, for example, depicts how traditional drawing with pencil and paper is used to work out the logic involved in producing the 3D models of the windmills. This type of planning is necessary, given the slow pace and intense engagement required in 3D modeling.

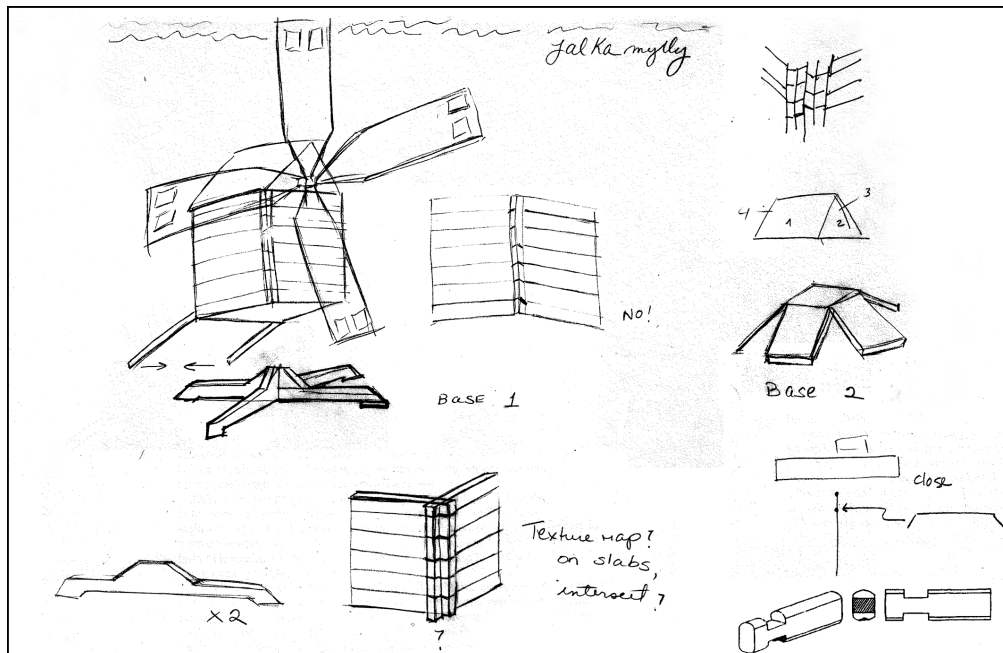


Figure 15: Drawings by the author were used to assist in the design of the 3D model of windmills. In the lower right hand corner, detail of a timber joint from Niilo V., and Vuoristo, O., Suomen kansan rakennukset, Museovirasto, 1994, 62.

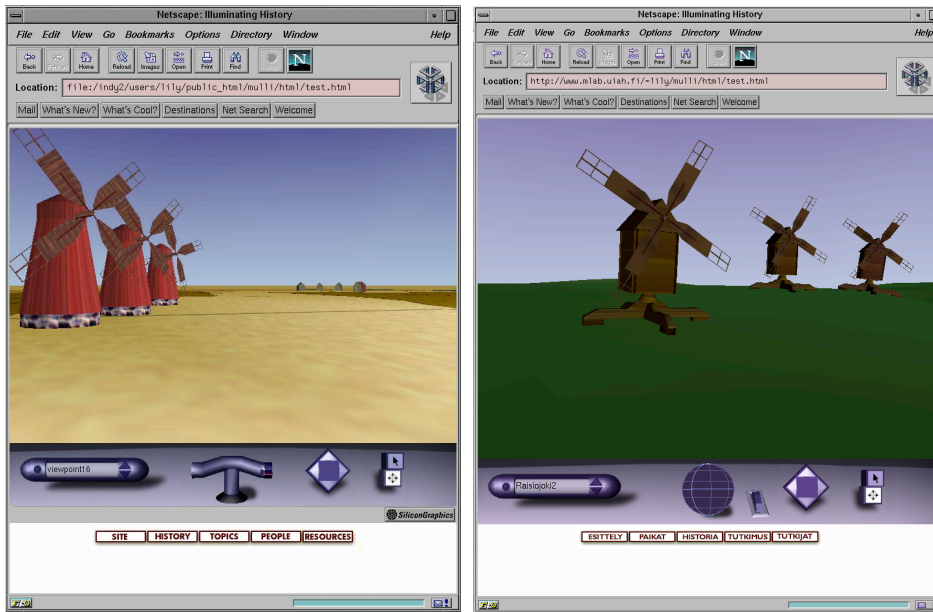
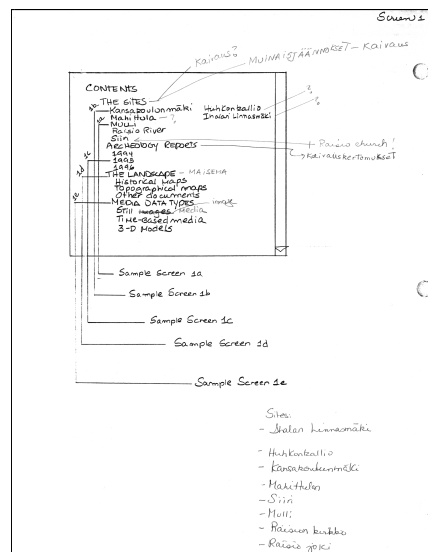
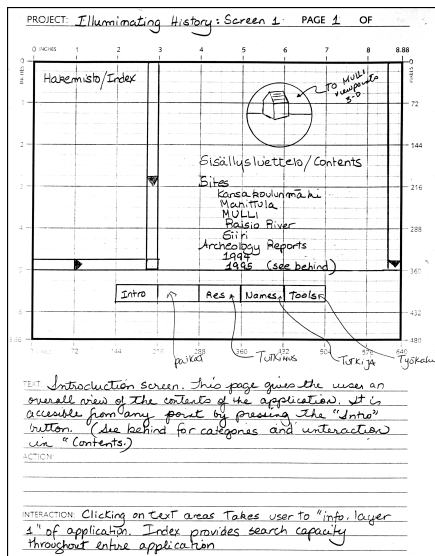


Figure 16: Left side, view of the first 3D model of windmills. Right side, view of the final model of the windmills utilized in the 3D world.

The current version of the windmills is a second iteration of these structures. An earlier iteration, shown in Figure 16, left side, was discarded because it was deemed to be inconsistent with the type of windmill structure that may have existed at Kansakoulunmäki. The final design is compatible with the representation on the map. It is also in accordance with other representations of windmills in the area from the 19th century.[12] Drawing and sketches were also utilized in the design of the components of the interface, such as the banners, buttons, icons and page layout. Figure 17 shows drawings created for the second iteration of the prototype.



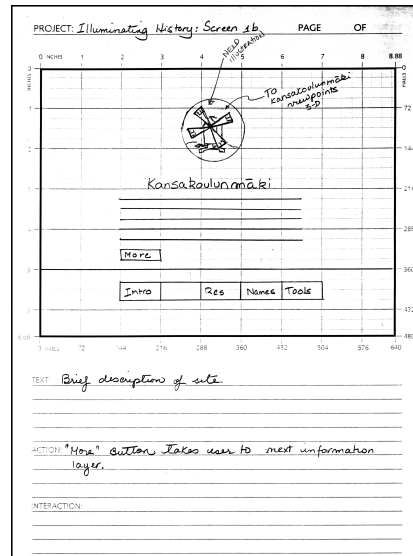


Figure 17: Diagrammatic sketches used to illustrate the navigation and interface design of the application.

Audio-visual media, such as photography and video, were used in the creation of the visual representations of the materials. For the most part, the audio-visual media employed has been in a digital format. For example, all the videos were recorded using digital media. In addition to being stored in DV format, the footage of these video documentaries has been printed and saved onto CD-ROMs. However, for archival purposes, most of the photographs and the interactive panoramas created for the archive, also have physical counterparts in the forms of color negatives and prints. Most of the panoramas in the archive were created using a traditional 35mm Nikon camera, with a 28mm lens. Color print film was used for the recording process.

Methods from virtual reality in the form of virtual networked environments and photographic interactive panoramas were used to create some of the representations. Because of their photographic quality, these interactive panoramas have been cited by archaeologist Lee Krasniewicz as a type of virtual reality that can be successful in simulating an experience that is relevant to the practice of archaeology:

Virtual reality tools can help restore some of the archaeological context so that other archaeologists can see where and how the data were found. This does not mean creating idealized models of the site but rather using the technology to immerse other researchers into the origins of the data. In the past this was done through textual descriptions, maps, photographs and drawings. Now this can be done through computer-generated models or through interactive photographic panoramas and other forms of virtual reality.[13]

The panoramas in the archive produce the effect of imitating the action of standing in one place and looking around, as well as moving to another spot to explore what is there. They were not created during the time of the excavation but produced by the designer throughout a successive period of three years subsequent to the excavation. In this sense they do not portray a view of the site at the particular moment of archaeological research. However, they provide a context for the material culture presented in the archive, in that they illustrate a certain aspect of time in the changing nature of the landscape. For one, the archaeological site is situated in an inhabited area that is being further developed, a fact clearly recorded in the last panoramas done in the Spring of 2000. In addition, they illustrate how the conditions of the weather vary throughout the seasons in Southwestern Finland.

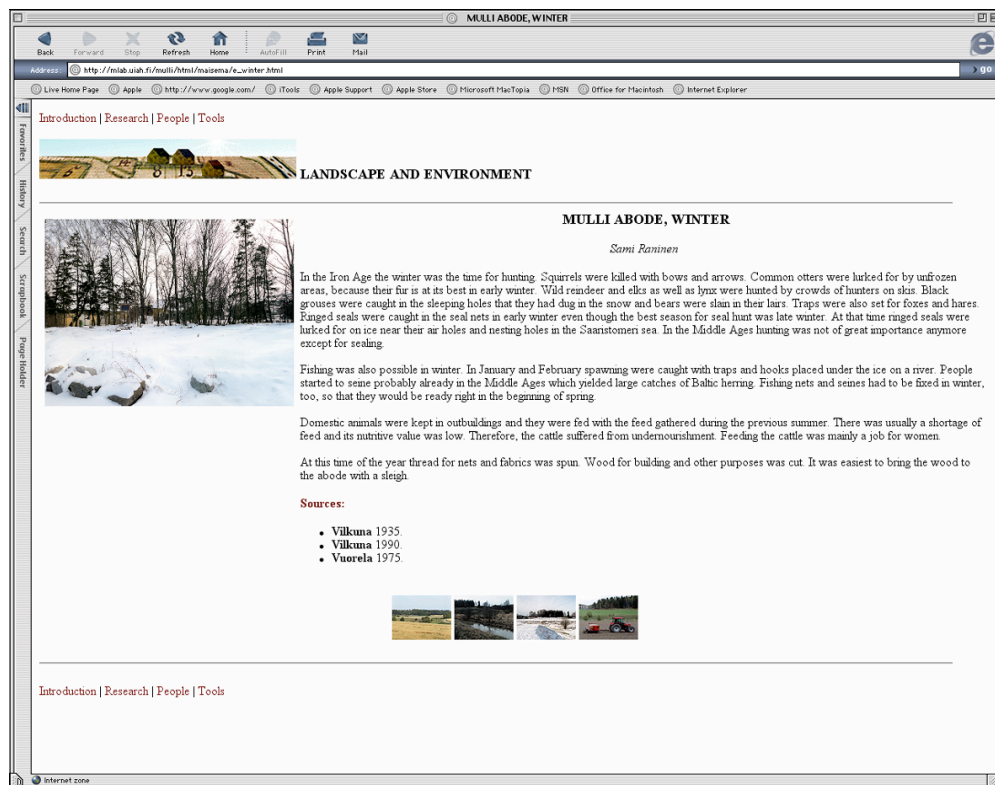


Figure 18: View of the screen of the Seasons section of the archive. Interactive panoramas, on the left side, depict the landscape throughout the seasons. On the right, one can read a hypothetical description of the activities during each season, written by an archaeologist.

All of the items in the archive are organized according to their content and media format. For example, there are panoramas about the excavation activities as well as the reconstruction activities. These have been further subdivided into those of the simple and those of the compound type. A compound panorama is one that is made up of several panoramas that have been edited together to provide an interactive walk-through of a site, from different positions, or points of view. A simple panorama

provides the viewer with one view that unfolds from one position, or point of view. Panoramas can be still further subdivided into the number of degrees afforded by the view they offer. The panorama of the excavation of the Mulli site, for example, provides the viewer with a stationary, three-hundred-and-sixty-degree view of the site. The panorama of the reconstruction of the Mulli abode, on the other hand, offers the viewer a stationary, one-hundred-and-eighty-degree view of the site. Interesting to note is that, although interactive panoramas such as these have been available for a number of years, as far as we know very little work has been done in terms of understanding and classifying the types of visual data that they can offer.

The term 'media artifact' roughly corresponds to the notion of hypermedia node. In the present application, it is used to denote a combination of media objects, such as interactive panorama photographs, still image photographs, videos, and diverse texts and narratives have been gathered together into one file using the HTML format. See Figure 49 (page 178) for a visual representation of how the concept of a media artifact is implemented in an HTML document.

SOME ASPECTS OF INFORMATION

There are two major aspects to the content materials included in the archive. These are the documentation and the interpretive aspects. In using the term aspect, I mean to describe how all the artifacts in the archive exhibit a relationship with respect to documentation and interpretation.

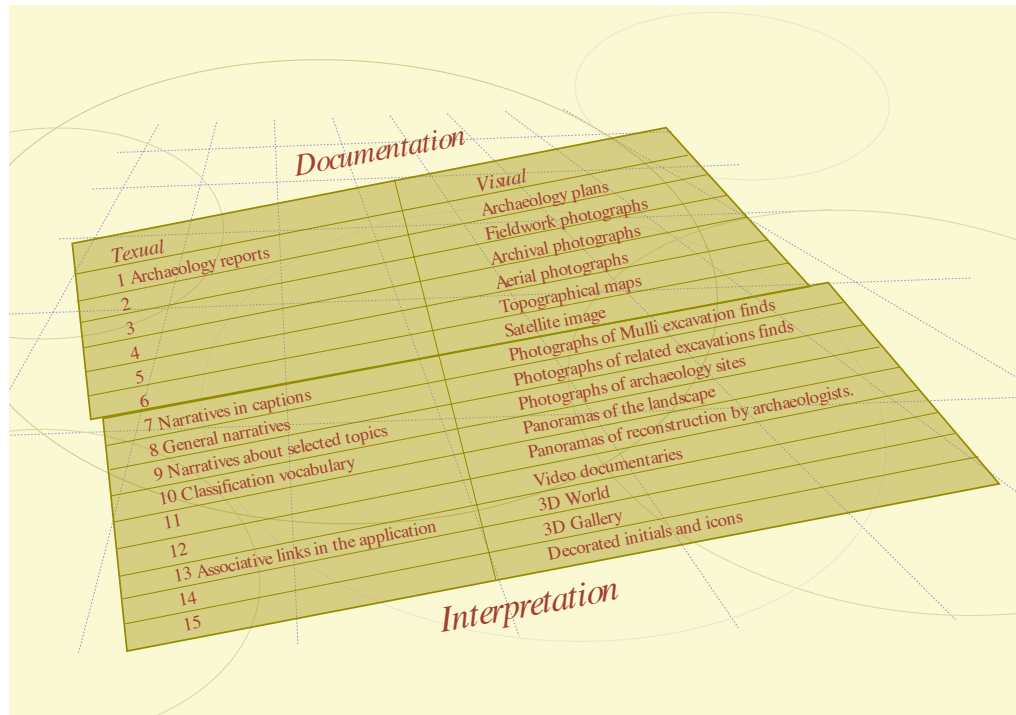


Figure 19: Information in the Raisio Archaeology Archive exists in a continuum from documentation to interpretation.

The term documentation is used to describe an ideal, rather than a real situation. It involves inscription or recording into a support mechanism or media, such as paper or an electronic format, in as neutral and a factual manner as possible. However, the act of inscription is never completely neutral, but involves the use of tools, such as rhetoric, to effect the manner of presentation.

As a theory of discourse, rhetoric is concerned with the design and production of speech, text, and all things pertaining to communication. Rhetoric frames the relationship between an author and the audience. It is the ability of persuasion with respect to a given subject matter. How does the expert express his knowledge about the object being discussed? Does s/he use vocabularies that are restrictive? How does s/he build her/his proposition statements so that they bear the weight of authority?

Because of their situated nature, these tools, and the objects produced through their use are always socially and culturally conditioned:

...[Rhetoric] is about enrolling in a cause and translating. The observation of the shape of the pot becomes; it is translated into a proof of a theory... Rhetoric is about establishing heterogeneous alliances of people and things, arguments and emotions, characters and evidences.[14]

In this context, the term interpretation is used to denote how the point of view of the expert, or the specialist, exerts force or pressure on the materials being presented as they move from a status of documented inscription to that one of interpretive narrative.

What differs is how the weight, or the influence of these aspects varies in the presentation of the artifacts. It could be said that while the documentation aspects pertain to activities considered by some as more objective, or scientific, the interpretative aspects are the result of processes considered by some to be more subjective, or artistic. Regardless of whether they are considered to be art or science, in the end, all the diverse information artifacts are constituted through combinations of these two aspects. Figure 19 outlines how all the information artifacts in the archive exist in a continuum between these two points of documentation and interpretation.

ILLUMINATION AND ART: A HISTORICAL CONNECTION

Illumination is a term with multiple meanings. It has been noted half-jokingly, that the use of the metaphor of light in the metaphysical tradition of the West could be the source of an encyclopedic treatise.[15] In the most basic realm of the physical, however, the term illumination can be described as an action word: A verb used to indicate the act of supplying something with light. A most common example of the use of the term in this context would be an act such as the turning on of a light source, such as a candle or a lamp. There are two consequences from the act of illumination. In the first is an implied transition, or transformation, from a prior state of obscurity to one of enlightenment. In the second there is a gathering and re-framing of three entities: the agent responsible for the action, the illuminating agent or source of light, and the item being illuminated. As we shall see later, from our perception of this act of illumination a very fundamental notion of the relationship between understanding and seeing is structured.

Within this project, the notion of illumination has influenced the way in which many of the philosophical questions are elaborated, as well as guided the use of metaphor in the design of some of the artifacts. This is especially true for the artifacts that are more

artistic than documentary, such as the decorated initials used in some of the narratives, the 3D World, and the 3D Gallery.

The decorated initials and icons used throughout the archive are a conscious reference to the connection between the ancient practice of illumination and how knowledge was gathered in the form of illuminated manuscripts. This was a practice that was closely tied to an idea of design as it related to the embellishing of reading matter with luminous colors (especially gold and silver). The term was also used in connection with the act of coloring maps and prints.[16]

The artifacts resulting from this practice were themselves called illuminations. They consisted of the decorations, and graphic inscriptions drawn and painted on illuminated manuscripts. These manuscripts, sometimes also referred to as codices, were the ancestors of our present-day books. Aside from the production of the illuminations the practice of illumination was a fairly well-developed technology involving different areas of activity. Illuminations ranged in scope from small plain initials and titles in red or other colors, to delicately painted borders, decorated initials, and miniatures, or paintings. Artists, who were also called illuminators, created them.[17]

The initial reaction one may have upon confronting the beauty and splendor of the ornaments in an illuminated manuscript is one of marvel. Nonfigurative designs, depictions of human or animal figures, as well as identifiable narratives bearing a resemblance to the text and which could be of an allegoric or symbolic nature, are some of the representation strategies used by illuminators.[18]

The aesthetic role which illuminations may have played have not been completely ascertained. Research and historiography, however, indicate that one of the prime functions of illuminations was to clarify the physical presentation of the text.[19] The initials may have provided opening and closure to the various sections in a manuscript. They may have also divided the textual contents structurally into Books or Volumes, and hierarchically, with the more lavish initials used to indicate the more important sections. It has also been suggested that, as vestigial remnants of the art of memory, they may have been employed to assist the reader in the acquisition and retention of knowledge. According to Frances Yates, the graphic devices of illuminated manuscripts were used to increment the emotional and psychological reach of the materials contained in the manuscripts. In this context, it is possible that they actively supported and reinforced a cognitive engagement with the textual object as it was being looked at, read, and reflected upon.[20]

FROM DECORATED INITIALS INTO A VRML SPACE

Decorated initials are used in the narratives in the Archaeology Sites section. These initials contain illustrations of the actual sites as they are rendered in the landscape of the 3D world. Clicking on them will transport the guest into this landscape. They are used to underscore the possibility of digital electronic formats to access multi-dimensional representations of space. In the opinion of the author, they are examples of potential expressive artifacts, created through engagement in technical pursuits such as 3D- modeling. The primary motivation for their existence is due to the author's interest in this area of digital technology.

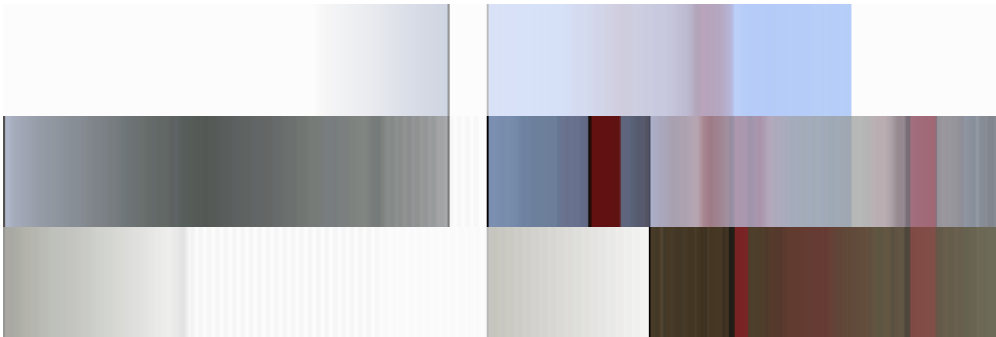


Figure 20: Illuminated initials “M” and “R”, provide entry into the Mulli 3D world space.

The decorated initials give the guest access into a 3D world-space that is interactive and responds to the actions of the viewer. The guest can navigate the site by selecting from a set of predetermined viewpoints. S/he can also move about freely with the mouse or by using the navigation mechanisms on the control deck. These navigation control mechanisms are provided as part of the Cosmo World 2.0 browser plugin. Parts of the world react to the guest's actions. Moving into the viewpoint of the Mulli site, for example, will trigger the sound of laughing children. Clicking on the barn doors of Siiri, will open the door and reveal a photograph of the inside of a real barn in Seurasaari.

The 3D-world space is an interpretation of the landscape based on the 1725 historical map of Ihala that is also located in the archive. It consists of digital representations of visual and auditory materials displayed through the use of a Virtual Reality Modeling Language (VRML) file format. At its core, VRML has been defined simply as a 3D-interchange format:

...[VRML] defines many of the commonly used semantics found in today's 3D applications, such as hierarchical transformations, light sources, viewpoints, geometry, animation, fog, material properties, and texture mapping.[21]

VRML was designed to be an analog to HTML. In this manner it would serve as a simple, multi-platform language that allows for publishing 3D content in web pages. VRML was chosen because it is a standard file format and because there are no issues with licensing when distributing content. Although VRML provides the technology to integrate 3D, 2D, text and multimedia into a coherent model, it does not provide a set of tools necessary to easily model and distribute rich interactive environments.

HOW THE 3D WORLD WAS BUILT

The basic building block of a VRML file is the node. These entities are organized using a hierarchical scene graph. The data used to create these representations comes from diverse sources. For example the shape and elevation of the land, as well as the contours of the river are derived from the data of a 3D model created by the Geography and Land Survey department of the city of Raisio. The model was initially built using a software program called TerraModeler. Though TerraModeler provides a command to export the data of the model into a VRML file, in the context of this project, this option proved useless. A lengthy process of research and testing was necessary to get to the point where the 3D representation could be rendered efficiently and delivered through the Internet.

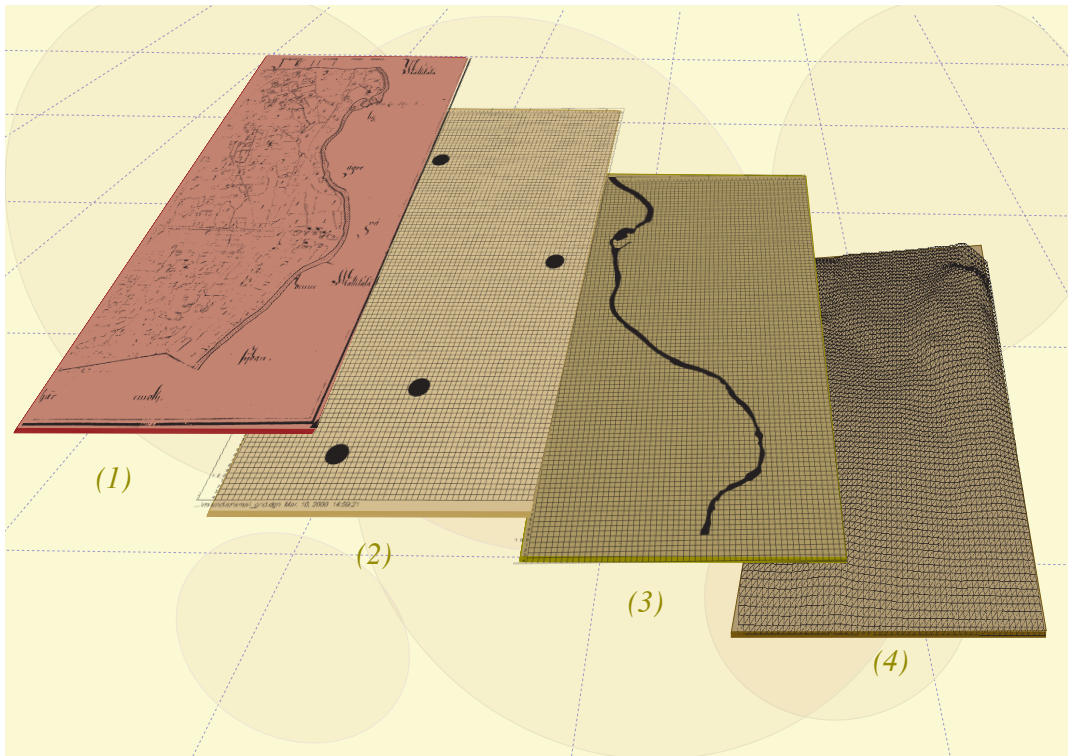


Figure 21: Transformation of data into representation of landscape. From left to right, (1) Image of 1725 map is digitized and used to compare the position of the archaeology sites as indicated in the contemporary digital version. (2) Digital image created with contemporary data indicates location of the excavation sites. (3) Digital model of the outline of the Raisio river is superimposed and used to cut the outline and create river banks in digital terrain model. (4) Digital terrain in the form of elevationGrid node.

In the task of rendering this data the designer collaborated with Mika Mannervesi, a land survey engineer. Mannervesi was provided with the information explaining how the ElevationGrid node in VRML reads and displays the coordinate points in 3D space. Mannervesi selected the relevant data from a TIN model produced in TerraModeler and exported it into an ASCII file that has all three coordinates of the grid points. The points are sorted so that they begin from the upper left (north-west) corner and continue row-wise (west to east). From this file, the data was input into an ElevationGrid node called "terrain" and inserted into the file of the 3D world. The node translates the data into a grid structure with rows and columns. There are 211 rows and 101 columns. The model was rendered at a resolution of 10 meters and covers an area of 500 meters, west to east, and 1050 meters, north to south. (For more information the reader is referred to Appendix 2.) In addition, Mannervesi created a series of grid templates that were used by the artist in the placement of the building structures on the land, and in the modifications of the riverbanks. The water in the river was created with an animated texture file that makes use of transparency. (See Figure 21.) This texture is displayed as a .PNG file that is bump mapped onto a rectangular polygon placed underneath the terrain file.

The shapes of the building structures, such as the windmills on the hill of Kansakoulunmäki, and the dwelling spaces of the farming communities were created by the designer, using a traditional 3D-modeling kit—Cosmo World 2.0. This toolkit provided the author with an interface to the VRML syntax. In this manner, she could work on the design of a structure, while the toolkit generated the proper VRML syntax. The Cosmo Player toolkit, however, does not offer complete control of all aspects of 3D design, so that a more detailed knowledge of VRML is required in order to be able to create complex models.

The representations of the building structures are based on the interpretation of the designer of several sources. Figure 21, p. 90, is a graphic information template created by the designer to depict the outbuildings of the 3D world. It uses a combination of diagrammatic illustration, photographs, and bibliographic sources to provide the reader with information about the sources and provenance of these structures. It is of significance that viewers are rarely provided with information regarding the sources used to make reconstructions.

Though the file is relatively lightweight—it carries a load of approximately 641 Kilobytes, it has yet to be optimized for performance. This next stage in production will require that the contents be divided according to their Level of Detail (LOD). The LOD will be used to determine the amount of detail that needs to be displayed. The further away the viewer is from an object, the less detail that has to be displayed.

The motivation for creating a 3D world was manifold. First, there was the challenge involved in producing an artifact of this type: There is not a lot of 3D content being delivered through the Web, precisely because it is so difficult to create these models. Second, there was a desire to provide a set of representations that, although based on, the materials also provide a more free and imaginative way to look at them. This type of representation, may find other uses besides that in archaeology. For example, they can be integrated into illustrated stories that are used to teach children about the history of their community. Lastly there was the objective of exploring the possibility of outlining a methodology that can be used by archaeologists to create databases that integrate 3D representations of an excavation and the information pertaining the archaeological finds.

THE 3D GALLERY

The 3D gallery is a collaborative artwork conceived by the author and created with the assistance of M.Sc. Janne Pietarila. The aim of the 3D gallery is to provide the visitors of the archive the option to curate their own gallery exhibition, using the materials of the archive. Like in the work of *Group Material*, the intention is to democratize the act of curating exhibitions. Instead of the physical domain, the gesture takes place in the virtual dimension. The 3D Gallery is an example of how you can create spatial 3D representations, using VRML that are dynamic and change according to user input. The 3D Gallery is an artwork in the form of an L-shaped structure. (See Figure 23.) The author chose and developed the design for this shape. Structurally it can be realized using a ratio that supports a combination of dynamic and static parts. In the gallery, for example, the perpendicular wall on the right and the glass-paned wall on the left, vary in length according to the number of photographs selected by the visitor.

Initially the plan was that the gallery should provide the guest with an option to select from the diverse types of media artifacts in the archive. Once the complexity of the task at hand became apparent, the decision was taken, for the time being, to concentrate on an option that made use of only the still images in the Field Photographs and Studio Photographs sections.

Concept execution:

A guest can go to the web page marked “3D Gallery” and select from a number of photographs to curate her/his own gallery show. After selecting the images, she can either enter straight into the gallery, or save her selection for notation and later use. When the guest selects the “Enter gallery” option, a series of scripts are executed that create the model “on the fly” as a virtual world. In this 3D space, the guest can experience an exhibition that is similar, in some respects, to being in a real gallery. The photographs chosen from the archive hang neatly displayed on an exhibition wall. Clicking on the paintings will, in turn, display the web page that contains all the information pertaining the object being displayed.

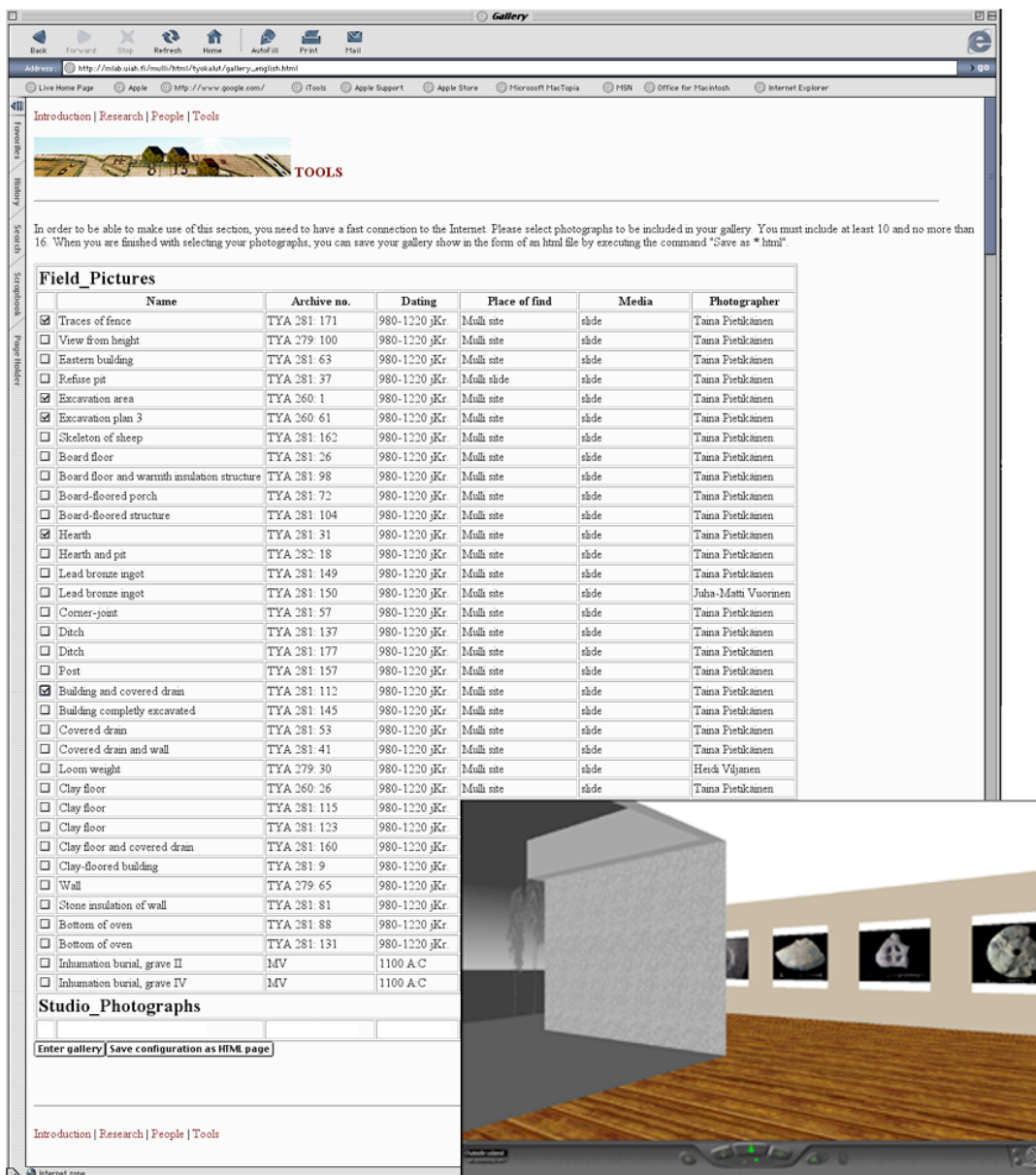


Figure 23: A dynamic 3D Gallery that is created “on the fly,” based on the viewer’s selection. The viewer can navigate the gallery space. Clicking on the works will display the web page of each object in a separate window.

The experience of the 3D Gallery of the Illuminating History Project, however, differs in many aspects from a traditional gallery. The author created the representation as an art project. The aesthetic dimensions have been defined according to her preference. The 3D environment and the gallery are an interpretation by the author of parts of the landscape in Finland, during the winter. A stark contrast in how the black and white tones are used, to render the space outside the gallery, in opposition to the vivid color of the images displayed inside the gallery, help to create a focused and peaceful

ambience. The metaphor of the museum as an island is used to highlight how, from the outside, museums might appear as entities that are disconnected from the rest of society. This is balanced by the fact that it is the visitor who is in control of the contents of the exhibition.

The 3D Gallery can be seen as an example of a potential artifact of expression. The parameters of what a gallery should be like have been established beforehand. It is within these constraints that the guest selects from the materials and builds his/her own interpretation of what a gallery exhibition should be like.

The 3D Gallery is an initial experiment to take the experience of visiting a digital archive beyond the act of navigating through 2D information spaces and into 3D environments. As a next step we would like to make use of artistic modes of expression to create information spaces that contain multiple and coexisting environments. These environments could themselves include diverse landscapes and levels that would be displayed dynamically, and according to the visitor's preferences.

SUMMARY

The concept of the archive originated from a proposition to create something that did not exist before. The object that was the focus of the activity was a hypermedia archive that gathers the materials obtained by the archaeologists as well as other culture heritage items of interest to the different communities that may benefit from using the contents of this repository. The archive should not be seen as a static object, but rather as a dynamic entity that will hopefully grow through time. The scope of the activity was a collaborative effort involving combined knowledge and skills from art, design, and the humanities. The object created reflects the collaborative nature of the activity. This is evident, for example, in the degree of relevance of the different sections in the archive to practitioners from diverse communities. The archaeological reports, and the field photographs may be of more interest to archaeologists than the 3D World. Whereas the 3D world can be seen as an experiment of an artistic nature, the 3D Gallery, which provides the guest with the ability to curate exhibitions from a selection of the content, may attract a wider audience interested in using the contents of the archive for their own educational purposes.

The archive was designed to be as inclusive as possible, while maintaining standards for quality of content production. This multiplicity of content, format and genres is in line with an ideology of "openness." It reflects a desire to open a space to challenge the notion that knowledge is only produced by academics working in academic settings, as well as posing the question of whether art is something that can only be produced by artists.

Notes to chapter five:

1. K. Stiles and P. Selz, eds., Introduction Theories and Documents of Contemporary Art, A Sourcebook of Artist' Writings (Berkeley and Los Angeles: University of California Press, 1996), 1–7.

2. A. C. Danto, “The Artworld,” The Journal of Philosophy, Vol. LXI, No. 19 (15 October 1964), 572.

3. M. Shanks, Classical Archaeology of Ancient Greece: Experiences of the Discipline (London: Routledge, 1996). The first two chapters of this book deal explicitly with the use of methods borrowed from art history and art objects and the role this may have played in the constitution of Classical archaeology.

4. L. Capitaine, H. Breuil, and D. Peyrony, La caverne de Font de Gaume (Monaco: Imprimerie Vue A. Chene, 1910).

5. T. R. Hester and R. Heizer, “Making Stone Vases: Contemporary Manufacture of Material Culture Items in Upper Egypt,” in Method and Theory in Modern Material Culture Studies, R. Gould and M. B. Schiffer, eds. (London: Academic Press, Inc., 1981). This essay represents a departure from this practice in that it illustrates a concerted effort by archaeologists to establish correspondences between the production of alabaster ceramics in ancient and contemporary Egypt.

6. Please note the following sources: P. Hulton, America 1585: The Complete Drawings of John White (Chapel Hill, N.C.: The University of North Carolina Press, 1984), which contains reproductions and an analysis of the work of John White, the first Englishman to paint the people and natural life of the American continent; Description de L’Egypte, Publiée par les ordres de Napoléon Bonaparte, Edition complète, Köln: Benedikt Taschen Verlag, Gmbh, 1997, which is a facsimile reproduction of the illustrations produced as part of Napoleon Bonaparte’s Egyptian campaign in 1798; and for an account of the role which architects and engineers have played, see C. C. Gillispie, “The Scientific Importance of Napoleon’s Egyptian Campaign,” Scientific American (September 1994): 64–71; also see S. Giles and J. Stewart, eds., The Art of the Ruins: Adela Breton and the Temples of México, City of Bristol Museum and Art gallery, 1990, which is a catalog published for an exhibition that contains samples and analyses of Adela Breton’s work by art historians and archaeologists; for an account of the role of hand-painted

replicas as archaeological sources, see J. Kinoshita, “Maya Art for the Record,” Scientific American (August 1990): 74–79.

7. M. McCullough, Digital Craft: The Practiced Digital Hand (Cambridge, Mass.: The MIT Press, 1996), 38. Malcolm McCullough has defined visual thinking as “the use of images to generate ideas and knowledge, plus the use of abstractive grasp to detect patterns and identities in images.” McCullough also notes the division between logos as based on the authority of the word, and *tekné* as derived from the masterful manipulation of the image.

8. R. E. Horn, Mapping Hypertext, Analysis, linkage, and Display of Knowledge for the Next Generation of On-Line Text and Graphics (Lexington, Mass.: The Lexington Institute, 1989), 6.

9. P. Delany and G. P. Landow, eds., Hypermedia and Literary Studies (Cambridge, Mass.: The MIT Press, 1991), 113.

10. E. Berk and J. Devlin, eds., The Hypertext/Hypermedia Handbook (New York: McGraw-Hill Software Engineering Series, 1991), 23.

11. J. McDaid, “Breaking Frames: Hyper-Mass Media,” in The Hypertext/Hypermedia Handbook, *op. cit.*, 446–447.

12. Z. Topelius, Maamme kirja (1875; reprint, Porvoo, Finland: WSOY, 1981). This volume contains assorted, highly idealized graphic illustrations of the Finnish landscape in the mid-nineteenth century. For an example of the use of this type of windmill, see the illustration on p. 251, the “View from Naantali’s southwestern side,” by Berndt Lindholm.

13. L. Krasniewicz, “Immersive Imaging Technologies for Archaeological Research,” in Virtual Reality in Archaeology, J. Barceló, M. Forte, and D. Sanders, eds. (Oxford: Bar International Series 843, Archaeopress, 2000), 164.

14. Shanks, 112.

15. R. Debray, Media Manifestos (London: Verso, 1996), 86.

16. M. Brown, Understanding Illuminated Manuscripts, The J. Paul Getty Museum and The British Library, Malibu, Calif., 1994, 69.

17. B. A. Shailor, The Medieval Book, Beinecke Rare Books Library (New Haven, Conn.: Yale University, 1988; reprint, New Haven Conn.: Medieval Academy of America, 1991), 39–46.
18. Brown, 68–72.
19. Ibid., 39.
20. F. Yates, The Art of Memory (Chicago: University of Chicago Press, 1966), 82–104.
21. R. Carey and G. Bell, The Annotated VRML 2.0 Reference Manual (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1997), 22.

Design as an Activity

THE ACTIVITY OF DESIGN

Herbert Simon defined design as being concerned with the processes and actions that lead to the systematic planning and creation of artifacts.[1] It is the opinion of this author that design can also be defined as a human activity that involves goal-oriented behavior, with the *intention* to produce a given result. That is, throughout the activity of design, the designer posits an objective and procures and utilizes the means to achieve it. As the discipline that is involved in the description and creation of the artificial, the matter of cause and effect, or causality, is of prime importance to designers. According to Alain Findeli:

The act of designing, the intervention of the designer, is seen as the *cause* of the movement from problem to solution, just as the movement of an accelerator pedal is the cause of increased speed in an automobile.[2]

What constitutes the role of cause and effect in the activity of design—or in any productive activity for that matter—is not necessarily an obvious thing. An objective that determines the kinds of means to be used, for example, may also be considered to be a cause.[3] This is the case in the field of information technology. Although not immediately apparent, interactivity, for example, can be seen as a form of designed causation. According to Geoffrey Bowkers and Susan Leigh Star, every link in a hypertext script reflects the processes of comparison, evaluation, and decision about the condition of two or more objects. Are they similar? Are they linked together as part of a larger narrative?[4]

In his writings on the subject of technology, Martin Heidegger drew a distinction between cause and means. According to Heidegger, whereas a cause can be seen as that which has an effect as its consequence, a means can be defined as that “whereby something is effected and thus attained.”[5]

But causality does not need to be limited to effecting. It can also be realized as emergence. In the opinion of this author, there is a relationship between design and the ancient concept of *techné* as that which reveals all that is gathered together in the act of making. An example of *techné*, cited by Heidegger, is the handcrafted object. In it, the instrumental hand of the artisan is present as the

agent of causality. It helps to shape and determine the manner in which revealing, or bringing forth takes place:

...what is brought forth by the artisan or the artist, e.g the silver chalice, has the bursting open belonging to bringing forth not in itself, but in another (*en allos*), in the craftsman or artist.[6]

In our contemporary world, the artifact of design can disclose a world. From its boundaries, the virtual reality application of an archaeology site, for example, can conjure forth a physical environment into presence. In this manner, this author thinks that the artifact operates as an indexical pointer to a space of embodiment. It indicates and describes to us a world that no longer is. It may even single out those who were involved in its making. Even in the fragmented state of the archaeological find, as a mere trace, the object that is the product of design is an instance of *ekphrasis*, of an opening.[7] The artifact reveals something about the essence of the materials available, how they were used, consumed.[8]

The artifacts that result from the activity of design can be molded, or shaped, into the form of objects as diverse as tools, products, processes and, concepts. Thus, three-tiered hierarchy proposed by Marx Wartofsky can be of use to designers. For one, this classification allows one to examine and describe how different aspects that are unique to human culture, such as representation, are incorporated into the object of design.

In Wartofsky's classification, primary artifacts—such as a hammer, a cup, a pen or a paintbrush—are the first basic tools created that can have a *direct impact* on the world. A small bottle opener in the shape of an animal can also be classified as an object of design that is also a primary artifact. Secondary artifacts, on the other hand, are representations of primary artifacts and of modes of action of using them. They mediate between direct action and other higher order processes, such as memory and symbolic thinking. The immediate action involved in using an alphabet, for example, is that one of communication. Through the use of an artifact such as the alphabet, other forms of production and modes of action that are distinctly human, such as the permanent recording of history, become possible. Secondary artifacts play an important role in the preservation and transmission of modes of action.

Contemporary examples of primary artifacts are simple interface devices, such as the mouse, that facilitate so-called direct manipulation.[9] Human computer interface objects, such as graphical user interfaces (GUIs) and the myriad digital representations included within them, are examples of secondary artifacts. A graphical user interface represents the consolidation of a series of mental models regarding how a user might interact with a given program. A “folder”, for

example, is a tool that stands for a directory of files in the virtual realm. It is also an example of a designed non-physical secondary artifact. An example of a secondary artifact that is both a digital and physical item is that of Computer Assisted Virtual Environment (CAVE). This type of artifact incorporates the direct manipulation aspect of primary artifacts, as well as makes use of symbolic systems for representation. Tertiary artifacts are those that come to constitute relatively autonomous worlds with their own rules. Digital networked environments (DNE), such as Multiple User Dimensions (MUDs) and MUD, Object-oriented (MOOs), with their ability to integrate diverse participants in real time and elicit myriad roles and actions, aspire to become tertiary artifacts.[10] According to Singhal and Zyda, Digital Networked Environments can also contain virtual representations, such as 3D models of architectural structures, renditions of landscapes extracted from the real world, as well as representations of human actors depicted in the form of avatars. They can also include multiple linear narratives that facilitate access and navigation through the world, as well as other possibilities for interaction between multiple participants.[11]

	Material domain	Immaterial domain
Primary artifact	Mouse	Telecommunication networks
Secondary artifact	Computer Assisted Virtual Environment (CAVE)	Hypertext software application
Tertiary artifact	Networked Virtual Environments (MUDs, MOOs)	Artificial Life System

Figure 24: Marx Wartofsky’s three-tiered hierarchy as applied to digital artifacts.

Like art, the activity of design involves not only thinking, and creating, but also *acting*. [12] In this manner, the objects of design can also be processes that engage the life and activities of humans. According to Enzo Manzini:

The matter of design and invention can therefore take the form of a process which allows one to produce, variously, a given composite, a computing method leading to a new approach to a structural problem, a flexible automated manufacturing process that imposes a new set of limitations while simultaneously creating new possibilities.[13]

Some information design products, however, may be processes that do not even assume the form of an artifact themselves. They may be involved, or evoked, to sustain and develop the classification, systematization, and standardization of other artifacts. The CIMI z39.50 Application Profile for Cultural Heritage Information, which seeks to standardize search and retrieval parameters for digital cultural information resources, is an example of one of these process design objects.[14] They may lead to innovation, to the creation of better products.

Financial products can also be characterized as immaterial, information-based artifacts. The re-engineering of the procedures involved in the transactions of financial products is an instance of how processes can be redesigned. A designer may work with the financial institution in reorganizing, simplifying, and updating the rules and regulation procedures of the firm. The implementation of these redesigned procedures can result in a renewed stimulus and better support for development and distribution of both new and already existing products.

Much like in the practice of art, the activity of design exists within discursive structures generated and sustained by communities that exist as pre-constituted networks and clusters of institutions. These networks bring together individuals, communities and, institutions. Figure 25 illustrates some of the different components of the activity, according to the point of view offered by the Activity System.

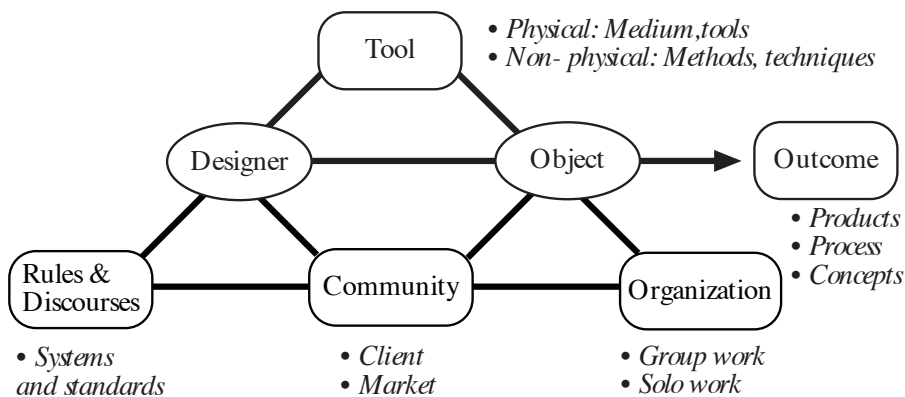


Figure 25: Visualization of the activity of design.

WHO IS THE DESIGNER?

As the active participant in the activity, the designer engages in a series of actions that ultimately yield a design product. Though we have spoken briefly about the object of design in terms of products and processes, there is yet another aspect that is more difficult to grapple with. For

indeed, the object of design is embedded in the imagined life. Moreover, design is indicative of desire, wish, and fantasy. As Paul Greenhalgh has pointed out: “To have a design on something or someone suggests an insatiable want.”[15] The author of this work thinks that, as the producer of objects of desire, the label of designer is as open a class or category as that of art objects. For in our postmodern eyes, design appears to be everywhere: In nature, we encounter the supreme Architect at work; in mathematics, we encounter the logic and structure of number sequences, in evolution we discern the hand of natural selection. The value of the participation of the nonprofessional as an integral component in the design process prompted Liam Bannon to say that “in a very real sense users are designers as well.”[16] Notwithstanding the multiple definitions, and different terms used to designate the agent, this author thinks that the designer is one who engages in design to conceptualize and represent. S/he is involved in producing a synthesis from diverse sources. S/he is someone who produces visualizations that translate the abstract into the concrete. S/he is a planner and a producer, engaged and working in the world.

Richard Coyne has described how the notion of synthesis as a gathering in design, originates in ideas dating back to Galen’s Medical Art. These themes can also be found in the work and methods of Descartes and Leibniz.[17] Per Galle, among others, has proposed that design itself is an activity that involves the creation of a design representation in the absence of the thing itself.[18] According to Galle, what is special about the types of representations produced by designers is that they allow us to formally describe what he labels as, “absent artifacts”. The absent artifact is a thing that does not really exist anywhere. From this point of view, design representations are devices that embody within the ideas and interpretations of the several actors with respect to the item being created. Galle proposes that these representations, and the notion of causality, or that which makes something happen, come together in the actual production of an artifact.[19] Focusing on causality, may be one approach to understanding how disciplines can make use of the same tools for different approaches. In the next section, I present an examination, from this point of view, of the tools for representation that the designer uses.

Through an engagement in these processes involving knowledge acquisition, the designer acquires an understanding of the community that creates the content. In this author’s opinion, because s/he is cognizant of the knowledge created, as well as how it is being produced and by whom, the designer comes to apprehend its ontological dimensions.[20] The designer is aware of the extent and shape of the boundaries of the knowledge being articulated, as well as the structural skeletons that support its configuration. Indeed, it could be said that the most significant task for the designer is to achieve an understanding of the client’s understanding. This is why the task of the designer has been described as an activity of self-conscious artifact production that operates at the metaphorical level. According to Paniaridis Louridas:

The designer proceeds by interpreting the effect his actions have on the situation. He tries to understand the effect of his materials and of his tools, to define their place in a structure. He wants to create a structure out of his means and the result of his actions.[21]

Additionally, the designer is also a specialist who works at a meta-level. In the process of coming to understand both the subject matter of the design, and the intended outcome, s/he must acquire an understanding of all the components in the activities of the different actors. In this process, s/he must also learn to negotiate with the rules and discourses of a community, as well as with the organization of labor. Many times, these rules and discourses enter the realm of ideology. In the case of work done with archaeological materials, for example, it may be that the content is one in which issues regarding ethnic, national, or religious identity converge. The choice of media, format, and the manner of presentation can influence the experience of the audience.

THE TOOLS

The association of design with art is perhaps most evident in the emphasis on creativity and how this manifests itself through the production of sketches and other forms of representation about the object of design. The use of visual artifacts as part of the activities in other disciplines, such as engineering, has been documented. Edward Ferguson, for example, has clearly demonstrated how drawing used to be a part of the engineering practice and how the categorical distinction that limits the productive use of nonverbal tools, such as drawing and many forms of visualization, to the art-related domains is a recent phenomenon.[22] Presently, however, design is one of the few disciplines that consciously promote the use of visual artifacts and tools as part of the process of knowledge production.

Still, though they may share tools, and a preoccupation with aesthetics, there are differences between the activity of design and that of art. Some of these differences can be observed in how designers use conceptual, nonphysical, tools. As can be seen in Figure 27, in the modern context, as an instrument used in visualization and representation, drawing is an integral part of the designer's toolbox. These tools are used by the designer for providing cognitive access, as well as changing the form and configuration of the object and outcome of the activity. In the case of the present work, the object of design consists of representations of archaeology and culture heritage materials.

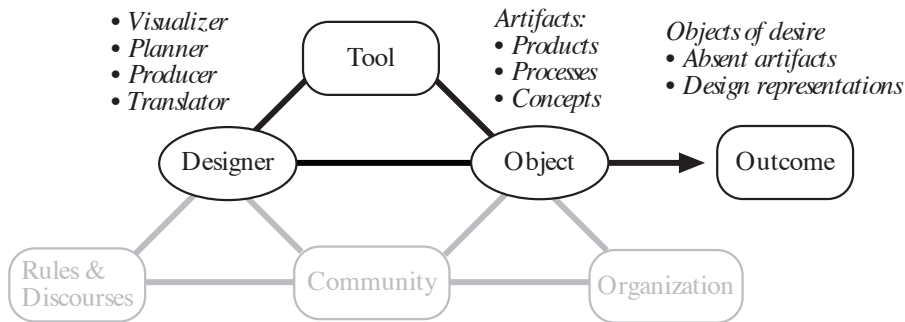


Figure 26: The identity of the designer, as well as that of the objects s/he produces is the subject of much discussion.

Though superficially they may appear to be similar in nature, the drawings of the designer differ radically from those of the artist. As Rudolf Arnheim has pointed out, these representations help to provide a center, and a sense of direction, or the “structural skeleton, namely the property that makes the pattern distinct, organized, identifiable.”[23] However, unlike the case with art, where the object produced by drawing is usually intimately tied to the aura of its maker (i.e. the identity and personality of the artist, within a given historical context), the sketches and representations created by designers can be better described as ephemeral communication devices.

The term ephemeral, as used in this context, does not refer to either the immaterial or virtual domain. A physical prototype used to demonstrate the capabilities of a product can be of a material nature, and be used as an ephemeral communication device. Therefore, the term ephemeral is used to describe a mode of being in the world that is meaningful, situated yet non-persistent. It indicates how the existence of these items is short-lived, transitory, and to a large extent instrumental to the design process. Theirs is a microhistory, contingent upon a larger historical context within the design process. In the activity of design, they stand in place as idealized representations of a final product:

A candidate design or partial design is a conjecture, much like a scientific hypothesis, that should contain within it the seeds of its refutation.[24]

As *absent artifacts*, these “stand-in representations” gather within them the self-reflections of the designer, the understanding of the client, and the interpretation of the producer. Through these, the three aforementioned actors communicate and acquire knowledge about an artifact that does not yet exist.[25] In a sense this artifact that is the object of design is produced with an idea that foreshadows it.

Other differences between design and art can be examined from the already discussed issue of the role of causality in design and its influence on the tools of the designer. The following paragraphs include an explanation of some of the instruments in the designer's toolbox. These have been grouped into a matrix that organizes them according to their causal dimension.

In using this term of causal dimension I intend to extend the notion of the *four causes* defined by the ancient Greek philosophers. These terms were brought into discussions of technology first through the work of Martin Heidegger, with his seminal essay "The Question of Technology," and more recently through the work of Brenda Laurel, who has used the metaphor of theater as a way of describing representation and narrative in human computer interaction.[26]

For the current discussion, this author has reinterpreted the four causes into four dimensions that, while delimiting the extent of reach and influence, also provide the designer with agency and scope of action. The *causa formalis* refers to the dimension of Form into which the material enters, the shape that it is given. The *causa materialis* refers to the Material dimension or the matter of which an object is made. The *causa finalis* refers to the dimension of Function or the end or purpose for which the item is created. The *causa efficiens* refers to the community and the Context in which the finished item emerges. The Material dimension, deals with the nature of the medium and the tools employed in fashioning the object of design. In the case of Information Design, the Material dimension can be described as a combination of electronic and digital media. The tools used involve the manipulation, storage and display of this aspect. The aspect of Form relates to the systematized processes that are gathered together and which bring the item into being. In the words of Brenda Laurel:

Formal cause operates through an idea or vision of the completed work, which will undergo change and elaboration as the process of creation unfolds ... there is a reciprocal relationship between the formal cause and the work in progress.[27]

Representation Tools in Design
Causal dimension

	Material	Form	Function	Context
Diagrams		✓	✓	
Flowcharts		✓	✓	
Drawings	✓	✓		
Models	✓	✓	✓	
Demos	✓	✓	✓	✓
Prototypes	✓	✓	✓	✓
Scenarios	✓	✓	✓	✓

Figure 27: Some of the representation tools used by the designer.

The aspect of Function is concerned with the relations of exchange in which the object is produced. Community and Context relates to how the activity of production is framed and determined.

Examples of the representation tools of the designer

Throughout the process of design, the designer of information uses tools such as drawings and diagrams, scenarios, and prototypes as communication devices. They are meant to convey information about abstract concepts, provide a context, and further the decision-making process among all parties concerned. Depending on how thoroughly they are constructed, they may sometimes even allow for engagement in an actual interaction with the item being designed. Unlike the art object, the drawings of the designer do not represent the solution to a problem. As ephemeral communication devices, the drawings of the designer consist of *proposals* of the solution to a problem. Because theirs is a microhistory that is tied to the larger process of design, they exist mostly as primary signals, mute declarations of existence. The interpretation of these devices is closely tied to the vocabulary employed by the designer and the context in which they are presented. Indeed it is the designer who establishes the frame for a meaningful dialogical space. In the words of Klaus Krippendorff:

The context of genesis consists basically of a complex process, a process *characterized in terms of communication*.... Within such a production-consumption network artifacts may be seen as temporarily frozen patterns, gestalts, forms or messages, that invite participation, suggest

appropriate responses that transform them into another medium or passing them on to others.[28] (*Italics added.*)

This communal aspect of the design object may be one of the reasons why, unlike the artist, the designer is less dependent on institutionally sanctioned narratives, such as those of the art critic, or the historian. Sketches and models are among the most basic examples of the communication devices created by the designer. As Katherine Henderson has noted, they operate by creating a communication channel through which different types of information, such as tacit knowledge and experiential knowledge, can be shared:[29]

The sketch or drawing used interactively can serve as a reference and collaboration ground to unite all these various forms of knowledge for negotiation.[30]

Because they create a shared context that can be understood by the specialist, as well as the generalist, they help to structure the work processes of design and its outcome. Sketches may be pictorial or pseudo-realistic, or of a diagrammatic nature. Pictorial sketches include perspective drawings and pseudo-realistic images created by illustrators. They do not convey the optical consistency required for production of design prototypes.[31] They are generally used for communication when the interaction is with an unspecialized audience. As we shall see later, archaeologists use pictorial sketches in presentations for general audiences.

Colin Ware proposes that diagrams are non-pictorial representations that utilize easy-to-read, standardized graphic elements, such as lines, boxes, circles and arrows.[32] They are of use to designers because many times they can convey ideas in a simple direct manner. Venn diagrams, according to Joy Mountford, use circles and oval shapes to convey the concept of inclusion, a notion that is difficult to communicate with verbal language.[33] This author thinks that flow charts and schematic diagrams are examples of marks that can be used to represent the flow of events in a process. They may indicate branching, or key decision points, as well as probable outcome projections.

John Carroll describes scenarios as representations that are accessible to both users and designers. They can help to make communications more efficient by linking elements from design situation to hypothesized effects for users and their work.[34] Kari Kuutti has proposed that a scenario is a description of an activity, in narrative form, and a view of a system from the outside, or from the user's perspective.[35] Kuutti has noted how, in terms of its scope, a scenario can be more narrowly defined as:

...a description of one or more end-to-end transactions involving the required system and its environment.[36]

Scenarios are significant tools in that they can embody detailed information about activities, in their full context. According to Carroll, they can reflect the complex world of human interaction with artifacts:

The defining property of a scenario is that it projects a concrete description of an activity that the user engages in when performing a specific task, a description sufficiently detailed so that the user engages in when performing a specific task, a description sufficiently detailed so that design implications can be inferred and reasoned about.[37]

This author's opinion is that the historical origin of scenarios as tools can be found in other analogical reasoning instruments used by scientists, such as thought experiments. These types of mental simulations, which have been documented, involve the construction of models that describes a sequence of events.[38] The reader/listener is asked to imagine a dynamic scene as it unfolds through time. The narrative abstracts from real-world phenomena exposes inconsistencies and exhibits paradoxes.[39] Scenarios can be textual, but can assume other forms, such as storyboards, annotated cartoon panels, video mockups, or scripted prototypes. "As We May Think," for example, is one of the most famous scenarios ever created. Written by the scientist Vannevar Bush as an essay, and published in a literary magazine in 1949, this scenario depicts a hypothetical user engaged with a hypermedia memory augmentation system.

Scenarios can be used not only as representation tools but also as part of the process of knowledge acquisition. From this point of view, Enzo Manzini proposed that the designer become a "conceiver of scenarios", and not just products.[40] However, as Alain Findeli has noted, this is a proposition that requires a radical revision of our assumptions regarding what technology is:

Ultimately, this model implies that we imagine the possibility of a technology that greatly goes beyond the materialist point of view inherited from the nineteenth century (as a guideline, think of the technique or art of gardens, the art of bringing up children, all the techniques that address themselves to living and human beings, such as they are).[41]

As an agent involved in the production of material culture, the designer must be involved, from the human point of view, with the artifacts created. S/he must be aware and be able to assume

responsibility for the impact that these items may have on the natural as well as the cultural dimension.

A prototype, or device used to engage the user in interaction with a replica of an actual item, is yet another type of tool that the designer can use to gain knowledge about how the object being designed operates in the real world. The prototype can be a simplified version, as long as the basic behavior is the same as in the actual product. The idea behind the prototype is that it allows the designer to test a solution at an early stage of design. Also, the prototype illustrates direction where the design is headed. Prototypes can be used to decrease the complexity of a problem while showing how requirements are going to be met. In addition, a prototype allows the designer to test usability aspects and receive vital user input before committing a large amount of resources to a given solution.

Knowledge acquisition tools and design

The designer also makes use of knowledge acquisition tools. Some examples of these tools are the diverse techniques used to acquire the knowledge necessary to create products for a given community. Among these is what is referred to as transverse knowledge or, conceptual knowledge that arises from the interaction of the designer with the matter to be designed. This transverse knowledge enables the establishing of “new channels of communication between different areas and with different technical world, languages, and dialects.”[42] Transverse knowledge is different from multidisciplinary perspectives in that it is knowledge in action. As opposed to a single logic approach that seeks to discover one solution that applies to all cases, transverse is a type of second-degree understanding in which the designer strives to apprehend how different users understand and make sense of the artifacts around them.[43] It provides the designer with a field of action or launching pad from which to ask motivationally[44] structured questions such as, “Who is this for?” or “What do I need to know?” or “Who knows about this?”

When the need arises, the designer can also incorporate a whole set of tools used in other disciplines, such as anthropology, cognitive science, and psychology.[45] This practice of methodological opportunism is not privy to design, but rather it is practiced by many other disciplines. Archaeology, for example, makes use of the methods of other disciplines such as geology, ethnology, and linguistics.[46] From a research perspective, through the use of techniques from anthropology, such as ethnographic recording and description, the designer can also allow herself/himself to become an *initiate* into the culture of the community for whom the artifact is being designed. By placing herself/himself in an involved position, s/he can attempt to

steer the inquiry through a series of contacts and communicative exchanges which are meaningful for the path of the design to take.

Cognitive modelling tools

Ontology has been described as the science of being; a “theory regarding the entities, especially the abstract entities to be admitted into a language of description.”[47] Ontology can also be defined as a way of characterizing the world and its entities through language. As a tool for description, ontology can be used in defining parameters, as well as the artifacts and ecology that populate a given domain of knowledge. Formal classification systems are definitions of shared ontologies for particular knowledge domains.

Categorizing involves a juggling and attribution of meaning, an effort to make sense out of something. It denotes a process of organization, separation, selection, inclusion, and ultimately, also of exclusion. The manner and methods by which humans classify may vary among cultures and in different periods of time. However, the motion of gathering and separating, of bringing together and arranging seems to be found in all human groups engaged in activities that produce knowledge. That is, though the gesture of arranging and organizing may be universal, the act of classification, how it materializes, how it is implemented, and whether it is agreed upon, or imposed, is particular. Classification itself is not a given, pre-existing entity and classifications are made, rather than found.

Designers routinely use classification schemes to apprehend and also to outline the positioning and scope of a potential product. Taxonomies are also regularly used for understanding market segments and target audiences. Uday Athavankar, for example, has described how the study of categorization systems can assist the designer in managing the introduction of innovative concepts so that they make sense to a prospective audience.[48] In addition to traditional classification methods, designers also make use of metaphoric devices to create idealized cognitive models. The application of rhetorical devices, such as metaphors as cognitive mediators in the practice of human computer interface (HCI) design has been widely documented.[49] In the context of this project, aside from the title, the idea of illuminating with respect to the perceptual response of the organism is used as a metaphor that describes the process of knowledge acquisition.

Systems of signs

Aside from the tools used to produce a design, the information designer works with other artificial and culturally determined artifacts such as the systems of signs and graphic devices that support and convey the representation created. This labor requires that the designer become an expert in the methodical manipulation of second-order symbolic systems. This is necessary because, in order for them to be successful, the digital representations that the designer creates must become signs for real entities and relations. Among the systems of signs that the designer has traditionally utilized are alphabets, symbols, and numerical systems. Alphabet items are combined into textual artifacts and used with the purposes of naming, identifying and assigning value and meaning. Gassée and Reinhold describe symbols as vehicles of creating that which has never been created.[50] Numerical systems are used in conjunction with culturally determined concepts such as quantification and ordering. Further, notions such as amount, size, position, and scale can be used to establish relations such as containment, or to indicate processes such as abstraction. They can also be used to order elements in the representation either in sequential or incremental order. An example of this is the use of structures, such as timelines, indexes, and table of contents.

RULES AND DISCOURSES

At the moment, design still exists in-between disciplines, as an ancillary activity. Figure 28 illustrates the slippery foundation of design as a discipline. This is not to be regarded as a deficiency on the part of design. Neither should it be attributed to a legacy of a past in which design may have been seen as an auxiliary practice carried on in the context of other disciplines.[51] Rather, it should be seen as part of an inflexible institutional framework that refuses to accept design for what it is.

The current situation creates a precarious state of affairs for the practitioner, especially when s/he is working in collaborative environments with more established disciplines, and in situations where the work that s/he produces becomes embedded into a final product that is shared by all. How is the output of her/his labor recognized, judged, rewarded, implemented?[52] From the part of traditional academic structures new attitudes that recognize diverse forms of knowledge, and the contribution of the different disciplines, are necessary.

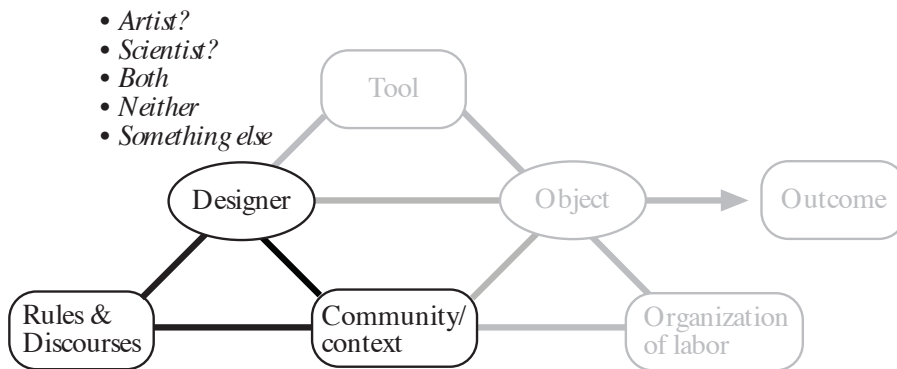


Figure 28: Discursive practices coalesce into rules that influence the identity and place of the designer in the community.

Yet in our contemporary post-industrial society the importance of design has grown, as the discipline becomes involved in the creation of a myriad of artifacts and processes beyond the usual conception of fashion and industrial design artifacts. Dynamic electronic advertisements, self-operating automobiles, intelligent fabrics, computer interfaces, communication networks, computer software and hardware, digital archives, smart domestic appliances, virtual games, to name a few, these are design artifacts of the future that make use of a combination of the material and the intellectual layers of society. In all there is the common thread of their being the product of design efforts. As the use design in the creation of digital products progresses further, there will be more need for understanding of its applications within diverse knowledge frameworks.

COMMUNITY AND CONTEXT

Whether working alone, or as a team member, the designer is also a participant in a community of design. Participation in this community is a collective action that involves learning the codes of communication that are shared by those who are members. These codes are comprised of symbols and labels used to denote and describe the objects of the activity. It is used in the exchange of information about the activity. As the activity unfolds through time, the terms change. For example, in the old days of hand-produced mechanicals, terms such as ‘pick-up’ and ‘scuzz-bag’ were routinely used to indicate some of the instruments used in the cleaning of the surface of the mechanical.[53] These were terms frequently used by the designers as part of the everyday work session in the so-called ‘bullpen.’ In a sense it could be said that the codes act as agents of mediation to further communication between different actors involved in the activity. They come into being and are utilized as part of the process of regulating the flow of activity among different elements. Also, these codes are of a historical and situated nature. For example,

the physical configuration of the 'bullpen' has probably varied so tremendously during the past fifteen years, with the introduction of the different types of computer equipment and related paraphernalia, that it may warrant the creation of a new term to designate it.[54]

The activity of design, however, does not always take place within a permanent community. I use the term *ephemeral community* to define a transitory entity through which labor is organized. In this work the term describes how a community can come into being at different times for the purpose of engaging in an activity that has a projected result as its goal. The term is not indicative of the non-material aspects of virtual communities, though the activities of an ephemeral community can occur in the virtual dimension. Ephemeral communities rely on the use of implicit meanings, and a common context. Their foundations are built on shared memories and past association. Their strength lies in their ability to improvise and expand.

An ephemeral community was brought together in 1996 around the idea of creating a multimedia product based on the material finds of the Raisio archaeological excavations carried on during the years 1994--1996. The community that came together to bring about this project was composed of individuals from a number of different sectors. They brought with them their own methods and tools. There were academics from the humanities and sciences sectors. Many of these were students who had participated in the excavations done in the years 1994--1996 and who were completing their Masters' studies at the Department of Archaeology of the University of Turku. In addition, academic research personnel from the National Board of Antiquities and from the Radio Carbon Dating Institute participated in the project. From the academic design and technology sector, there was the designer who brought in the skills necessary to create the concept and product of a hypermedia archive. This idea was proposed by the designer, as a way to disseminate the research resulting from the excavations. Aside from providing access to information, the designer saw an opportunity to develop knowledge about how to further collaborative endeavors involving the arts and the humanities.

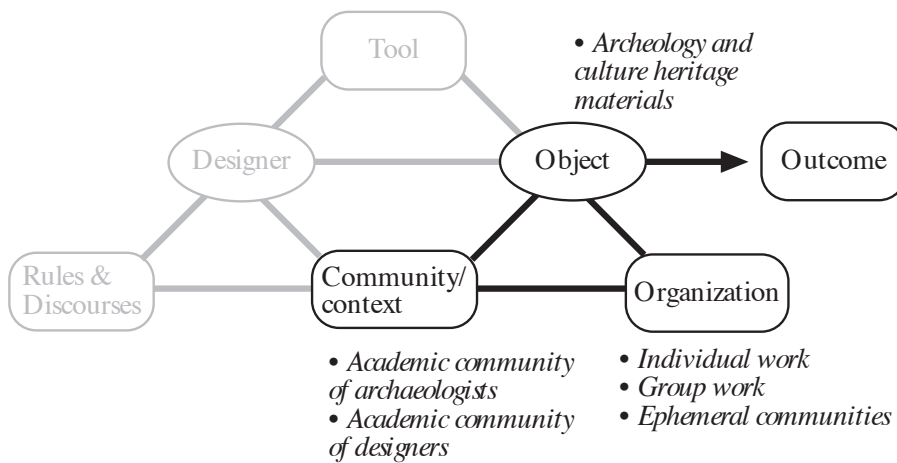


Figure 29: The object mediates between the community and the organization of design activities. Who does what with it and their relationship with it is determined by their position in the community as well as by the organization of labor.

In addition to the academic component, there was an active participation from Raisio City Hall. This is the government entity in charge of the land where Mulli, and related archaeological sites excavated by the students, are located. This municipality’s involvement came from personnel involved in the culture and education offices, and also from professionals in areas such as the Land and Survey Engineering departments in the city of Raisio. For them, the archive, with its emphasis on archaeological and historical material artifacts, is a platform that can be used to create educational materials that teach audiences about the history of their region.[55]

Ephemeral communities, can be an invaluable asset in a multidisciplinary project: they are instrumental in being able to create the type of shared context that is necessary to support a collaborative endeavor of this nature. Like the ephemeral communication devices mentioned earlier, their existence is short-lived and transitory. Although ephemeral communities can constitute themselves as tangible, physical, entities, they are not like virtual communities that have a persistent agency residing in the immaterial, electronic realm. Ephemeral communities can be thought of as emergent entities brought forth as part of the effort of planning and producing a design object. Their existence may be contingent on the execution of a given task. At a given point in time, they might rise to the topmost level of activity, only to recede, or vanish, once the assignment has been completed.

We must consider that to be perceived as information, artifacts must exist in a context. We know what noise is in the context of what silence is. Within the present reality of multiculturalism,

creating contexts that can be shared, are of relevance, and can be understood by all parties involved, is a challenging proposition. Information, knowledge and context, are not only a matter of abstractions that exist in the mind. They are the result of embodied interaction unfolding through time:

We lack a good relational language here. There is a permanent tension between the formal and the empirical, the local and the situated, and attempts to represent information across localities. It is this tension itself which is under-explored and under-theorized. It is not just a set of interesting metaphysical observations. It can become a pragmatic unit of analysis. How can something be simultaneously concrete and abstract?[56]

Context has been cited as the most significant characteristic of archival materials.[57] Archives exist as proof of human activity. Archives are also artifacts of information. The contents of an archive are closely bound with the activities of those who produce them, and in a sense, Community is implicit in the notion of the archive, with its emphasis on the principle of provenance.[58]

Context is also the arena where knowledge is framed, that is, gathered together. It can, and has been, examined as that which occurs outside a system of activity, but which nevertheless influences the system.[59] Thinking in terms of context can force one to consider new ways of developing activity systems. Michael Cole has illustrated how this can occur through the metaphor of garden-as-culture:

Broadly speaking, like the gardeners, activity theorists must attend simultaneously to two classes of concerns: what transpires inside the activity system (“garden”) they study (or design and study) and what transpires around it.... Gardens do not, obviously, exist independently of the larger ecological system within which they are embedded.[60]

Aside from a unit of activity, an ephemeral community can also be seen as a tool that can be used to create the shared context that is, many times, necessary for collaboration. Some negative aspects about working with ephemeral communities are that it is easy to lose continuity as new members rotate in and out. In addition, it may be difficult to remain motivated and thereby lose focus on objectives after periods of inactivity, or as new projects come into being in the member’s primary field of activity. Also, an instrumental use of community as a whole requires a sense of ethics as well as sensitivity on the part of the designer, or the artist. There must exist a sense of trust, a willingness to participate and adjust from all collaborators. Also, the activities

necessary to carry out the project have to be mapped very carefully. Ideally, they should resemble, or even concur, with activities that they are already engaged with, as part of their regular everyday work schedule.

ORGANIZATION OF LABOR

The designer can work as a staff member in a corporation. The formal, and often hierarchical, structure of the corporation will have an effect on the amount of control that the designer has on the diverse tasks of design.[61] Designers can also work as members of a team in interdisciplinary projects. In this type of project, the activity of design has many levels and components. For example, in information design of digital network environments, such as the WWW, the designer might work as a type of translator that transfers knowledge from one domain to another. In this capacity s/he uses her/his tools and methods to ensure that a proper cognitive entrance is afforded to the audience for whom materials about a particular content (or subject matter) have been collected.[62] As a translator her/his task is also to bring out the essence of the content from within the confines of the specific discipline in which it is formulated. In doing so, the designer effects a transformation from one context to another. This is a strategy used by the designer in the cases where the content is the product of diverse minds, using different methods, and working in diverse disciplines:

These are empirical or second generation methods. They assist designers in collaborating and being creative: brain storming, synectics and the use of tables and checklists as aids rather than rigid procedures.[63]

The activities of the designer can occur as solo work. They can be independent projects whose realization requires the use of the designer's abilities and skills. It is also possible for the designer to operate as a single entity within a large collaborative effort. In this type of situation, the way in which the activity unfolds might vary depending on the organization of the labor, the nature of the institutions, and the position from which the designer operates. The communication and exchange of information with the members of a given community, for example, is likely to vary depending on whether the designer is working within a company with a tight hierarchical organization, as an independent freelance designer with a set of clients, or whether s/he practices mostly as an educator within the realm of academia. Still, in all of these situations, the participation of the designer involves a process of naturalization. This process of naturalization can create a situation whereby the contingency of the categories and the codes of communication are so familiar that they become transparent, or invisible, to those within a community. In this situation, the freelance designer who frequently does projects, or works, for a given company

may no longer be thought of as a freelance designer. Indeed s/he may be thought of as another member of the community.

SUMMARY

Like art, the activity of design can also be analyzed, at a meta-level, with the help of models borrowed from Activity Theory. Design can benefit from the conceptual and linguistic repertoire of the theory. For example, often we are unable to directly penetrate patterns that many times are naturalized, transparent, or subconscious. Concepts such as mediation can provide the deflected point of view needed to approach an understanding of how it is that others understand things.

The significance of the approach afforded through Activity Theory may reside in the possibility to observe not only the diverse aspects of the activity but also, the instruments of the practice and how they are constituted. Collaborative design occurs as part of a dialogue. The tools used by designers in this endeavor help to foster this condition.

As a tool for collaborative design, Activity Theory can be used to examine how the objects resulting from each activity differ. One can look at how the components of the activity—the Rules, Community and, Organization—vary across domains. Subsequent analysis of these variations can help to understand how factors such as ideology, social organization, and economics influence the object produced. Furthermore, by studying the tools used by different communities working together, one can gain an appreciation of their differences, how and why these may have developed, as well as their similarities. How do archaeologists, designers, and artists make use of visual representation in their practices? What is the difference between the drawings of the artist, the designer and the archaeologist? As a tool for collaborative design, the contribution of Activity Theory may reside in its ability to help us understand motivations behind action—what the actor is trying to achieve—and how they vary from one discipline to another. It can also help us to discern better how the different components of the activity influence the final outcome.

Notes to chapter six:

1. H. Simon, *The Sciences of the Artificial*, 3rd edition (Cambridge, Mass.: The MIT Press, 1996). On p. 9 Simon writes: “Description of an artifice in terms of its organization and functioning—its interface between inner and outer environments—is a major objective of invention and design activity.”

2. A. Findeli, "Will Design Ever Become a Science?" in No Guru, No Method: Conference Proceedings, P. Strandman, ed. (Helsinki: University of Art and Design/UIAH, Helsinki, 1998), 66.
3. In this sense design is instrumental in a way that art can never be.
4. G. Bowker and S. L. Star, Sorting Things Out: Classification and its Consequences (Cambridge, Mass.: The MIT Press, 1999), 290.
5. M. Heidegger, "The Question Concerning Technology," in Basic Writings, D. F. Krell, ed. (London: Routledge, 1993), 313.
6. *Ibid.*, 319.
7. Classicists and historians of art use the technical term *Ekephrasis* to indicate a verbal description of a work of art, or of a scene, as rendered in a work of art.
8. E. M. Segal, "Archaeology and Cognitive Science," in The Ancient Mind: Elements of Cognitive Archaeology, C. Renfrew and E. B. W. Zubrow, eds. (Cambridge: Cambridge University Press, 1994), 22–28. This article presents a hypothesis on the role of goal-directed behavior in the creation of ancient tools in prehistory.
9. B. Schneiderman, "Direct Manipulation: A Step beyond Programming Languages," in IEEE Computer, Vol. 16, No. 8, as cited in M. McCullough's Abstracting Craft, The Practiced Digital Hand, (Cambridge, Mass.: The MIT Press, 1996), 23–29.
10. "A MUD (Multiple User Dimension, Multiple User Dungeon, or Multiple User Dialogue) is a computer program which users can log into and explore. Each user takes control of a computerized persona/avatar/incarnation/ character. You can walk around, chat with other characters, explore dangerous monster-infested areas, solve puzzles, and even create your very own rooms, descriptions and items." <http://www.lysator.liu.se/mud/faq/faq1.html> (February 8, 2002), "MOOs are internet accessible, text mediated virtual environments..." <http://www.itp.berkeley.edu/~thorne/MOO.html> (February 8, 2002).
11. S. Singhal and M. Zyda, Networked Virtual Environments: Design and Implementation (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1999), 1–18.

12. P. Galle "Design as intentional action: A Conceptual Analysis," Design Studies, Vol. 20, No. 1 (January 1999): 58.
13. E. Manzini, The Material of Invention: Materials and Design (Cambridge, Mass.: The MIT press, 1986), 52.
14. For more information about the CIMI profile the reader is referred to the web site of the CIMI consortium:
http://www.cimi.org/old_site/documents/_ProfileRevisedHTML_/profile.htm#1 (February 23, 2001). It is expected that different users will utilize the capabilities of the profile differently.
15. P. Greenhalgh, "The History of Craft," in The Culture of Craft, P. Dormer, ed. (Manchester: Manchester University Press, 1997), 39. This point, with respect to the design object, was also brought to my attention by Prof. Kari Kuutti.
16. L. J. Bannon, "From Human Factors to Human Actors: The Role of Psychology and Human-Computer Interaction Studies in Systems Design," as cited in K. Kuutti, "Activity Theory as a Potential Framework for Human-Computer Interaction Research," in Context and Consciousness: Activity Theory and Human-Computer Interaction, B. Nardi, ed. (Cambridge, Mass.: The MIT Press, 1996), 22.
17. R. Coyne and A. Snodgrass, "Problem Setting Within Prevalent Metaphors of Design," Design Issues, Vol. 11, No. 2 (Summer 1995), 38.
18. K. Henderson, On line and On Paper: Visual Representations, Visual Culture, and Computer Graphics in Design Engineering, (Cambridge, Mass.: The MIT Press, 1999), 33. In the context of design engineering Henderson, for example, says: "...designers join in the immutable information of drawings at centers of calculation and collect them into increasing iterations and sets of drawings, in order to hold pieces of information in the absence of the thing itself."
19. See Galle.
20. E. Svenonius, The Intellectual Foundation of Knowledge Organization (Cambridge, Mass.: The MIT Press, 2000), 31. Ontology has been described as the science of being. It is a way of characterizing the world through language, and a tool for description that can be used to define the parameters, as well as the artifacts, that populate a given domain of knowledge.

21. P. Louridas, "Design as Bricolage: Anthropology Meets Design Thinking," Design Studies, Vol. 20, No. 6 (November 1999): 530.
22. E. Ferguson, "The Mind's Eye: Nonverbal Thought in Technology," Science, Vol. 197, No. 4306 (August 1977): 833.
23. R. Arnheim, "Sketching and the Psychology of Design," in The Idea of Design: A Design Issues Reader, V. Margolin and R. Buchanan, eds. (Cambridge, Mass.: The MIT Press, 1996), 73. For a more in-depth treatment of the subject, see idem, The Art of Visual Perception, A Psychology of the Creative Eye, The New Version (Berkeley and Los Angeles: University of California Press, 1974).
24. Coyne and Snodgrass, 39.
25. Galle, 57–81.
26. B. Laurel, Computers as Theater, (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1993).
27. Ibid., 42.
28. K. Krippendorff, "Product Semantics: A Triangulation and Four Design Theories," Proceedings from the Product Semantics Conference in 1989, S. Väkevä, ed. (Helsinki: University of Art and Design Helsinki/UIAH, 1990), 17.
29. Henderson, 6.
30. Ibid., 54.
31. Ibid., 33.
32. C. Ware, Information Visualization: Perception for Design (San Francisco: Morgan Kaufmann Publishers, 2000), 10. Ware emphasizes the role of convention in diagrammatic representation.

33. J. Mountford, "Tools and techniques for Creative Design," in The Art of Human-Computer Interface Design, B. Laurel, ed. (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1990), 23.

34. J. M. Carroll, "Introduction: The Scenario Perspective on System Development," in Scenario-Based Design: Envisioning Work and Technology in System Development, J. M. Carroll, ed. (New York: John Wiley & Sons, Inc., 1995).

35. Kuutti, K., "Work-Processes: Scenarios as a Preliminary Vocabulary," in Scenario-Based Design: Envisioning Work and Technology in System Development, *op. cit.*, 21–22.

36. Ibid.

37. See Carroll, "Introduction: The Scenario Perspective on System Development."

38. J. R. Brown, "Thought Experiments Since the Scientific Revolution," in International Studies in the Philosophy of Science, Vol. 1 (Routledge, 1986); and W. Sellars, "Scientific Realism or Irealistic Instrumentalism," Boston Studies in the Philosophy of Science Vol. 2, R. Cohen and M. Wartofsky, eds. (1965), 171–204, in N. Nersessian, "How Do Scientists Think? Capturing the Dynamics of Conceptual Change in Science," in Diagrammatic Reasoning: Cognitive and Computational Perspectives, J. Glasgow, H. N. Narayanan, and B. Chandrasekaran, eds. (Menlo Park, Calif.: The AAAI Press, 1995), 137–182.

39. N. Nersessian, "How Do Scientists Think?" 137–182. This essay provides a cognitive-historical account of different analogic reasoning tools used by scientists, with historical examples of their use.

40. E. Manzini, "Prometheus of the Everyday: The Ecology of the Artificial and the Designer's Responsibility," as cited in A. Findeli's "Ethics, Aesthetics and Design," Design Issues, Vol. 10, No. 2 (Summer 1994), 58.

41. Findeli, 58.

42. Manzini, The Material of Invention, 54.

43. Krippendorff, ed., “New Design Principles,” Design in the Age of Information: A Report to the National Science Foundation (NFS), Design Research Laboratory, North Carolina State University, 1997, 31.

44. A. N. Leontjev, Activity, Consciousness and Personality (Englewood Cliffs, N.J.: Prentice Hall Inc., 1978), 51. Leontjev’s concept of motivation is being used to refer to “...the fact that in society a man finds not simply the external conditions to which he must accommodate his activity, but that these same social conditions carry in themselves motives and goals of his activity, his means and methods; in a word, society produces the activity of the individuals forming it.”

45. G. Button, “The Ehtnographic Tradition and Design,” Design Studies, Vol. 21, No. 4 (July 2000). This essay is a review of the uses of ethnography in engineering and systems design.

46. See the Mulli classification for examples of ancillary disciplines:
<http://www.mlab.uiah.fi/cgi-bin/mulli/classification/english/tree.pl>

47. Svenonius, 31.

48. U. Athavankar, “Categorization... Natural Language and Design,” Design Issues, Vol. V, No. 2 (Spring 1989).

49. Laurel, 1–33. This chapter contains a thorough discussion on the subject matter and its relation to representation.

50. J.-L. Gasseé, “The Evolution of Thinking Tools,” in The Art of Human-Computer Interface Design, B. Laurel, ed. (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1990), 227.

51. K. Friedman, “Theory and Imagination in Design,” in Useful and Critical: The Position of Research in Design, Proceedings from the International Conference, University of Art and Design Helsinki/UIAH, 1999. Friedman states that “the field of design has hitherto been an adjunct to art and craft,” 5. He proposes that for design to become accepted as a scientific discipline, it must develop a body of theoretical knowledge.

52. Findeli, “Will Design Ever Become a Science?” Findeli, for example, refers to an editorial of the British Journal Design Studies, in which the editor, Nigel Cross, points out the

fact that “...certain North American colleagues, all design teachers, have seen their application for tenure refused under the pretext that research in design lacked the rigor or relevance,” 64.

53. The mechanical is a term used by designers to indicate the layout. A pick-up is a square-shaped rubber instrument used to gather the remnants of cement from the surface of the mechanical. A scuzz-bag is a small pillow-shaped contraption containing pulverized eraser and used to clean leftover pencil marks from the surface of vellum plates. The bullpen is the common area in a design studio where most of the actual production work occurs. It is part of the apprenticeship of a professional designer to do time in a bullpen learning the necessary production skills.

54. Instead of the usually open space with drafting tables, it is possible that contemporary design spaces resemble more and more a traditional office space.

55. Jari Näränen, personal communication (April 2, 2001). (See Appendix 3.)

56. Bowker Star, 291.

57. M. J. Fox and P. Wilkerson, Introduction to Archival Organization and Description, S. Warren, ed. (Los Angeles: Getty Information Institute, 1998), 7.

58. Fox and Wilkerson, 6: Respect des fonds, or the principle of provenance is the central principle of the archival enterprise, “It is the formal expression of the principle that an archivist must respect, and reflects the origins of the assembled materials as an integral and organized corpus of documentation.”

59. M. Cole, “Cultural psychology: Some general principles and a concrete example,” in Perspectives of Activity Theory, Y. Engström, R. Miettinen, and R.L. Punamäki, eds. (Cambridge: Cambridge University Press, 1999), 87–106.

60. Ibid., 92.

61. R. Buchanan, “Myth and Maturity: Toward a New Order in the Decade of Design,” in The Idea of Design: A Design Issues Reader, V. Margolin and R. Buchanan, eds. (Cambridge, Mass.: The MIT Press, 1996), 76. The essay makes a point to contrast the freedom of the designer who works as an entrepreneurial consultant with the designer, who is absorbed into the design department of a corporation.

62. Krippendorff, “On the Essential Context of Artifacts or on the Proposition that ‘Design is Making Sense’ (of Things),” in The Idea of Design: A Design Issues Reader, V. Margolin and R. Buchanan, eds. (Cambridge, Mass.: The MIT Press, 1996), 174: “Designers create highly individualized patterns in the forms of drawings, sketches, models, descriptions of possible uses, specifications (of materials and production processes needed to enable others)....”

63. Coyne and Snodgrass, 37.

Design in Illuminating History

The Raisio archaeology archive, created in the Illuminating History project, has been designed as an open system that can be modified and used by others as a platform to create other applications. The system integrates art and archaeology. The archive is the result of a strategy of co-design. This means that the archaeologists participated in defining the form as well as the structure of the application. This is apparent in many ways, including how the contents are organized in a manner that is of relevance to different potential audiences. The objective has been to be as inclusive as possible, while at the same time to respect the integrity of the disciplines involved. Although the archaeological materials and the so-called raw data are organized into separate sections within the archive, there are no boundaries that the visitor cannot cross.

DEVELOPMENT OF THE HYPERMEDIA ARCHIVE

From the archival perspective, the Raisio archaeology archive encapsulates the activities between a group of archaeologists and a group of new media artists and designers who worked in the project 1997—2001. It contains the materials recuperated during the excavation, as well as materials that are related geographically to the history of the region and which are now dispersed in diverse archival repositories throughout the country. The archive is not targeted to one particular community or audience, but rather it is meant to operate as a dynamic research site growing incrementally as new information is added. It is available to researchers and the public at large through the World Wide Web. This is in contrast with the more closed nature of so-called canonical knowledge works.

The archive is composed of media artifacts documenting the activities of a group of archaeologists, members from the community of the city of Raisio, and a designer doing her/his doctoral work in new media design. The activities of these individuals were brought together by the desire to collaborate in the creation of a multimedia product. The product would contain culture heritage materials pertaining the history of the region. Many of these artifacts, which are dated within the periods of the late Iron Age (800–1200 A.D.) to the early Middle Ages, were recuperated through the excavations performed by the archaeologists. Other artifacts, such as the religious objects from the church of Raisio, are in the custody of the National Board of Antiquities. The collection in the archive gathers materials from dispersed sources to provide the visitor with a view of the history of the region.

In addition to material culture, the archive also documents interpretations by the archaeologists, regarding aspects of the everyday life. These interpretations are illustrated through a series of reconstructions that were staged by the archaeologists and recorded by the designer, with the help of other students from the Media Lab. In some instances, such as in the workshop documenting

hypothetical techniques used to fire ceramics during the late Iron Age, the photography was done by the archaeologists and converted to digital format by the designer.

The production of the archive comprised three major stages. These stages consisted of an Audit or Information Gathering Stage, a Prototype Development Stage and an Application/Content Development Stage. These phases must not be seen as a series of consecutive steps, but rather, of concurrent activities.

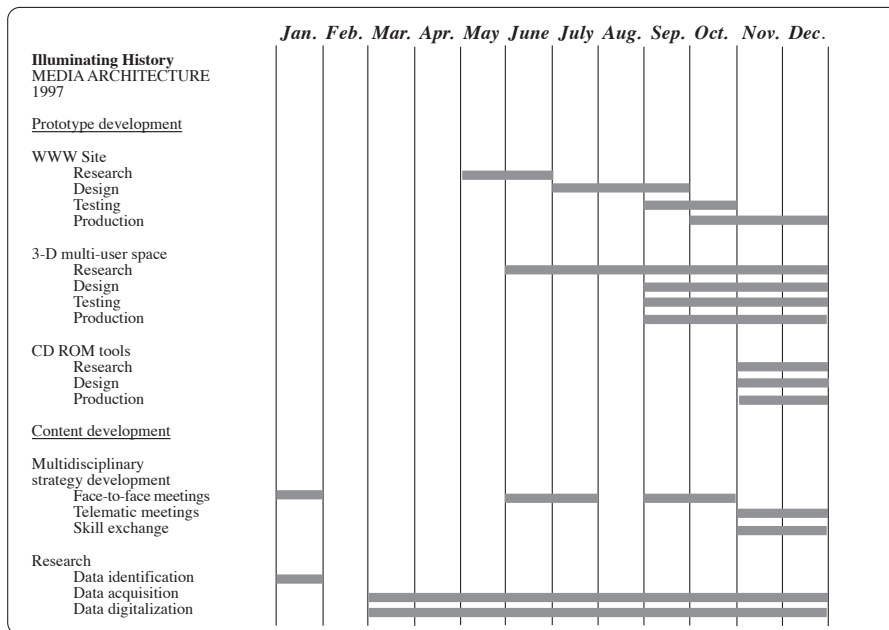


Figure 30: Timeline flowchart reflecting many of the activities during the year 1997.

An ephemeral community gathered around the tasks of creating the archive. The members of this community were situated in distinct physical as well as knowledge-discipline locations. These distances were not beneficial to the collaboration, but rather hindered the development of the work. This was especially the case with respect to developing and maintaining a set of common objectives. Communication was maintained mostly through electronic mail exchanges. This was supplemented with face-to-face meetings. Two major yearly meetings were held every year, one in the spring and one in the winter. These meetings were mostly held at the Media Lab, though on occasion the participants also met at the University of Turku, or in Raisio. The designer was the organizer and facilitator of most of these meetings. The atmosphere was always relaxed and cordial. The agenda of the meeting was usually divided in two parts. During the first part, all the collaborators discussed, not only the status of the project, but also their own related activities. This informal exchange of information followed a more formal status report given by the designer. During this presentation, the designer made use of flowcharts and diagrams to explain the progress and nature of the on-going activities. In addition, a list of attained goals and objectives to be pursued during the next phase was always presented. These were always illustrated by using examples from the application itself, and trying to answer the

questions such as, Where are we? Where do we want to go? In retrospect, these meetings served as catalysts. They also helped to increase the interest and involvement of the participants. It was the case that after these events, new opportunities emerged for the project.

AUDIT, INFORMATION GATHERING

“The initial objective of the project is to establish a common language. Acquisition of this tool can engender a sophisticated, and intellectually rigorous, interdisciplinary cooperation among all parties involved.”[1]

The preparatory stage for the project, which included the period of becoming acquainted with the archaeologists and their subject matter, extended well into the first year of the project. There were several face-to-face meetings during this phase. The agenda for these meetings centered on the research of the MA student in archaeology. Suggestions as to how to develop their topics for inclusion in the project were offered by the professors. In addition, how new media could be used to illustrate their research, was demonstrated to the students from Turku with an experimental sample created with the assistance of Kari-Hans Kommonen, Antti Huitinen and Raimo Lång.

During this phase, the designer also looked for activities that would help to establish a good working relationship and proper channels for communication. A series of activities that would promote an exchange of skills and knowledge, were programmed. Among these activities, there was an introductory workshop on HTML scripting. In addition there were attempts to launch some telematic events. In the opinion of this author, neither the workshop, nor the telematic exchanges, were successful in bringing the two communities closer. This may have been due to a lack of motivation resulting from not having a clear enough idea of the potential benefits. In addition, for the partners in Turku, there was an obvious lack of technological resources and support personnel that restricted their ability to participate in these activities.

Developing a common language

The objective of standardizing the means of communication had been included in the proposal itself, under the rubric of Developing a Common Language. At a very early stage of the project this need to define the codes of communications—the names used for the artifacts—developed into the idea of creating a controlled vocabulary. The reasons for this were manifold. Among these was that archaeology itself is not a monolithic discipline, but exists rather, in a symbiotic state in which it borrows from the knowledge base of other disciplines in the humanities and the sciences. In addition, there were questions related to the future management of the multidisciplinary content, such as that which we were creating. As the system increased in size and complexity, how could we make sure which topics had been covered and in what manner? Additionally there was also the issue

of trying to create a new system that departed from the Outline of Cultural Materials of the Human Relation Area Files.[2] Then there were problems related to information retrieval in open environments such as the World Wide Web, and how to guarantee that the guests of the archive would have access to the resources we were creating. Finally, the requirement of being able to map out the entire contents of the archive emphasized a need for some sort of standardization of the materials themselves.

Description of the classification system created

The first concerted effort in this direction was started in the fall of 1997, when Sirkku Pihlman, Archaeologist and head of Museology at the Department of Cultural Studies at the University of Turku, gave a workshop in Classification. According to Pihlman, the Turku workshop covered:

...issues about the classification of archaeological materials, especially in the context of the Ihala/Mulli research, were reviewed and the terms collected from each of the degree works to be included in the digital archive. These terms were unified and gathered within higher-level terms to create a hierarchical concept system. The higher level terms were later revised to increase the logic and to stabilize the system.[3]

In addition, the designer participated in a workshop given as part of the Interactivity in the Museums Conference on “Issues in Multilingual Terminology: Theory and Practice” given by personnel from the Getty Information Institute. In this workshop, the designer made contact with information specialists from the Getty Institute who later provided her/his, and the Turku partners with literature and information about their own ongoing projects in archival documentation and controlled vocabulary design. The designer also learned about key aspects of the design of classification systems and the problems encountered with translation. This knowledge was also used to create the guidelines for documentation. The guidelines were given to the archaeologists for use when writing the textual materials and narratives in the archive. These specifications helped the archaeologists to structure their narratives. They also helped with the problem of having to write texts intended for an audience of nonspecialists.

The initial sample of the classification created during the workshop held in the fall of 1997 was revised during the summer of 1998. At this point a group gathered to create new templates for the classification and documentation of the materials in the archive. The group, which can be regarded as an ephemeral community, included the designer, a researcher and instructor in archaeology, two archaeology students, and a representative from the office of culture affairs in Raisio. Although the system was developed primarily for use in the Finnish language, an English version, which still requires revision and adjustments, was also created.

New terms have been added to the classification, as the need arises. For example, the receipt of images of religious objects that used to belong to the church of Raisio required a revision and updating of the Religious Artifacts hierarchy. In addition, terms from the discipline of new media, such as Panorama and Digital Video, have been merged into the classification system. From a modest beginning, the classification system grew so that it now includes approximately 435 terms that cover archaeology, anthropology, architecture, art history, design, ethnology, and new media.

In retrospect, the creation of a controlled vocabulary and classification system also provided the opportunity for a joint activity, which was necessary to bring all the collaborators together. The aspects of commonality were probably due to the fact that both designers and archaeologists are accustomed to work with taxonomies. In addition, because it brought to the forefront the issue of content definition, it forced the all participants to focus on defining the boundaries and the scope of the topics to be included in the application.

The classification system: how it works

Information specialists, such as librarians, use facets such as categories of high generality created through the initial partitioning of a subject discipline into units that are semantically cohesive.[4] The starting point for the Raisio Archaeology Archive classification system consists of three major facets that include: Archaeological materials, Interpretation, and Research. The archaeologists proposed the partitioning of the materials into these facets. Facets can provide benefits such as the ability to create groups of terms that are of manageable size. From a formal classification point of view, however, facets can be problematic. There may exist, for example, multifaceted terms that cannot logically be placed in only one facet. This is a problem that exists in the Raisio archive classification. As an archaeologist who worked on the creation of the classification system noted:

I remember it was hoped that no terms would appear two times in different places. I have tried to follow this rule, but it is difficult in some places, because of the homonymic meanings and the structure of the index.[5]

The classification is primarily implemented through the use of keywords, supplied by the students, and content specialists, and inserted as metadata in the header of the HTML files. Visitors of the archive can search the materials in two different ways. First, they can use a free-form search which takes into consideration all words in the HTML files, but which gives more weight to metadata in the headers. This is implemented using Namazu, a full-text search engine licensed under GPL. Second, they can locate material by navigating the classification tree, or hierarchy, that behaves like a normal tree widget. A tree is constructed using the classification text file as input. A click on a keyword lists all the HTML files that contain that keyword as metadata in the header. (See Figure 31.) The implementation uses a combination of Namazu and a custom written Perl program.[6]

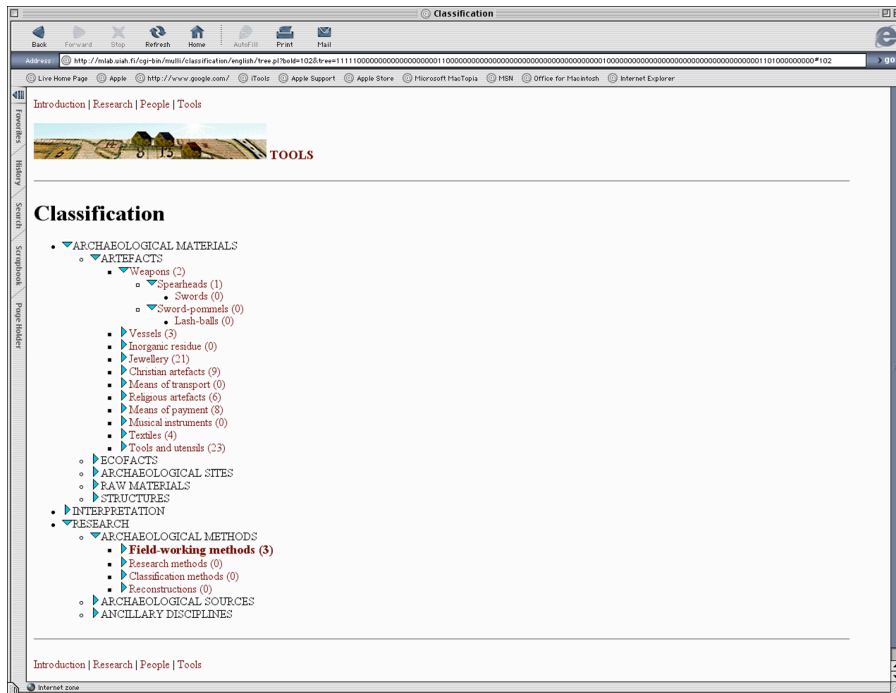


Figure 31: The classification system in the Raisio Archaeology Archive. The system includes approximately 435 terms dealing with the material culture of Finland. The archaeologists developed terms, with the assistance of the designer. The system, which operates in Finnish as well as in English, can be updated as new terms are selected for inclusion.

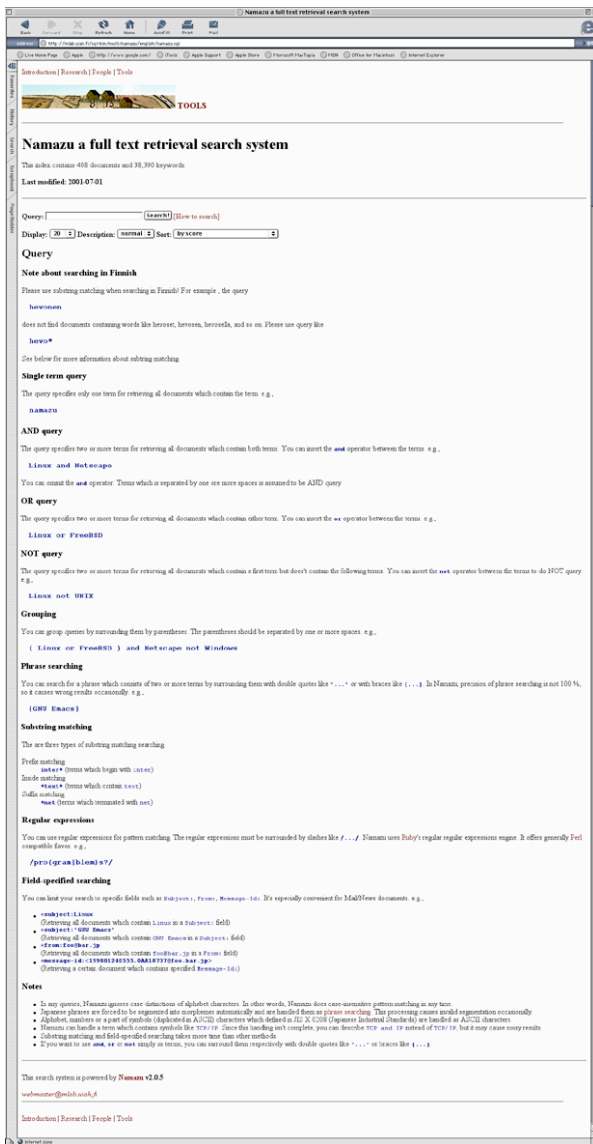


Figure 32: The search facility uses Namazu and allows the guest to search through the materials of the archive in Finnish as well as in English. The search system accommodates free text search, as well as the use of Boolean operators. These later are used in conjunction with the keywords included in the header as metadata.

PROTOTYPE DEVELOPMENT

During this stage a model, in the form of storyboards and a working prototype, were created and presented to the directors of each group. This prototype was further developed to the point where it could be given to the archaeologist for testing. The archaeology students tested the prototype during the last quarter of the year 1997. During this time, they submitted their suggestions for revision, all of which were incorporated into the subsequent versions. The prototype, designed primarily for the Windows PC platform, included working examples of almost all the current

capabilities of the application. In December of 1997, the application was presented for the first time to a public audience during the Media Lab's demo day. However, it was not until January of 1998 that a fully working version of the archive application was available. At this point, work on creating and adding content materials began in earnest. This work continued until December of 1998, when the designer went on maternity leave. This version, created in 1998, was revised during the summer of 1999 and again during the spring of 2001. At this time, a new interface that does not utilize frames, and allows the guest to bookmark the application, was introduced.

APPLICATION DESIGN AND PRODUCTION

The interface

The interface includes the logical organization and behavior of information, the visual presentation of data and functions, as well as the user's interaction with a computer program.[7] The interface is also "the means by which computers and users communicate." [8] User interface design is an area of increasing interest and concern for those involved in the creation of digital resources and applications. Appropriate organization of the contents, easily grasped representation that successfully conveys the key aspects of the system to the user, and efficient navigation schemas that provide consistent movement are some of the key aspects involved in user interface design.[9] Other aspects often cited are: usability, or ease of use, how natural it feels in the everyday context, and functionality, or how well the controls respond to user demands.[10]

The user interface of the archive has been developed for use with Netscape Navigator browser versions 3.0 and above. It is also compatible with Microsoft Internet Explorer 5 browser. This means that a window object operates as the support mechanism for displaying content documents with textual and graphic elements. As can be seen in Figure 33, frames were used in the first versions of the interface. They split the browser window into upper and lower regions containing content documents and the navigation tools, respectively. These frames were removed during the final production phase to standardize behavior, and to make better use of the information retrieval system created.

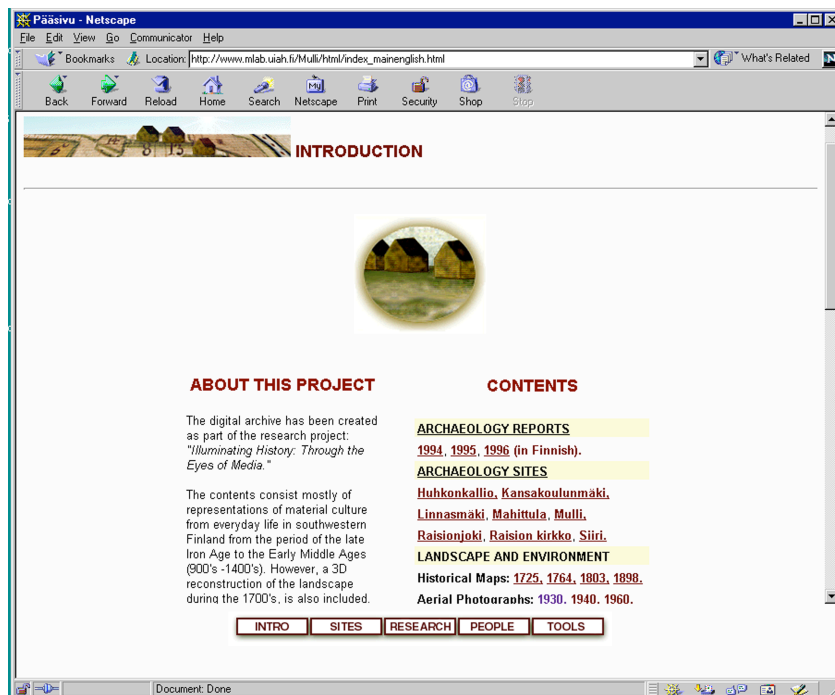


Figure 33: Screen design of first prototype. The initial prototype made use of frames to implement a universal navigation bar.

The screen design for the archive requires a minimum display resolution of 640 X 480 pixels for each document. However, it works best with a 16-bit color display set at 1024 X 768 pixels. Overall, in the Raisio archive, the document is the basic unit for display of information. The documents in the application have been linked together as a hypermedia application using very prosaic, vanilla flavored, HTML 4.0. The visual representation of the document consists of a header, the body and contents of the document, and a footer to provide closure. These areas are indicated visually through the use of a graphic bar that separates the sections. The header section, contains application links that allow for transverse movement within the four main sections of the archive, as well as application links that allow for local, hierarchical movement within the Media Types subsection. It also includes descriptive information, including the location of the document within the hierarchy, which is displayed. The body of the document contains the content materials. These include the media items in the form of photographs, illustrations, videos, and panoramas, as well as their textual documentation.

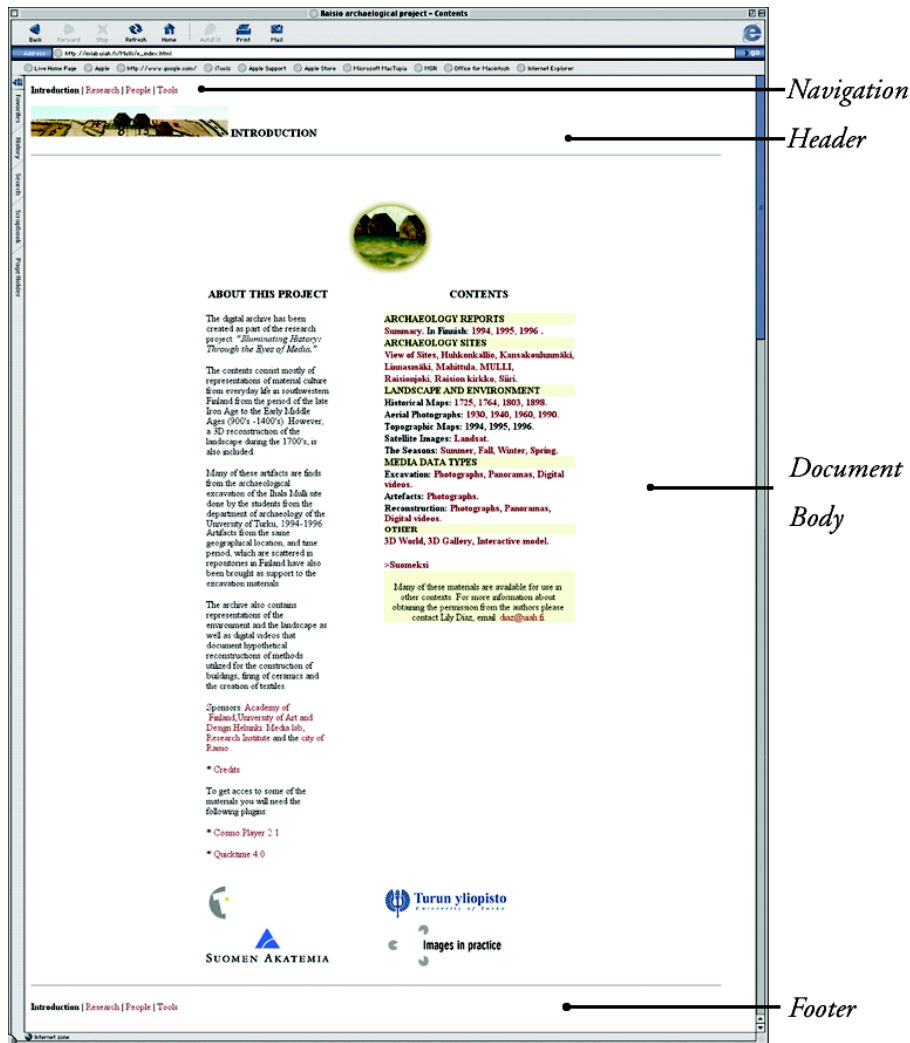


Figure 34: The Introduction/Contents screen, in the form of an inventory register, demonstrates the current interface design of the archive.

Navigation through the archive is enabled through the use of two basic tools. These are the general navigation tools that allow for browsing, such as forward, back, and home, and application links that are specific to the contents of the archive. The archive uses the standard navigation tools provided by the browser. These reflect the inherently hierarchic structure of the browser model. Application links, on the other hand, serve the purpose of extending the scope and meaning of the contents of a document. Garzotto has described application links as reflecting semantic relationships between the different sections and documents in the application:[11]

An author deploys an application link, to give readers access to information whose relevance depends on insight in the topic area, rather than merely on the structure of an entity.[12]

Application links can also launch other applications, such as is the case with the search facility.

This same structure is reflected in the internal disposition of the hypertext document where the so-called “header” of the document contains the information regarding metadata and style sheets. This organizing has the effect of separating descriptive data from the contents of the document itself. In the case of the present work, metadata tags are utilized to provide the author and the designer's name, and keywords for each document. Keywords, selected by the archaeologists using the classification, were also input as part of the metadata. It is through the use of these keywords as metadata that the search facility is implemented. In addition, to the metadata tags, the header section of the document also contains a reference to a global CSS style sheet that is used to maintain a uniform graphical representation of each document.

	Windows PC	Mac	Unix	File Format
Text	✓	✓	✓	• html (HTML 4.0)
Photos	✓	✓	✓	• JPG
Panoramas	✓	✓		• Mov (Quicktime 4.0)
Video	✓	✓		• Mov (Quicktime 4.0)
2D Graphics	✓	✓	✓	• JPG • PNG • GIF
3D Graphics	(1) ✓	(2) ✓	(3) ✓	• WRL (VRML 2.0)

(1) *Cosmo Player 2.1, Cortona parallel plugins,*
 (2) *Maclookat 0.96 plugin,*
 (3) *Cosmo player 2.0 plugin.*

Figure 35: Interoperability of application components.

Metadata is a lively topic of discussion in the virtual heritage community, who see in it a potential for creating better descriptive aids and cross-platform search retrieval strategies. The current work also makes use of metadata resources. The documentation created for each of the media types, for example, is compliant with the Dublin Core specifications for metadata. Provisions, such as these, will help to ensure that future developments can take advantage of compatibility with evolving standards such as the CIMI Z39.50.

Content development and organization

The identification and data acquisition of the content materials in the archive was a process that involved the archaeologists and the designer. Professor Jussi-Pekka Taavitsainen, for example, was

instrumental in identifying a wide variety of activities, such as the reconstruction workshops that could involve both parties in the production of media artifacts. In addition, the archaeology students selected most of the items contained in the Media artifacts section. The recording of the historical cartography, as well as the aerial photographs and the panoramas of the seasons occurred at the suggestion of the designer.

The contents materials in the project were organized following documentation approaches borrowed from an archival tradition that emphasizes the provenance, and origins, of the archival record. From this point of view, the activities of individuals and institutions constitute the genesis, or point of origin, of all materials in an archive. The Principle of Provenance mandates that the organization of materials in an archive must reflect the original order and context in which they were created. The first place where this strategy of documentation becomes evident is in the overall organization of the materials in the archive. These have been divided into four main sections consisting of: Contents, Research, People, and Other. These sections can be thought of as placeholders that define an area. They are meant to expand, as more materials are placed in the archive.

Introduction and contents section of the archive

All the materials that were created either as a result of the excavation, or specifically in the tasks of assembling the archive are included in the Contents section. This section is accessible by clicking on the button labeled as Introduction. The layout for this section has been designed as a type of archival inventory register. (See Figures 33 and 34.) An archival inventory is a tool used by archivists for the organization of records:

The archival inventory is another tool that allows archivists to deal with the quantity as well as the complex organization of archival records... Structurally, inventories often consist of two parts: an expanded description of the entire corpus of the materials being described ... and a detailed list of the subordinate components of that unit. The latter usually takes the form of a contained list that provides an outline of the organizational and intellectual structure of the materials....[13]

Figure 34 provides a description of the different elements in the Contents screen of the application. As can be seen from this illustration, on the left side of the browser window, there is an expanded description in the form of a narrative that explains what materials are included, the parties that were involved in the collaboration, as well as the names and links to the institutions that funded the project. On the right side of the window there are container lists for the categories of Archaeology Reports, Sites, Land and Environment, Media Types, and Other. The materials in each of these lists are of a different nature and this is reflected in the categories.

Archaeology reports

The Archaeology Report's subsection contains materials gathered by the archaeologists throughout the course of the excavation. They are specialized documents that may be of more relevance to an audience interested in the practice of archaeology in Finland. Consequently, only the summary of the contents of these documents has been translated into English.

Sites

The Sites subsection provides an overview of the network of archaeological sites within the municipality of Raisio. A "clickable" map, in the form of an aerial photograph, allows the guest to visit these sites. Documentation in the form of a narrative intended for a general public and created by the archaeologists introduces the guest to the history of the region. Associative links to other sections of the archive extend the information included in these narratives.

Land and Environment

The Land and Environment subsection contains Historical Maps of the region, dating back to the 18th century. These maps are also complemented with documentation written by archaeologist Sami Raninen. In addition to the maps, there are also Aerial Photographs that document the changes in

the region from the 1930's to the present. The shift from an agrarian-based to an industrial economy is clearly visible in these images. One Landsat Satellite image, dating to 1994, is also included.

The Seasons

In the Seasons subsection, there are contemporary renditions of the landscape of these sites throughout the different times of the year. These illustrations have been rendered in the form of interactive panoramas. The photography and processing necessary to create these panoramas was done throughout the years 1996–2000. The panoramas contain documentary narratives, created by the archaeologists, about the activities of the inhabitants of the region during the period of the late Iron Age to the early Middle Ages. Iconic displays embedded in the panoramas assist the viewer in navigation.

Media Types

The Media Types subsection contains the digital representation of material culture objects that were recuperated as a result of the excavation on the Mulli site. The objects have been grouped according to provenance. Excavation and Reconstruction, for example, include all the media artifacts created by the archaeologists, the designer, and other media personnel, throughout the course of these activities. In addition, other material culture resulting from prior research and excavations, in the Archaeological Sites listed, has been included. These have been gathered in the Artifacts group. Emphasis has been placed on clarifying how these items have already gone through a process of cleaning and restoration. In addition, the manner in which they have been recorded—which includes the controlled lighting of a studio setup—has been noted.

Other

This subsection contains a 3D representation of the landscape in 1725. As was discussed earlier, this model consists of an adaptation of current data from a 3D model used by the Raisio City Hall geography department. Figure 22 indicates the different types of data and literary sources that were used to create the structures in this 3D representation. It is the author's desire to be able to dedicate more time in the future to the refinement and expansion of this section.

The overall organization of the Introduction section and the Content screen is also the result of several iterations and revisions. Feedback from the archaeologists indicated that the cognitive load in terms of the type and amounts of material presented on the screen, in conjunction with the number of clicks, affected their perception of the efficiency of the design. From earlier schemas that used many levels, it has been simplified so as to include a flat hierarchy that, in general, contains two levels. (Visitors have to negotiate three levels of navigation only in the Media Type section.) The design has been changed with each subsequent version, resulting in improvements, and yet even more suggestions. The goal has not been to adhere to any particular paradigm, but rather, to find a practical and comprehensive expression for the structure.

The Research section of the archive

The Research section is the space reserved for inclusion of materials resulting from research activities that make use of the materials in the Introduction and Contents section of the archive. Although this section was primarily created to hold the MA works of students in archaeology, presently there are only sample narratives that demonstrate how research can make use of the these materials. For example, an essay on the topic of Treasure Finds from Raisio, written by researcher Tuukka Talvio from the National Board of Antiquities, makes use of the coin photographs in the artifacts section. Another essay by archaeologist Sami Raninen on the topic of the History of the Hamlet of Ihala, makes extensive use of the historic cartography in the Land and Environment section. His essay focuses on how changes in the political and social systems are reflected in the configuration of the landscape that is recorded in the historical maps.

The People section

This section was created to include the names, e-mail addresses, and web-page links of the different people who have worked in the creation of the application, as well as those who will hopefully will be involved in the future. Presently this section only includes the names of those who have been involved in the project from the beginning.

The Tools section

The instruments that have been created to facilitate and extend the use of the application are included in this section. These include a Search facility that allows for free text search of the application. There is also an index in the form of a Classification system. The Classification operates as a filter showing the guest a set of selected terms that can be used as point from which to navigate through the materials in the archive. In addition, there is also a 3D Gallery that allows the guests to select from items from the Media Type section of the archive and curate their own gallery show. The selections are displayed in a 3D structure designed to resemble a gallery. The guest can navigate this structure and examine the exhibition. Clicking on the images on the wall of the gallery will display the Web document of the item on display. These shows created by visitors can be saved to an .HTML file for further annotation and display. In addition, a Web site map that offers “sample tours” or guided paths, through the archive have been included. The Web site map is also a visual aid that summarizes the overall contents of the archive. Lastly, by allowing the guest to create bookmarks, the application offers the possibility of collecting “points of interest” that can be revisited.

METAPHORS AND DESIGN

The use of metaphors in design has been a subject of study by scholars from diverse disciplines. The philosopher Max Black elaborated what he called an interaction view of metaphor, in which he proposed that, a metaphorical statement has two distinct subjects, a principal subject and a subsidiary one. Subjects should be considered as systems of things. A metaphor works by applying to the principal subject a system of associated implication that is characteristic of the subsidiary subject. A metaphor selects, highlights, obscures and organizes features of the principal subject by suggesting statements about it that normally apply to the subsidiary subject. Black proposes that because they highlight particular interpretations of a shared context, metaphors act as filters. In a sense, metaphor takes a context that is implicit and naturalized and brings it to the foreground.

From the point of view of design, Laurel has focused on the application of this rhetorical device as a cognitive mediator between the world of computers and that of theatrical representation.

Rhetoric has been defined as a theory of discourse concerned with the design and production of communication devices, with the intent of persuading and convincing an audience:

Rhetoric foregrounds the relationship between author and audience: the act, circumstances, technology and techniques of communication. For Aristotle, rhetoric is the art, skill, or faculty of establishing the possible means of persuasion with reference to any subject matter.[14]

In Laurel's vision, the metaphor of Computers as Theater can be an effective tool that allows us to better conceptualize human-computer interaction. In seeking to design human-computer interaction, we are actually designing behavior and its representation. This is best done, according to Laurel, by following a narrative approach, or strategy. The metaphor of the theater is effective because in both domains of theater and computers, one has the overarching objective of how to represent action with multiple agents. Also, the theater suggests a model for human-computer activity that is recognizable, inclusive, as well as evocative.[15]

In the fields of linguistics and philosophy, the work of George Lakoff and Mark Johnson has been influential in demonstrating how metaphors operate as conceptual systems that structure our understanding. Every metaphor has a source domain, a target domain, and a source-to-target domain grouping. The source domain is the one in which the metaphor originates and which can be understood independently of the metaphor itself.[16] In the case of illumination, for example, we have a situation where the device is both a source domain and a metaphor. As a source domain, the act of illumination is directly understood, since our basic perception of light structures our apprehension of space, of forms in space, and our understanding of the relationships between these. At the same time, illumination can operate as a metaphor as when we speak of "bringing to light," or "in the light of..."

Lakoff and Johnson propose that because metaphors are motivated by the structure of our experience, they also have an effect on how we apprehend our everyday reality. According to Lakoff and Johnson, the study of metaphors can yield rich information about how the human mind and body are active participants in the process of constructing reality. In the case of illumination, one could argue that there is a structural correlation in our everyday experience that motivates the details of its metaphorical mapping. Overall, the more light there is, the more that is revealed of a given scene, and with different types of light, we will perceive different relationships among the objects in a given scene.

Metaphors are also of prime importance to design. For one, as has been suggested, to a large extent, the activity of design is about creating design representations.[17] Metaphors are one of

the tools that designers utilize to create such representations. Because of the immaterial nature of the object, in the domain of information technology, metaphors seem to extend beyond representation: They become the artifact itself. In a sense the current state of affairs in the area of interface design is one where familiar metaphors such as desktops, or windows are used to provide behavioral and contextual cues about the activities supported.[18]

From a design perspective, Richard Coyne and Adrian Snodgrass propose that metaphors, such as design as decision-making, design as state space search, or design and analysis and synthesis, can be used as part of the process of designing, to help describe, or represent the problem of space. At the same time, they point out how metaphors can also obscure. In how they frame the problem, metaphors can also become part of the problem. Because they inform the way the problems are approached, metaphors can obscure the real reasons for a problem. In many instances, it could also be that the so-called problems are created by the metaphor itself. The metaphor of Design as Information Processing, for example, can lead to a definition of a particular problem as that of accurately communicating information from the designer to a manufacturer. Such an emphasis on accuracy in communication can obscure the more pressing matter of understanding as it relates to experience and context. As a practice that involves the use of communication, design may be best characterized as a process of enabling. Accuracy of information is not necessarily a matter of right or wrong, good or bad, but rather of facilitation.

The metaphor of illumination

The project *Illuminating History* makes use of the metaphor of illumination in other ways as well. The first and most obvious, which has already been mentioned, is how, in sections of the application, the screen design makes use of icons and decorated initials in a manner that may be similar to how we think an illuminated manuscript might have functioned. Accessing a 3D space through the illuminated letters of a 2D document page can suggest a certain amount of immersion in the experience of reading. Icons have also been placed to identify the introductory documents as entry points to the four major sections of the application: Introduction and Contents, Research, People, and Tools. These icons are also meant to provide an element of playfulness and discovery. For example, by pressing on the icon in the Summary page for the Archaeology Reports, the guest will be transported to an interactive panorama of the excavation. In this page, the documentation describes general aspects of the excavation itself. Scrolling through this panorama, the guest can find hot spots that trigger video interviews with the archaeologists, created at the time of the excavation. The intended effect here is to bring the audience closer to the archaeologists and their work. At the same time, there is a desire to highlight the continual human presence, in the same locality, through the ages.

With respect to information technology, however, one could also make use of illumination as the source domain that can enable metaphoric descriptions of topologies, as well as objects. In a three dimensional Cartesian space, information objects can exist in different planes. In these spaces, information objects can be projected in different planes, such as in the foreground or in the background. The position, as well as the configuration, can be described in different levels of detail. Illumination sources, for example, can be designed as information filters. These can be defined independently, and according to diverse parameters. We can speak, therefore, of degrees of color of the illumination source, with respect to the information objects being illuminated.

An important aspect to consider is that there is nothing ethereal in the use of illumination.[19] As a technique for representation, illumination involves the gradual increase or decrease of some perceptual quality in time.[20] In the context of this project, the use of the term illuminating evolved from a conversation in which the term was used to refer to the tasks at hand, as in the use of media to illumine history.[21] History works with traces that are present in the form of documents, monuments, or alterations in the landscape. Through his/her practice, the historian transforms these remnants of the past into a meaningful experience that can be understood by contemporary audiences. In order to do this, the historian creates narratives that tell a story. The realization that the narrative of history varies from audience to audience led to the idea of creating a platform that provided resources that allows others to tell stories.

SUMMARY

In designing objects through collaborative efforts, Activity Theory can assist us in defining the space and processes involved in collaboration. This information is important if—like in the Illuminating History project—the objective is to realize a polysemous object that can be used by different communities. In collaborative design, Activity Theory can be useful in examining the changing world of practices. By revealing how activities change, for example, we can begin to understand how the objects resulting as outcome of the activity change. Also by working with the category of context, designers involved in collaborations can also learn about how meaning is embedded differently in the objects, products and practices of diverse communities.

Notes to chapter seven:

1. “Through the Eyes of Media: Illuminating History,” Joint Application to the Academy of Finland, University of Art and Design, Media Lab and University of Turku, Department of Archaeology, 1996.

2. The Outline of Cultural Materials (OCM) is a classification system that was developed, as part of the war effort, in the United States during the mid-1940s. An initial attempt was made to use this as the guiding paradigm, but it was deemed as not suitable by both the archaeologists and the designer.

3. Sirkku Pihlman, personal communication (January 1999).

4. E. Svenonius, The Intellectual Foundation of Information Organization (Cambridge, Mass.: The MIT Press, 2000), 139: “To characterize a facet as semantically cohesive is to say that the terms in it have similar referents. For instance, terms in one facet may refer to processes like mining, building, or cataloguing; in another they may refer to concrete objects, like coal, houses, or books.”

5. Sami Raninen, “Notes of Index”, Undated memorandum. Raninen points out, for example, how terms such as hemp and nettle (and linen in Finnish form) appear in both Plant Materials and Flora category “but in a different sense, meaning plant species there, and textile materials here.” Personal communication.

6. J. Pietarila; the programming of the classification system has been done by M.Sc. Janne Pietarila. The following URLs, which are accessible in the “Other” and the “Tools” sections, provide access to the classification and search engine system:

<http://www.mlab.uiah.fi/cgi-bin/mulli/classification/finnish/tree.pl> (March 2, 2001);

<http://www.mlab.uiah.fi/cgi-bin/mulli/classification/english/tree.pl> (March 2, 2001);

The URL for namazu is: <http://www.namazu.org> (May 2, 2001). The URL for licensing information about Namazu is: <http://www.fsf.org/copyleft/gpl.html> (May 2, 2000).

7. A. Marcus, Graphic Design for Electronic Documents and User Interfaces (New York: The ACM Press, 1992), 118.

8. B. Laurel, ed., The Art of Human-Computer Interface Design (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1990), 87.

9. Marcus, 118.

10. L. Vertelney, M. Arent, and H. Lieberman, "Two Disciplines in Search of an Interface: Reflections on a Design Problem," in The Art of Human-Computer Interface, B. Laurel, ed. (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1990), 87.
11. F. Garzotto, P. Paolini, D. Schwabe and M. Bernstein, "Tools for Designing Hyperdocuments," in Hypertext/Hypermedia Handbook, E. Berk and J. Devlin, eds. (New York: McGraw-Hill Software Engineering Series, 1991), 192.
12. Ibid.
13. M. J. Fox and P. Wilkerson, Introduction to Archival Organization and Description, S. Warren ed. (Los Angeles: Getty Information Institute, 1998), 20.
14. M. Shanks, Classical Archaeology of Ancient Greece: Experiences of the Discipline (London: Routledge, 1996), 104.
15. B. Laurel, Computers as Theater (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1993), 21.
16. G. Lakoff, Women, Fire, and Dangerous Things: What Categories Reveal about the Mind (Chicago: University of Chicago Press, 1987), 276.
17. P. Galle, "Design as Intentional Action: A Conceptual Analysis," Design Studies, Vol. 20, No. 1 (January 1999).
18. R. Coyne and A. Snodgrass, "Problem Setting Within Prevalent Metaphors for Design," Design Issues, Vol. 11, No. 2 (Summer 1995).
19. Recent advances in computer assisted visualization of archaeology reconstructions have focused on achieving a high degree of control of the factors involved in illumination. For examples of this work, the reader is referred to the work of Dr. Alan Chalmers at the University of Bristol, Department of Computer Science. <http://www.cs.bris.ac.uk/~alan/> (November 24, 2001).
20. R. Arnheim, The Art of Visual Perception: A Psychology of the Creative Eye, The New Version (Berkeley and Los Angeles: University of California Press, 1974), 275; Arnheim refers to these gradually variable perceptual qualities as gradients.

21. These events occurred during an early planning meeting with Prof. Jussi-Pekka Taavitsainen.

Archaeology as an Activity

THE ACTIVITY OF ARCHAEOLOGY

In the volume, *A History of Archaeological Thought*, the archaeologist Bruce Trigger defined the activity of archaeology as concerned with the study of the ancient through the examination of material remains of human beings and its impact on the environment.[1] Yet how is the ancient artifact to be understood? As has been noted by another archaeologist, Michael Shanks, “the act of looking always involves an intentional act of giving meaning.”[2] The archaeologist is bound by the situated nature of historical understanding. This is because the artifact was not created by him, but by the craftperson. This latter acted in accordance to techniques of production established through centuries of practice, and the use of a vocabulary of forms for representation that reflected a point in time in the society that produced it. The gap that exists is a real obstacle that comes between us, and our understanding of the artifact.

This is a gap that is bridged by the scholar through the use of tools, such as narratives, to portray time in various ways and to link events that are not by themselves necessarily related. For understanding the archaeological fragment involves a *mediation* between the object, and meaning as interpreted through the filters of the observer’s prejudices. In this author’s opinion, this situation is similar to that of the painter who, when selecting a point of view from which to render the perspective in a given scene, also determines the relations between the shapes, the lighting, the form and the background, in the final work. In the hands of the scholar, the item becomes more than its past: it becomes part of several histories, of archaeology, of science, of design, of art. In a sense it becomes instrumental, enabling us to thread together, not only the past and the present, but also diverse fields of knowledge.[3]

Michael Shanks has also defined the activity of archaeology as a scientific practice that seeks to attain objective knowledge through empirical observation, gathering of data, and through the formulation of hypotheses that are tested against the canon of knowledge.[4] What kind of a science is archaeology? Or rather, how does archaeology constitute itself into a science, and how is this in turn articulated in its activities? According to Shanks, as a scientific discipline, archaeology is concerned with the generalizations that can be derived from particular aspects of the material past.[5] Also, a science of archaeology is, according to Klaus Krippendorff, concerned with the realm of classification, description, and the ordering of ancient artifacts.[6]

As can be seen in Figure 37, the activity of archaeology encompasses tasks that employ a series of tools and methods, ranging from historical archival research, to land-surveillance strategies, and

into the examination and analysis of the chemical processes involved in fossil formation. These instruments are used in defining the physical as well as the theoretical space encompassed by an excavation. A peculiar relationship exists between archaeology and its subject of study. The destructive nature of the archaeological excavation makes total recovery impossible. Thus, a *selection* of what is to be extracted always has to be made. The more ravenous the appetite for data, the higher the stakes and the larger the loss of what vanishes. Since an excavation cannot aspire to apprehend the full range of what *could be* found within a site, a selection of what is to be excavated is performed *a priori*. Therefore, many of the tasks involved in excavation can be seen as part of the process of answering research questions.[7] Appropriate excavation strategies and recording procedures that complement the goals of the research are chosen. This is why it has also been remarked that among the tasks of the archaeologist is included that of building models:[8]

A favorite set of models [in archaeology] has been systems.... A system is an interconnected network of parts, which form a complex whole. So society (the whole) may be divided into subsystems of economy, religion, technology, whatever, relationships between the parts specified, and then archaeological data fitted within. Testing models involves applying them to data—fitting data within a model to see if it works as expected.[9]

Then there are the post-excavation tasks. These include statistical summaries and scientific analysis of the remains found. They are also part of the scientific work done in archaeology, as is the work related to conservation and consolidation of items in a perishable state.[10] Common to all these procedures is a hermeneutic thread.[11] This is the element in interpretation, as understanding, that deems some items as important, and relevant, and rejects others as inconsequential. From the activity of gathering to its transformation into data, it is through classification that material culture is bound to a topic of research.

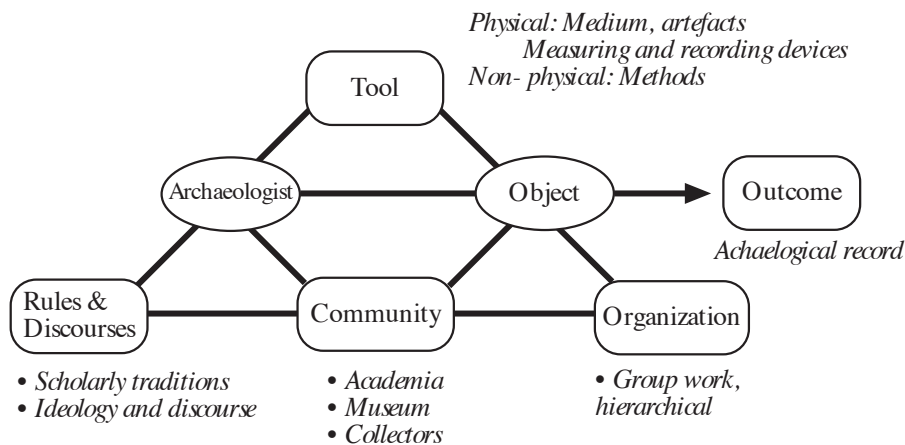


Figure 37: Visualization of the activity of archaeology.

The activity of archaeology is concerned with the interaction between people and artifacts. Of particular importance is their condition as excavated artifacts. For although excavating is not the only task that archaeologists engage in, it is this action of unearthing, revealing, and exposing in archaeology that has captured the imagination and thought of layman and scholar alike. Michel Foucault, for example, employed the notion of the archaeological excavation as anchor to his intellectual project of the archaeology of knowledge. Most recently, due to the increasingly complex layers of information that are being superimposed onto the fabric our daily lives, the idea has also found resonance in information systems design.[12] In the context of the present study, the interest towards archaeological knowledge was based on the idea that archaeology, as a discipline that is also heavily involved with the study of artifacts, can reveal much about the everyday life of people. This was especially deemed to be the case at the Mulli site. It was reported that this was one of the few times that archaeologists in Finland had been able to study everyday life in the late Iron Age using settlement (and not funerary) remains.

The involvement of the designer with the archaeologists in this project occurred in the context of creating a multimedia project that used the finds of the excavation on the Mulli site to disseminate information about the material culture and history of a region. The highly focused point of view does not mean to preclude the fact that, in addition to digging, archaeologists operate within a wide terrain that includes a diversity of tasks. Indeed archaeologists are involved in many facets of knowledge production such as: ethnographic studies, cognitive studies, geology, and historiography and archival sciences, to name a few. (For a longer list of disciplines related to archaeology, the reader is invited to take a look at the Ancillary Disciplines category in the Raisio archaeology archive classification system.)

Regardless of the school of thought, however, the notion that material culture can convey information about the past is a cornerstone of archaeological thought. This is obvious when we consider how early archaeology used artifacts for typology.[13] This emphasis on the interaction between people and artifacts plays a key role in understanding archaeological knowledge: As the outcome of an intentional action, the artifact represents varying amounts of skill, knowledge, and social organization.[14] From the cognitive perspective, artifacts can provide information about how ancient people solved problems, what knowledge and skills were necessary to produce them, and what type of complexity in the social organization might have supported such production.



Figure 38: Photograph of fragment of a loom disk with cord impressions from the Mulli site.[15] Images can allow the archaeologist to detect patterns, that lead to comparison, and therefore, to classification.

Michael Shanks has said that archaeology is constituted of various disciplines.[16] This is because, as an activity, archaeology is concerned with identifying and understanding the realm that artifacts reveal. Colin Richards has also described archaeology as a form of culture contact that provides for the opportunity to engage in a physical and intellectual confrontation with another culture.[17] As an embodied practice, the processing of archaeological knowledge is an act that occurs within a community, and involves more than thinking.[18] It includes the use of other senses, such as sight, touch, and hearing. How they affect the essence of archaeological knowledge is an area of increasing importance for all the fields engaged in knowledge production. The sense of sight, for example, involves not just the receipt of data through the eyes, but also the processing of information into meaningful content. Aside from an optical relation, there is an informational relation between the picture and what it depicts.[19] In archaeology, for example, images are used to convey information, as well as to express. Expression in images of an

archaeological nature can be described in the context of what they evoke, what they connote, and the associations that they trigger. Images can allow the archaeologist to detect patterns, that lead to comparison, and therefore, lead to classification. How these processes are enacted can be partially examined by looking at images used to record the context and physical surroundings of the items excavated, as well as the interaction between the personnel—Who is doing what?—in a given site. The analysis of the discursive practices with which a given archaeological work is associated will, in turn, also reveal aspects pertaining to the use of images. Why is it that images of excavations do not show the people who work at the site? Though archaeology can be regarded as a form of specialized history writing [20], the tools of analysis, the methods of classification, and the organizing principles are of the present.

THE ARCHAEOLOGIST

The archaeologist as a scientist

The archaeologist is a professional who practices the methods and uses the tools developed within the discipline of archaeology. The method not only defines the techniques used for gathering information and data, but to a certain degree, also constraint the scope of his findings. As it is illustrated in Figure 39, the method consists of work in three basic areas. These are called survey and pre-excavation research, excavation, and post-excavation activities.

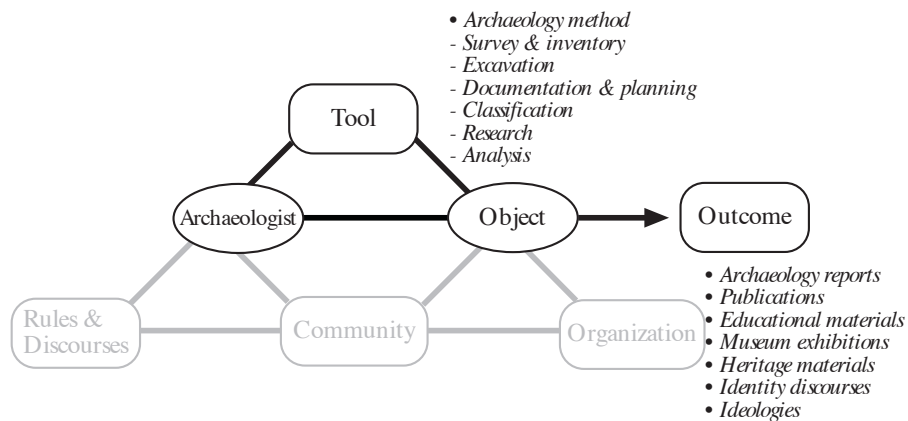


Figure 39: One visualization of methods and outcome in archaeology.

Surveying involves reconnaissance. This involves work performed so as to obtain an understanding, or descriptive framework, of the physical form and extent of the area to be excavated:

The aim of a survey is to take horizontal measurements between points and to establish the relationships between features in order to produce a map or a plan of the area.[21]

During the course of surveying a potential site, the archaeologist walks over the terrain and examines the landscape. S/he studies and delineates its form by using scientific measuring equipment and methods, and thus acquires data about aspects of the landscape, such as the height and degree of fall in the slopes of the terrain. Through the use of these tools and methods, the archaeologist creates a representation that is not of the landscape itself but of the landscape as seen through the filters of archaeology. In this representation, the natural world is made to fit into the patterns of structures defined through geometry: The perimeter for the excavation is determined, a grid is assembled, and area subdivision co-ordinates are established and marked. In this process of sketching the landscape, the archaeologist gathers and enframes. Guided by criteria of selection, “important” features are chosen. Aspects of the world that, according to the archaeological viewpoint, are representative of the site are selected for further study, while others, not considered to be relevant, are left out.

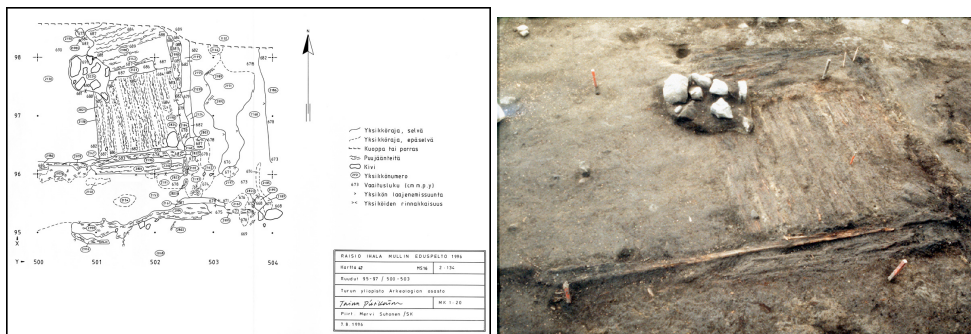


Figure 40: Drawing and photographing. Left view, a plan of the Mulli site. Right view, a photographic representation of the same area of the site.

All *plans* usually bear the site code, plan number, context, site grid co-ordinates in all four corners of the plan, and scale. Because it affects the amount of detail and degree of accuracy of the measurements, the scale chosen is important.[22]

In order to maintain a level of accuracy and consistency, archaeologists use instruments such as planning frames or grid frames. These are positioned over the area to be planned, mapped, or sketched. The scale used in the planning frame is related to the scale of the site grid. The panorama shown below in Figure 41 depicts an example of how one of these devices was utilised during the excavations at the Mulli site.



Figure 41: Section of panorama of the Mulli excavation site.

The information assembled in these representations is presented in the form of diagrams, schematic maps, and illustrations of the landscape.[23] Conveying the maximum amount of information in an efficient way as possible is one of the chief objectives of these representations. But these devices go beyond mere representation, for they come to mediate between the archaeologists, the landscape (as it exists in the world) and the topic of research. This is because the representations operate as *meta-indexical* devices that integrate multiple meanings as well as multiple formats of verbal, visual, and tacit knowledge.[24] In this author's opinion, much like in other types of visual cultures, these representations are bound together into narratives through the use of drawing conventions, such as symbols, and information devices, such as scales and the co-ordinate locations.[25] They gather and inform the collective and changing cognition of the archaeologists involved in the creation of knowledge. They also help to create the visual culture of a discipline, since they index, re-frame, and elicit types of knowledge (such as tacit and experiential knowledge) that would otherwise be inaccessible.

The archaeologist as a craftsperson

Aside from the actual recuperation of material artifacts, an archaeological excavation comprises myriad other tasks. Of particular importance is the so-called *planning*. This is a term used to describe how archaeologists make use of drawing and graphic representations to describe and record the actions involved in excavating. In preparation for the work to be done, the archaeologist makes use of other tools besides methods and scientific equipment. For example, the units of measurement and scale to be used in the planning are chosen. The part of the site to be excavated is divided into equidistant squares of the same dimension, and grid pegs are placed to mark the intervals. As the archaeologist labors, s/he uses media tools and modern recording devices, such as cameras, to register the features of the surface, mark the position of artifacts, and illustrate the state of the site throughout the process of excavation. In this

manner, the archaeologist creates an archaeological record. The figure below depicts some of the different skills and tasks involved in the creation of this object. This object—the archaeological record—can be described as an information artifact.

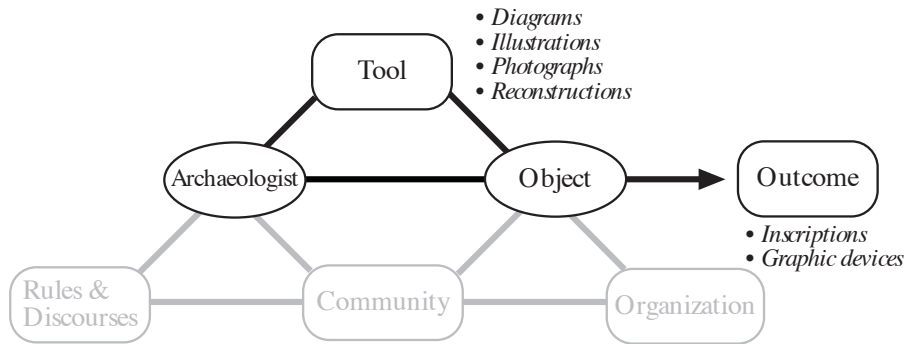


Figure 42: Craft and archaeology

It has been remarked that, since the archaeological record is largely made up of written material in the form of textual reports, lists of finds, and descriptions of the work performed during an excavation, archaeologists can be seen as writers. To the extent that they employ graphic tools and make use of visual devices, such as photographs and illustrations, it has been suggested by Shanks that archaeologists can also be seen as crafts-workers.[26] In both cases, archaeologists not only make use of, but also create documentary narratives as well as conceptual knowledge. How the tools of writings and the use of graphic devices are employed to create the archaeological narrative has been the subject of much discussion among archaeologists from the Post-Processual Movement in archaeology. The archaeologist Julian Thomas, for example, has argued that, throughout the history of the discipline, concepts such as the Neolithic have been constructed primarily through discursive practices that involve more than empirical observation and the recording of data.[27]

The archaeologist and the Information Society

Archaeologists have always been involved in the production of literature and presentation materials used in education and planning. In general, the materials created by archaeologists are used to provide the public with information about the history and culture of a particular region or state. Archaeologists provide relevant narratives, contextual enframing, and data used by different institutions in a society. In this manner, it has been remarked that archaeologists play a role in helping to forge the identity of nations, regions, and individuals. They help to mold the visions that a given group may have of itself and of other people. In this respect, the archaeologist's voice may have quite a degree of influence on a community. Archaeological

projects can, for example, be instrumental in recuperating the voices that have been suppressed through Colonialism. In an ideal world, archaeology can be an important agent in the building of multicultural communities.[28] The archaeologist also plays a role as consultant in planning and development of projects from the public sector. The Mulli excavation is an example of this type of work.[29] In this capacity the archaeologist works alongside other interpreters, mediating between the public and its understanding and knowledge of the past. S/he operates as a voice of expert opinion on matters related to cultural and national monuments. From this perspective, the archaeologist provides the connections between the past and present that help people orient themselves in their cultural experiences.

Upon completion of an excavation project, there is a lot of additional work to be done with the site, and with the materials recuperated. Such post-excavation work, as it is referred to, might involve conservation, as well as reconstructions of items found in the excavation. Reconstruction is an interesting example of fuzzy boundaries between the theoretical inclinations of the discipline and aspects related to applied knowledge. For though they can help to clarify whether a given hypothesis is possible, in general reconstructions are created from hypothetical formulations originating in idealized representations of the past.

In addition, to excavate past artifacts, archaeologists engage in a wide variety of research and analysis activities that deal with the present. They study human behavior as well as the interaction with material culture. In an effort to describe and explain present human behavior, they conduct research into cultural systems and material objects.[30]

THE ARCHAEOLOGICAL RECORD

The record as a textual object

The activity of archaeology produces knowledge that eventually coalesces into the tools and methods of the discipline. These tools come to form part of the matrix of the discipline.[31] The concept of the record is one of the tools in the archaeologist's matrix.[32] According to Linda Patrick, the concept of the record gathers within a wide variety of assumptions regarding the data that archaeologists use:

The concept is used by archaeologists as a model for their evidence, because it implies something about this evidence that is not directly observable—namely, that the *evidence records something*. What archaeological evidence records and even that it records are not

observable facts; the former is inferred from the evidence, the latter presumed as a basic hypothesis for the purpose of inference.[33] (*Italics added.*)

Though there is not one all encompassing definition, among archaeologists, of what the archaeological record is, there seems to be a general notion that it consists of data and interpretations derived from the artifacts obtained via the archaeological excavation. This might produce an initial impression that the archaeological record is an object being constantly updated and transformed through a process of accretion of data gathered as the result of fieldwork. While it is true that archaeological data is continually being collected, the results are not cumulative with respect to data being added, but rather with regards to how interpretations are built on the basis of previously existing narrative layers. Moreover, as Bruce Trigger has noted:

...archaeologists often seem to build more on what their predecessors concluded about the past than on the evidence on which these conclusions were based.[34]

The concept of the record, however, is not a monolithic discourse, and there are divergent ways in which this notion can be interpreted. Whereas the New Archaeology conceives of the record along the lines of a fossil record, structural archaeologists conceive of the record as a text object composed of material symbols.[35] It proposed that the archaeological record, as it is used, comprises two models—the physical and the textual model. The physical model proposes that archaeological remains are the result of law-like processes of nature. Law-like processes form the record. This latter records its causes in the way that a fossil records the past of a living organism.[36] The textual model brings into comparison the data recorded with material symbols. It creates a notion of archaeology as a historical discipline and draws the evidence into a comparison with historical sources. Also it relates the discipline of archaeology with that of semiotics. Archaeological remains are not merely physical evidence, but also, a body of signs that encode and communicate past human ideas, actions, and events.[37]

There are other factors that influence the way that archaeological knowledge is organized, interpreted, and produced. For example, in writing for archaeology, archaeologists aim at transparency and invisibility. Even when the textures of their own beliefs, opinions, and experiences are present, scientific protocol dictates that these are to be smoothed away. It has been remarked that this is a spectator-based knowledge focused on exhibition and which there is little desire to know about the problems of representing the world.[38]

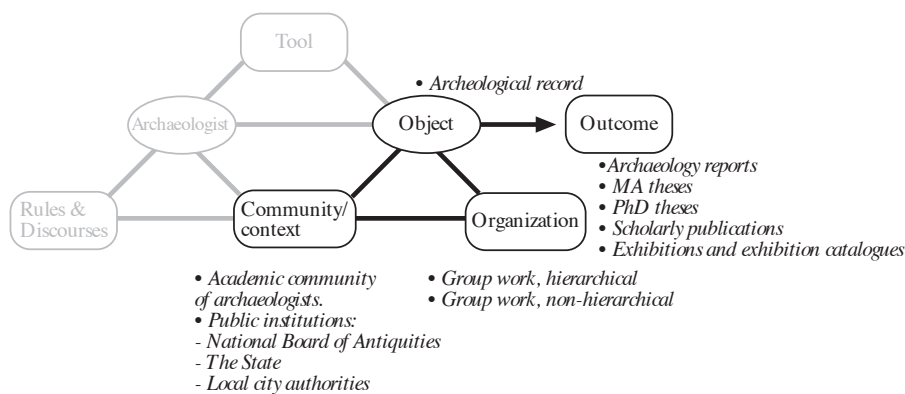


Figure 43: Community and organization influence the outcome of the activity.

Figure 43, above, shows the archaeological record as it is being created. Since the team of archaeologists is a community that shares this object of the archaeological record, the object embodies the tools, methods, organization and discursive practices of those engaged in the activity of making it. What this means is that, at one level, the record is but a mute assembly of data. At another, it is a platform, or structure from which knowledge of an archaeological nature can be spoken of, disseminated, exchanged, and promoted.

As part of the outcome, there is the creation of the archaeological reports, which as already mentioned, attempt to record the activities in the excavation, the finds recovered, as well as their physical situation and condition within the site. But the work does not stop when the excavation is over. For one, these reports, which are produced in a format to conform to specifications provided by conservation institutions such as the National Board of Antiquities, can work as primary sources. In this manner, they can be utilized as an information platform, to support further research activities performed under an umbrella topic such as “Everyday life in Southwestern Finland from the late Iron Age to the early Middle Ages.” Thus, students participating in the excavation may write MA theses and PhD dissertations based on the fieldwork and research done as part of the excavation. A theme such as this may have been chosen by the professor responsible for the academic training of archaeologists, and for the results of the work done at the site. Or it may have resulted from organized discussions within the group involved in the excavation. The first instance may reflect the hierarchical nature of how research work is organized in academia. The second situation might reveal the existence of more horizontal organizational structures.

Regional and municipal authorities can get involved in the production of archaeological knowledge. This was the case with the Mulli excavation, in which Raisio City Hall financed the excavation and also a series of archaeological exhibitions, as well as most of the interpretive work done by the MA archaeology students working for the project. The State, as keeper of the

cultural heritage of the nation can also be involved in the production and dissemination of knowledge. Indeed, many of the artifacts in the archive are displayed with permission obtained from the main institution of the State that deals with these matters, the National Board of Antiquities.

Graphics and the record

An archaeological report is made of primarily of text and narrative. Graphic devices are regularly used, as well; they illustrate and augment the information presented. Among these devices we have the use of drawings and illustrations, photographs, three-dimensional reconstructions and, most recently, interactive panoramas and three-dimensional digital models.

Drawing has been cited as the preferred mode to visually represent an object in archaeology. According to some archaeologists, this is because drawing is a medium that can selectively and efficiently convey relevant information.[39] Drawings, for example, can be edited to show several views and sections within one model. They can also be created so as to combine and connect different research strategies and results. Drawings, or plans, are used routinely in archaeology as part of the on-site recording process. Recording rock art in an archaeological site for example, can be accomplished using a combination of different media such as tracing, direct transfer, and photographs which are then combined into a drawing. Sketches and section drawings of this type of archaeological evidence are done to scale, in order to yield an illustrative type of representation.[40]

Drawing is also used in scenes involving reconstructions of buildings and archaeological finds in full 3D. Drawing and illustration are also employed in creating hypothetical representations of scenes that include how past activities unfolded in the landscape. These graphic devices are generally used in archaeology to create more effective presentations geared towards the general public. Reconstructions can also be used as part of archaeological research as well. In this capacity they can act as tests that challenge the evidence and thus contribute to a better understanding of particular aspects of archaeology.[41]



Figure 44: Left view, a reconstruction of pottery by archaeologist Minna Hautio. Right view, a reconstruction of an upright loom created by archaeologists from the University of Turku. Looms, such as this one, may have been used for textile production in the Nordic countries during the late Iron Age.

Figure 44 shows examples of some of the reconstructions created by the archaeologists as part of the research stemming from the excavations of the Mulli site. In the case of the former, the inside of the Mulli abode has been reconstructed using hypothetical building techniques used in the Novgorod region. In the case of the latter, an upright loom that exhibits clay disks, such as the remains found in the excavation, has been reconstructed using previous research from other Scandinavian countries.

THE TOOLS

Inscription tools

Michael Shanks has said that archaeology does not begin with the object but with a desire. [42] This translates into motivations that affect, not only the activity, but how that activity is articulated in its choice of method and goals selected. Why does a student decide to use a recording method that has not been used in previous excavations in this area? Which types of items are photographed and how? At each stage of the activity, the transformation of the object into an outcome is accomplished through the use of a different set of tools. As in art and design, these tools have a history.

Inscriptions, for example, are a way in which ideas can be given shape on paper.[43] Bruno Latour has defined these devices as visual representations created by scientists for inclusion in scientific writings. According to Latour, scientists make use of inscriptions when trying to persuade the rest of the scientific community that a certain claim should be accepted as a fact.

The rhetorical power of the inscription may be related to the function it fulfils: the role of the inscription in a scientific text is to supplant the observed phenomenon with a representation. Also, in the process of creating the inscription, the instruments used for its creation are rendered invisible, transparent.[44]

It could be argued that drawings are a type of inscription frequently used in archaeology as part of the on-site recording process. As part of this activity, drawings can be used to create records of the singular features and artifacts of an archaeology site, such as rock art. It can also be used as part of the mapping, or so-called planning, of the ongoing processes and results of the excavation. The drawings resulting from planning are more like interpretive diagrams than naturalistic drawings, since a choice is made about the type of contents that are included and how they are depicted. Altogether, the excavations in the Mulli site produced approximately three hundred plans of the excavation. Together with the archaeology reports and the archival materials, these drawings are some of the representations left of the Mulli site, since the excavation has been completed and destroyed, and the land is being prepared for a housing development.

Drawing can also be used for creating scenes involving reconstructions of buildings and archaeological finds. Drawing and illustration can be used in creating hypothetical representations of scenes that include how past activities unfolded in the landscape.

Recording rock art in an archaeological site can be accomplished using different media and methods, such as photography, tracing, direct transfer, and drawing. In the case of drawing, sketches and section drawings, done to scale, are used to obtain an illustrative type of representation.[45] These graphics make use of a combination of symbols, abbreviations, and colors to depict the items on the site included in the representation. Direct transfer methods can also be used to create a representation. These methods involve the use of polythene sheets that are fixed to the surface with plasticine or drafting tape, and felt-tipped pens. Like with all methods that involve a direct contact with the surface of the artifact, care is taken to prevent altering the surface composition of the rock:

Direct transfer is possible on engraved rocks, but techniques such as the application of paint or ink with a roller should not be used. Methods likely to cause damage should be contemplated only when the features being drawn are about to be destroyed.[46]

Reconstruction drawings and illustrations are also used in archaeology. These graphic devices are generally used in archaeology to create more effective presentations geared towards the

general public. Whereas a full-sized model is usually referred to as a replication, restoration, projection, or a realization, the term reconstruction is commonly used to indicate drawings. These drawings of finds, structures and buildings are among the most common types of reconstruction illustrations used in archaeology. Illustrations of finds, for example, are created to provide a view of an artifact as it may have existed in its original context. Also, incomplete finds may be drawn using conventions that indicate where evidence is lacking. Illustrations of buildings can be created using line drawings. Using different tools for projection, a three-dimensional impression of space can be provided. An orthographic projection that does not create a perspective with foreshortening, for example, is commonly used in building reconstructions.[47] Where it is considered that the three-dimensional quality can offer a greater realism, other projection systems, such as axonometric and isometric, are utilized. In the axonometric projection the normal view plan is tilted at a forty-five degree angle to the horizontal plane. In an isometric projection, the horizontal axes are drawn at a thirty-degree angle from the horizontal plane so that the angles between all three axes are equal. Isometric projections can appear more realistic than axonometric projections, since they are nearer to perspective drawings.[48]

The use of projection systems need not be limited to architectural reconstructions of buildings. Exploded isometric projections can be used for showing the relationships between the different parts of the structure in a given device. The type of graphical device that combines the exploded view reputedly invented by Leonardo Da Vinci, and the isometric view, introduced in England in the early 19th century by William Farish, is an example of this type of visual representation.[49] Most recently isometric projections have been successfully employed to represent information structures in the virtual domain.[50] Figure 36 in the previous section is an example of how this type of projection has been modified and applied in information design. The representation in Figure 36 uses a combination of projection and Venn diagrams. The Venn diagrams indicate the contents of the archive, the manner in which they have been classified, and the possible routes for interaction. The design has been influenced by the work of Kahn and Lenk.[51] This type of representation is not new, but dates back to the 16th century.[52] All of these methods can be used to give a better idea of the original form and function of the object.[53]

Artistic or pictorial reconstructions are also used in archaeology. These include line drawings, often painted in color. These illustrations can be used to depict scenes from life that include people, animals, trees and other topographical details. Generally, they are not used for scientific purposes, but rather in the context of exhibitions and publications, to illustrate the contents of

the archaeological work to the general public. By scientific purposes I mean that they are used as graphic support for textual materials that intend to prove a hypothesis.

Rather than realistic drawings, archaeological drawings can be described as interpretative diagrams. They are supposed to present important details and omit irrelevant information. In order to achieve this, the illustrator creating the drawings must be cognizant of the concepts used in archaeology, as well as of the details pertaining to the item being represented. It could be said that archaeological drawings express conceptual structures, hypotheses, as well as the paradigmatic states of the discipline during a given point in time.

Though artists, archaeologists, and designers may use drawing as part of their practice, there are additional skills that are necessary for creating archaeological illustrations. As has already been mentioned, the illustrator who makes archaeological reconstructions must have a thorough understanding of excavation techniques. S/he must also be familiar with the processes by which archaeological features are formed.[54] The archaeological illustrator is not free to determine the content and manner of the illustration, since the type of evidence, availability of data, and desire to infer from evidence on other sites dictates the types of reconstruction possible.

Full 3D reconstructions can be used as part of archaeological research. This is because they can contribute to a better understanding of particular aspects of archaeology. For example, it may be the case that a reconstruction requires the archaeologist “face up to and even challenge the evidence.”[55] This is particularly the case when, in order to determine whether a reconstruction is plausible, the meaning and function of the surviving evidence is examined and interpreted with precision. Figure 45, below, is an example of a full-model reconstruction maquette created by artist Kai Puumalainen in collaboration with the archaeologists as part of the research stemming from the excavations of the Mulli site.



Figure 45, Model reconstruction created by artist Kai Puumalainen, in collaboration with the archaeologists.

Figure 46 represents the inside of the Mulli abode as it was reconstructed using hypothetical building techniques used in the Novgorod region. In the case of the latter, an upright loom that exhibits clay disks, such as the remains found in the excavation, has been recreated using previous research from other Scandinavian countries.



Figure 46: Panorama of the reconstruction of the Mulli abode by the archaeologists. The reconstruction is installed permanently, and available to the public at the Krookila Community Site in Raisio.

Photography and the archaeological record

Photography has been frequently used in archaeology, as a way to record and document archaeological finds. In addition, researchers routinely employ photographs as part of the more prosaic chore of taking notes.[56] Yet in archaeological publications, illustrations and diagrams still outnumber photographs as the preferred method of presentation. There seems to be a certain explanatory power that is attributed to the drawing and to the illustration. This author's opinion is that the lack of interest in using photographs for publication may be related to how,

as opposed to a drawing where collective effort is expended on the standardization of forms and symbols, the photograph depicts everything that is in front of the camera.

Shanks has said that, in archaeology, the representation that is a photograph is taken for granted; treated as a mere technical aid that assists in recording or identifying features and objects.[57] This may be because, until recently, a certain amount of neutrality had been assumed regarding the technical apparatus and use of photographic techniques. But the notion that photography exists outside of a situated context has been contested by research in the humanities as well as in culture studies. In archaeology, Michael Shanks has demonstrated how photographs are neither value-free nor always objective. According to Shanks view, photographs are often used as a means of quoting the past:[58]

Looking and the *means of its recording* are always situated. They are from a particular viewpoint, it can be argued, and techniques help constitute particular attitudes to the objects of record and note, particular relations between subject and object positions.[59] (Italics added.)

For Shanks, the photograph is a subtle blend of realism and naturalism. Like found objects, photographs harness the magic of the real.[60] From the point of view of this author, the photograph frames a representation in two basic ways. The first is in time. The photograph displays a *selected* moment of arrested motion. The second is in space. Frequently, the photograph presents an *anticipated* scene visualized by an observer who is witness to an event.

In the archaeological report, drawings, illustrations, and photographs do not accomplish the same function as text. This is due to how the temporal experience and interpretation of these graphic devices differ from that of text. For these devices do not describe in the same way as writing does. In photographs, for example, we experience a juxtaposition of forms that creates a moment of recognition, a moment of bringing together. This bringing together can result in an understanding that proceeds by virtue of association, abstraction, and synthesis of forms. Whether it is recognized or not, the goal is to construct something new out of the old: To connect things that may appear as dissimilar in order to achieve new insights. It is also partly related to the rhetorical functions that they fulfill as inscriptions. That is, they act as representations, substitutes, for the real world. Their importance cannot be under estimated, given the nature of archaeological fieldwork as one in which the subject of study partially perishes through the process of extraction.

Tools for measuring

Archaeologists make use of instruments to evaluate and represent the physical characteristics of the environment in which they work. At the most basic level, archaeologists make use of basic drafting materials such as paper, illustration board, vellum and of utensils such as pencils, pens, ink, tee-squares, lettering templates and shading screens. They also employ other aids such as planning frames, or grid frames. These frames are positioned over the area to be planned or mapped. The scale used in the planning frame is related to the scale of the site grid. These frames are used to formulate boundaries, subdivided the space, to quantify. With these frames, archaeologists aim to *succinctly* describe the landscape represented. For an example of one of these devices, the reader is referred to the panorama of the Mulli site.

In the next level, the tools are of the type used for measurement in land survey engineering and their use is related to the estimated accuracy of drawings, plans, and maps created: The clinometer is used to measure height and degree of fall in slopes; the optical square is used to obtain right angles for area subdivision; laser technology might be used to measure and indicate the location of fixed points in natural and man-made landmarks.[61] Higher on the level of technological complexity, moreover, is the use of aerial photography, photogrammetry, and remote sensing technology that is used to discern structures and patterns that cannot be observed with the unassisted eye.[62]

Methods

Archaeologists have also developed nonphysical instruments, or methods, that they use in combination with the task of drawing and creating representations. The data acquired from the use of these methods is entered into the reports and databases created. This is evident in the activity of planning and in the existence of different methods through which the archaeologist decides what to include as context in a plan. There is *single-context planning* in which each individual layer, or context, is planned on a separate sheet, or map. There is *single-level planning* in which everything that has been excavated in a particular level is planned arbitrarily on one plan sheet, regardless of its date or function. Then there is *phase planning* in which features are planned according to their presumed date. Given the continuing debate about the accuracy of scientific dating methods, and their application in an archaeological context, it is not surprising that this last method is not used as much anymore.[63]

Archaeologists also make use of methods in analysis and interpretation. Some of the methods used by archaeologists are: stratigraphy, seriation, periodization, and classification. Many of these methods do not originate in archaeology but have been borrowed from other disciplines in the natural and physical sciences. Stratigraphy, for example, is a concept derived from geology. It is used in research pertaining to the origin, composition, distribution, and

succession of strata.[64] The archaeological application of the concept of stratigraphy, however, is closely related to the idea of human presence. This is because archaeological stratification[65] is the result of human activity.[66]

Initially the introduction of new scientific methods, such as radiocarbon dating and dendochronology, freed archaeological research from being limited to the dating of artifacts and forms, and to the outlining of patterns and distribution. However, these new methods also brought about the need for modification of already existing practices.[67] The use of radio carbon dating technology has, for example, generated interest in so-called formation principles and their role in the coalescing of the material culture that creates a site. Archaeologists also make use of conceptual tools in dating. For example, an archaeologist might make use of a concept such as seriation, or the positioning of artifacts in a series according to an attribute identified by the researcher, in conjunction with stratigraphy. In this manner, the archaeologist can arrive at a hypothetical date that allows him/her to construct a relative chronology.

The notion of classification is a theme of much relevance to archaeology. Over the years, archaeologists have successfully created a robust corpus of data and low-level generalizations about the past that has withstood scrutiny.[68] Intrinsic to the classifications used by archaeologists are the typologies created for the cataloguing of archaeological finds. These typologies have been the focus of much debate as creations of the archaeologists and not as reconstructions of significance to the original makers:

These classifications reflect the interests of individual archaeologists in dating, determining the function and studying the role of the archaeological material. Even efforts to classify objectively by searching natural clusterings of attributes within large data matrices are subjective to the extent that the listing of attributes is based on the archaeologists' knowledge and sense of significance of the material they are analysing.[69]

Bruce Trigger has described how a lot of the work done with classification of archaeological materials deals with the application of deduction and induction as scientific methods within archaeology. In the case of deduction, typologies are used to create hypotheses that are then tested against the data recovered from the field. In the case of induction, the typology itself results from the analysis of the data. What may be missing in both cases are the contextual associations. According to Shanks, the associations include not only what may be known about the artifact's origin, but also the context in which the item is being analysed by the archaeologist.[70] In spite of these discussions, Trigger maintains that the fact that the classifications produced by archaeology have endured time and major changes in interpretive

fashion is proof that “they are based to a substantial degree on reasonably objective empirical observations.”[71]

Archaeology also uses concepts such as material culture to refer to how the interaction between society and artifacts is embodied in the latter. In archaeology this concept has been formulated from a theoretical foundation that sees culture as an ideational construct that does not survive in the archaeological record. That is, although we cannot really access the mind of the ancient craftsman, many aspects of culture, such as the technical knowledge required to produce an object, are reflected in archaeological finds.

Some archaeologists treat material culture as a concrete expression of human ideas, as a fossil that is the record of past social processes.[72] Victor Buchli has noted that the proposition that artifacts can express or contain ideas as language has been instrumental in the opening up of areas of discourse in archaeology that would otherwise remain inaccessible to scientific inquiry.[73] This is because it enticed scholars to question how the archaeological record is part of, and contributes to, the development of structures of power in a given society. In the case of prehistory, for example, where there is no written record, how are the narratives pertaining to distant ancestors formulated? How do tools such as seriation and chronology mediate between the archaeological find and its interpretation? What discourses inform the activities involved in the creation of the archaeological record? How does the organization of labor affect the activities of an excavation? And how is archaeological data used to create the construction of archetypes about the past of a given community? In this context, the post-excavation work of archaeology has been seen as instrumental in supplying data used to create historical narratives.

RULES AND DISCOURSES

Discourse not only influences how a given subject matter can be approached meaningfully and reasoned about, but it also affects how ideas are put into practice and used to govern the conduct of others. Discourse defines acceptable and intelligible ways to talk about a subject matter, and limits, restricts, and rules out other ways of talking, in relation to a topic or constructing knowledge about it. Discourse, however, does not consist of one statement, or one text, or one action. The same discourse, which is indicative of the state of knowledge at a particular point in time, will appear in different texts, forms of conduct and institutional sites within a society.[74]

Instrumentality and history

It has been said that many discourses in archaeology are related to the instrumentality of history and its use, or misuse, to further the interests of ethnic groups, nationalities and elites in society.[75] At an abstract level, this topic can be addressed from the point of view of: Who needs the past? Is the past something that can be appropriated? For what purpose? In concrete terms the topic translates to how and why certain groups will seek to assert their version as being the official history. Such an agenda most commonly seems to flourish in the context of Colonialism. But it can also operate under diverse rubrics in so-called democratic political systems. In either situation, implementing an official historical narrative occurs through a process that features the omission and distortion of the research, interpretation, and presentation of history with the objective of solidifying the political and hegemonic rule of one group in society over others.[76] In these official versions of history, for example, it may be the case that the prehistory of a nation— that period for which there is no written record and which is part of the history of minority and indigenous groups—is excluded. (The message implied is that the past is worth consideration only at the point in which the history of the group in power enters the scene.)

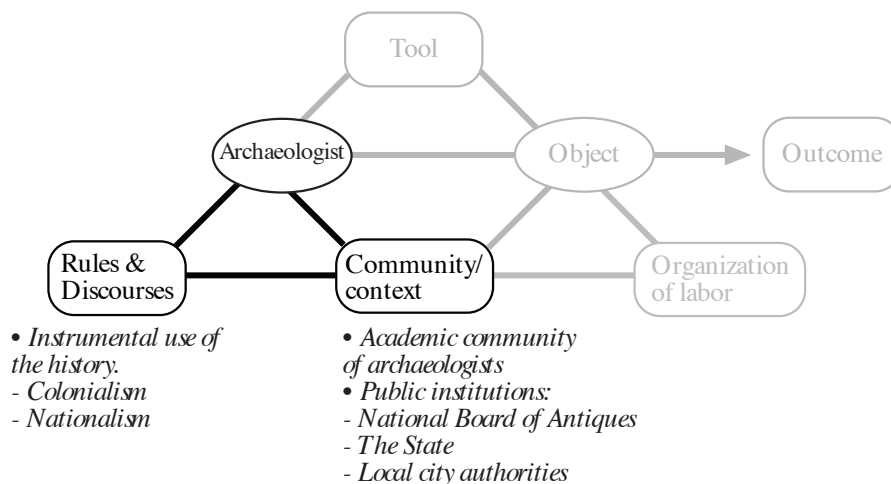


Figure 47: The archaeologist’s work mediates between discursive practices and the community in which the activity of archaeology takes place.

Examples of this type of discursive practices have been cited in places as distant from another as Venezuela, Japan, and the Scandinavian countries. In Venezuela, for example, archaeologists have argued that the chronologies presented by many institutions as those pertaining to the history of the nation emphasize the Colonial period as their point of origin. From this point of view the origins of the continent begin in the 15th century with the colonization of the continent by the Europeans. This practice effectively obliterates the presence of pre-Hispanic groups of hunter-gatherer tribes which have inhabited the continent for thousands of years developing their own languages, cultures and technological expertise.[77] The case of Japan is a different situation in which the problem is thought to originate in how the teaching of history,

including certain versions of their prehistory, has had a long association with the maintenance of national identity. Since 1945, education in archaeology has become one of the primary means to understand the prehistoric and protohistoric past. Although results indicate that the early emperors may have been more mythological than historical, reducing the number of pages devoted to this subject matter effectively eliminates conflicts between renewed nationalism and archaeological evidence.[78] In the Scandinavian countries, the use of archaeological artifacts of a Viking origin to promote ideals of racial superiority has been documented, and is the subject of discussion among archaeologists and other knowledge producers.[79]

The involvement of archaeology with discursive practices can also be very positive. Archaeologists can clarify and act as sources of illumination in situations in which, due to colonialist agendas, the past has been obscured. An example of one such case has been demonstrated in the use of archaeology for unearthing and revealing the history of African-Americans in the United States. This has resulted in museum exhibitions and permanent installations in public spaces of artifacts that are evidence of the early presence and contribution of African-Americans to the history of the country. As noted by one of the archaeologists that participated in the project:

...historical archaeology can be a vehicle to give voices to the silenced, power to the disenfranchised, recognition to the ignored, and a historical signature to the anonymous.[80]

These activities have brought to the forefront how “knowledge of the African-American past is absent from most people’s understanding of history.”[81] In this sense, archaeology has helped to provide another perspective to that available through more traditional historical narratives. At the same time, this topic of the instrumentality of history is of high relevance to archaeologists because they are the ones who recuperate and interpret the data. As scholars, they are the ones actively involved in the renegotiation of boundaries within their disciplines. Part of the task of interpreting and mediating between the citizen and history, is that of bestowing meaning to the objects of the past. It is within the realm of archaeology to pose questions such as: What is the relationship between archaeological find and the historical narrative? What are viable notions of world heritage? Is there such a thing as an undifferentiated past that is universal to all of humanity? How are these legitimized and supported through archaeological research? Who is responsible for what is written about the past? What does it mean to say that there is a multicultural past? Is history something that can be owned?

That archaeology is of interest to everyone can be seen in examples such as that of the United Kingdom where statistics show that there are over seventy million visits a year to archaeological sites.[82] The myths reinforced through archaeology go beyond the academic and into areas that deal with basic human issues such as identity, sense of belonging, and self-worth. Therefore, as is the case with all the arts, sciences and humanities, education in matters of archaeology, whether formal or informal, can have a big impact in society. Schooling itself can be seen as a process of education and as a tool for transmitting ideology. In the context of the latter, access to the past can be equated with power.[83]

COMMUNITY

Though there exist many so-called archaeological institutions throughout the world, this entity that is the archaeological community—that which makes one an archaeologist—does not necessarily exist as a material, physical item. Its being unfolds in how the practice is articulated, the manner in which visions of what constitutes archaeology are implemented. Shanks has remarked that the activities involved in the practice of archaeology can be seen as a particular type of *doing* that produces facts, data.[84] The distinctive character that endows knowledge with that quality of the archaeological, is supported through the existence of a community that is articulated through the institutions that participate in the activity, the discourses they embody, and how these are organized into a coherent force that can exert pressure. For example, an idea not necessarily advocated by the present study is that archaeologists can gain meaningful, objective, knowledge of an independently existing reality, *if* they are methodical and scientific. In archaeology, it may be the case that the community of practice gathers around an ideal of meaning as that which is open to testing against a set of facts. As was pointed out in the section on discourses, there are examples where this is not necessarily the case. Archaeological knowledge can and has been used as a source of legitimacy for Colonialism and nationalistic ideologies.

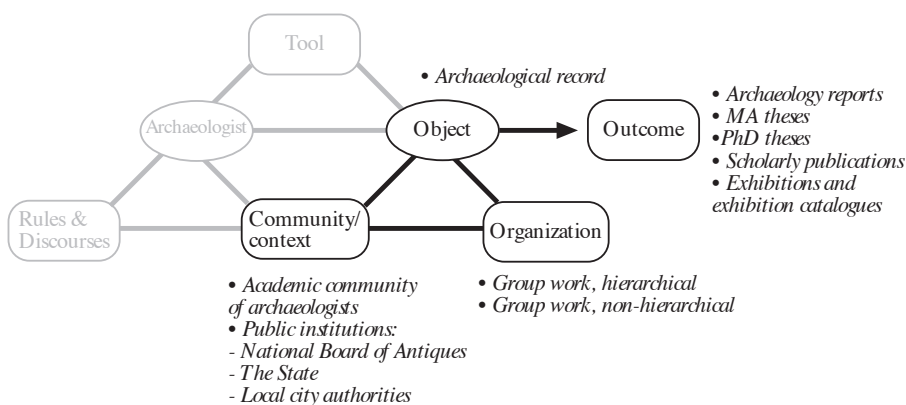


Figure 48: The individual's relationship to the object is determined by the community s/he belongs to as well as by the organization of labor.

Still, the archaeologist is an expert. Aside from being a professional who can engage in archaeological research, the archaeologist is usually proficient in many other areas such as anthropology, botany, cartography, ceramics, chemistry, folklore, history, and palaeography, to name a few. As a scientist, the archaeologist proposes the hypotheses and models. S/he outlines the methods for testing and deriving results that will ultimately form part of the record. In this sense, it has been pointed out that archaeological know-how is produced through a set of practices that occur in the context of a community of practice.[85] For it is through being a member of this community that one acquires the agency and power to act as an archaeologist.

The work produced by members of this community guarantees authenticity based on qualities such as age and origin. But these qualities are not intrinsic to the object under scrutiny. Rather, these are qualities that are attributed through a system of exchange where desire plays a key role. What is found in an archaeological excavation is, by itself, neither authentic, nor original. It is in the context in which it is studied and interpreted that it becomes original. That is, through its circulation within the community of archaeologists the fragment is tested and verified. Its authenticity is confirmed, or negated. During this process, the fragment becomes something different than when it was found. A network of meanings is woven around it. An imagined past is constructed from data extracted from the archaeological record.

SUMMARY

Concepts such as mediation, and models such as the Activity System can be of use when studying the tools and methods which disciplines such as archaeology use to produce knowledge. With them we can pierce through the topmost layer. Delving deeper inside, myriad components and elements weave in and out, finding expression within the meaningful patterns of the artifact. Identifying these components, as well as the patterns that they form is a key question for collaborative endeavors: They may allow us to understand better how the knowledge of a discipline is framed and where there may be the open, accessible, boundary spaces in which collaboration is likely to successfully grow. They can also signal areas of rigid engagement, with little room for negotiation. Or they can point to pockets of opportunity in which a window that allows for exchange of knowledge can open the road to collaboration.

Much like in art and design, archaeology makes use of diverse media as tools for representation and communication. As we have already seen, among these tools we find the use of drawing, illustration, and photography. The use of these tools by the archaeologists, however, differs

radically from that one of the artist or the designer. This is because their use is framed by how diverse discourses shape the rules of the discipline, and by how these rules become articulated in the community of archaeologists. What constitutes an accurate representation of an archaeology site, for example, is determined by a set of canons regarding how the archaeological knowledge about an artifact is to be encoded. In this context, the use of representation is instrumental, and the main function of tools may be to communicate the archaeologist's interpretation of the data. Whereas a diagram might be considered to be more objective and used to support a carefully outlined hypothesis presented in an academic essay, a beautiful illustration of a reconstruction might be thought of as more expressive and communicative to a general audience and thus be included in a museum exhibition.

Notes to chapter eight:

1. B. G. Trigger, *A History of Archaeological Thought* (Cambridge: Cambridge University Press, 1997), 19.
2. M. Shanks, *Experiencing the Past: On the Character of Archaeology* (London: Routledge, 1992), 8.
3. Ibid.
4. Ibid., 18.
5. Ibid., 26.
6. K. Krippendorff, ed., *Design in the Age of Information: A Report to National Science Foundation (NSF)*, Design Research Laboratory, North Carolina State University, 1997, 41.
7. Shanks, 19–20: “Total recovery of all the surviving past is not possible, some selection must be made. The most efficient and rational way to make a selection is to pose meaningful questions and set about answering them.... This application often takes the form of model building and testing.... Testing models involves applying them to data—fitting data within them to see if it works as expected.”

8. Ibid., 19: “Models are ideas or sets of ideas which simplify the complexity of archaeological observed remains, isolating those aspects considered important from irrelevant facts and information, and offering an explanation of what has been observed.”
9. Ibid., 20.
10. Ibid., 15.
11. Ibid., 44. In the context of archaeology, Shanks has defined hermeneutics as “the theory and skill of interpretation...the understanding of the significance of actions.”
12. G. Bowker and S. L. Star, Sorting Things Out: Classification and its Consequences (Cambridge, Mass.: The MIT Press, 1999), 5.
13. M. Shanks, Classical Archaeology of Ancient Greece: Experiences of the Discipline (London: Routledge, 1996), 22–91. There is here an interesting and critical account of the use of typology in the early history of archaeology, with an emphasis on the use of categories borrowed from art history and the influence that this may have had on the development of classical archaeology as a whole.
14. C. Renfrew, The Ancient Mind: Elements of Cognitive Archaeology, C. Renfrew and E. B. W. Zubrow, eds. (Cambridge: Cambridge University Press, 1994), 6. Renfrew argues for the idea that even in prehistory, artifacts are the result of a process of design: “...the production of an artifact need not depend upon any conceptualising, nor need it pre-assume the use of language. Yet unless the production process is an instinctive one which is genetically determined, then the term design is appropriate.”
15. TYA 619-564. Clay disk with cord impressions. University of Turku Department of Archaeology Archive:
http://www.mlab.uiah.fi/mulli/html/media/valokuva/e_tya619_564.html
16. Shanks, Experiencing the Past, 30.
17. C. Richards, “Knowing about the past,” in Interpreting Archaeology: Finding meaning in the past, I. Hodder et al., eds. (London: Routledge, 1997).

18. Shanks, Experiencing the Past, Shanks notes how: “Archaeological data are created in people’s experience, through their senses, their application of terms of descriptions and attribution, their social practice of archaeology,” 26. In the opinion of the author, this means that the archaeologist brings his/her own body, as well as his/her social network, into the practice of archaeology.

19. Costall, A., “Things and things like them,” in The Cultural Life of Images: Visual Representation in Archaeology, B. L. Molyneaux, ed. (London: Routledge, 1997), 51.

20. Jussi-Pekka Taavitsainen, “Archaeology is a form of specialized history writing,” personal communication (August 2001).

21. L. Adkins and R. Adkins, Archaeological Illustration: Cambridge Manuals in Archaeology (Cambridge: Cambridge University Press, 1989), 60.

22. Ibid., 72–73: “Most plans are drawn at a scale of 1:20, although for greater detail they may be done at a scale of 1:10.” The plans of the Mulli site have been done using a scale of 1:20.

23. Ibid: “Vertical measurements are not required, since a survey is a two-dimensional representation of a three-dimensional landscape.”

24. K. Henderson, On line and On Paper: Visual Representations, Visual Culture, and Computer Graphics in Design Engineering, (Cambridge, Mass.: The MIT Press, 1999), 199.

25. Adkins, 59-80. Scales and all the other devices used for field drawing and that are part of the visual culture of archaeology are very important, since they allow for the construction of narratives pertaining the degree of accuracy in the measurement, or the amount of detail in the illustration.

26. Shanks, Experiencing the Past, 170: In Shanks opinion, craft is “the intention of a unified practice-hand, heart, and mind combined in critique and affirmation, a harnessing of pleasure and learning.”

27. J. Thomas, “Reconciling symbolic significance with being-in-the-world,” in Interpreting Archaeology: Finding meaning in the past, I. Hodder et al., eds. (London: Routledge, 1997), 210–211.

28. M. P. Leone et al., “Can an African-American historical archaeology be an alternative voice?” in Interpreting Archaeology: Finding meaning in the past, *op. cit.*, 110–124.

29. The activities organized by the archaeologists working for the Raisio community, and now by the staff of the Harkko Museum, are a good representative of this. Some of these activities are recorded in their publications.

30. Trigger, 370–371.

31. A term that roughly corresponds to that of matrix is toolbox.

32. L. Patrick, “Is There an Archaeological Record?” in Advances in Archaeological Method and Theory, Vol. 8, M. B. Schiffer, ed. (London: Academic Press, Inc., 1985), 28–29.

33. *Ibid.*, 29.

34. *Ibid.*, 17.

35. *Ibid.*, 28. Elsewhere Patrick argues that as a model the record not only compares two phenomena, but also, relates the data in complex ways. “When a model is rigorously defined and applied, it is tied into a theory so that the theory’s logical consistency, explanatory force, and predictive capacity are preserved and actually furthered by the model,” 32.

36. *Ibid.*, 38.

37. *Ibid.*, 38–41.

38. Shanks, Experiencing the past, 67.

39. Adkins, 6–7.

40. *Ibid.*, 80: in archaeological illustration, section drawing is a term used to refer to the drawings of a vertical section of a site, with the aim to “represent the sediments together with the archaeological features as naturalistically and informatively as possible.”

41. Ibid., 131; this is particularly the case when, in order to determine whether a reconstruction is plausible, the meaning and function of the surviving evidence is examined and interpreted with precision.

42. Shanks, Experiencing the Past; see Part 2, Archaeological Interests, the section on “Desire and Metaphor: An Archaeological Erotics,” 53–82, for elaboration on this theme.

43. B. Latour, Science in Action: How to Follow Scientists and Engineers Through Society (Cambridge, Mass.: Harvard University Press, 1987), 64.

44. Ibid., 64–74.

45. Adkins, 80.

46. Ibid., 71.

47. 3D Computer Graphics Dictionary: In an orthographic projection, the projectors (or the imagined lines from the object to the surface on which projection takes place) are parallel, and therefore, do not create a perspective with foreshortening:
<http://oss.medialab.chalmers.se/dictionary> .

48. Adkins, 144: “An isometric projection is a species of orthographic projection in which but a single plane of projection is used. It is so named from the fact that the projections of three equal lines, parallel respectively to the three rectangular axes, are equal to one another.” Hypertext Webster’s Gateway: “Isometric” From Webster’s Revised Unabridged Dictionary (1913).

49. E. Ferguson, “The Mind’s Eye: Nonverbal Thought in Technology,” Science, Vol. 197, No. 4306 (August 1977): 831.

50. P. Kahn, L. Krzystof, and M. Kasman, “Real Space and Cyberspace: A Comparison of Museum Maps and Electronic Publication Maps,” in ICHEM ‘97, Proceedings of the Fourth International Conference on Hypermedia and Interactivity in the Museum (Paris, France: Archive and Museum Informatics, 1997), 126–140. In this essay, the use of isometric perspective in electronic maps is discussed.

51. P. Kahn and K. Lenk, Mapping Websites (East Sussex, Engl.: RotoVision, 2001).

52. L. Nuti, "The Perspective Plan in the Sixteenth Century: The Invention of a Representational Language," The Art Bulletin, Vol. LXXXVI, No. 1 (March 1994), 105–128. According to this essay, the use of perspective encouraged the development by artists of a new language of representation.

53. Adkins, 133.

54. Ibid., 131-132.

55. Ibid., 131.

56. Shanks, "Photography and Archaeology," in The Cultural Life of Images: Visual Representation in Archaeology, B. L. Molyneux, ed. (London: Routledge, 1997), 74.

57. Ibid., 73.

58. Ibid., 84.

59. Ibid., 76.

60. Ibid., 80.

61. Adkins, 59–69.

62. F. El-Baz, "Space Age Archaeology," Scientific American (August 1997): 40–45. This article is a summary of state-of-the-art remote sensing techniques and their applications in archaeology.

63. Adkins, 77–82. By shifting the concept of the archaeological site as a static entity, as opposed to something that comes into being as the result of a myriad of variables of an environment and cultural nature, in archaeology this debate has had a profound influence.

64. Strata is the term used to refer to "a sheetlike mass of sedimentary rock or earth of one kind lying between beds of other kinds." Merriam Webster's OnLine: <http://www.m-w.com/cgi-bin/dictionary> (January 8, 2001).

65. Stratification literally means “The act or process of laying in strata, or the state of being laid in the form of strata, or layers.” Webster’s Hypertext Dictionary: <http://www.fin.gov.nt.ca/webster.htm> (July 11, 2000).

66. E. C. Harris, Principles of Archaeological Stratigraphy (London: Academic Press, 1979), 9.

67. J.-P. Taavitsainen, “Cemeteries or refuse heaps,” Fennoscandia Archaeologica, Helsinki: Eripainos Suomen Museo, 1991, 5: “Scientific dating methods permitted archaeologists to concentrate in a much broader way on new problems of theory and method, and socio-economic problems came to be addressed. This meant the birth of a theoretical archaeology.”

68. Trigger, 382.

69. Ibid., 383.

70. Shanks, Classical Archaeology of Ancient Greece: Experiences of the Discipline (London: Routledge, 1996), 40–48.

71. Trigger, 383.

72. Thomas, 210.

73. V. Buchli, “Interpreting material culture: the trouble with text,” in Interpreting Archaeology: Finding meaning in the past, I. Hodder et al., eds. (London: Routledge, 1997), 182.

74. S. Hall, “The Work of Representation” in Representation, Cultural Representations and Signifying Practices, S. Hall, ed. (London: Sage, 1997), 44.

75. See: I. Vargas Arenas and M.S. Obediente, “Education and the Political Manipulation of History in Venezuela” and “Education and Archaeology in Japan” in The Excluded Past: Archaeology in Education, P. G. Stone and R. McKensie, eds. (London: Routledge, 1990). These essays contain specific references to how archaeological know-how is manipulated for the production of ideologies of power.

76. P. G. Stone and R. McKensie in The Excluded Past, 1.

77. Vargas Arenas and Obediente, "Education and the Political Manipulation of History in Venezuela," 58.

78. C. Fawcett and H. Junko, "Education and Archaeology in Japan," in The Excluded Past: Archaeology in Education, P. G. Stone and R. McKensie, eds. (London: Routledge, 1990), 225.

79. Sirkku Pihlman, personal communication (September 10, 2001). See also: "Des misshandlade vikingen," in Populär Arkeologi, No. 2 (1998), and Prof. Christian Keller's keynote address: "Production of the Past. On Management of Cultural Monuments in Norway. Past, Present and Future" at the Material Ideal Conference, held in Helsinki, May 18–20, 2000.

80. M. P. Leone et al., "Can an African-American historical archaeology be an alternative voice," Interpreting Archaeology: Finding meaning in the past, I. Hodder et al., eds. (London: Routledge, 1997), 111.

81. *Ibid.*, 123.

82. P. G. Stone and R. McKensie in The Excluded Past, xix.

83. *Ibid.*, 8.

84. Shanks, Experiencing the Past, 130.

85. *Ibid.*, 55.

Archaeology in Illuminating History

Since the late 1980s, computers and new media technology have played an increasingly important role in the humanities and in disciplines such as archaeology. A survey of projects being conducted in this area reveals that there is a wide spectrum of efforts. These range from the obvious application of the technology in the reconstruction and cataloguing of ancient edifices, to the creation of computerized “dictionaries” of ancient pictograms that allow the researcher to examine large amounts of data and play with diverse combinations of graphic elements.[1] The goals or sites of the work have varied, however, whereby an interdisciplinary collaborative approach, and the projected the results in terms of information based products (such as hypermedia databases, digital libraries, archives, and museum exhibitions), seem to be constant ideals for these projects. This should not come as a surprise: Within the electronically mediated *milieu* of information environments, not only can novel forms emerge from the cultural production, but also the *old can be reinterpreted* and given new configurations. The work described in this collaboration is one example of the type of projects being done in archaeology that make use of digital media.

LATE IRON AGE ARCHAEOLOGY IN RAISIO

The city of Raisio lies on the coast of Southwestern Finland, close to the larger city of Turku, an important center of culture in Finland. Raisio is not an old city; 50 years ago it was still a rural municipality with little more than 2,000 inhabitants. However, during the 1950s Raisio entered into a process of rapid urbanization. Nowadays, Raisio has 23,000 inhabitants. It is also the site for some important food processing plants and factories in Finland. There is not much agriculture left, but outside the small town center and the apartment-block suburbs surrounding it, Raisio has retained a countryside appearance. Farming villages have been transformed into communities of single-family homes.

According to archaeologist Sami Raninen, the first archaeological excavations were undertaken in Raisio during the 1930s. Additionally, the co-operation between Raisio and the University of Turku has produced several archaeological fieldwork projects since the mid-1980s. The focus of interest in these has been the district of Ihala, where several archaeological sites are situated in close vicinity to one another. These sites can be mostly dated to the Finnish Late Iron Age, or roughly 800–1200 AD. One of these sites is the settlement site that has been called Mulli by the archaeologists. In this site, extraordinarily well-preserved remains of several wooden buildings

were found. They belonged to a farm that was inhabited 9th–13th centuries. Archaeological evidence suggests that the people of the farm cultivated barley, rye, and wheat and practiced fishing and sealhunting. Several artifacts related to trading activities were also found. Among these, there were imported Islamic glass beads, and a hoarded bronze ingot weighing approximately 17 kg. The main exports were probably furs.[2]

Among the finds, there is evidence of the practice of handicraft activities, such as metalworking and extensive cloth-making. Near the settlement site lies the early Christian cemetery of Kansakoulunmäki. This site has been dated mainly to the 12th century, and quite possibly, it was used by the inhabitants of the Mulli site. The finds of this site, such as a sword deposited in a burial, the remains of a richly ornamented dress from a female inhumation, and a silver hoard from the 11th century, seem to indicate that the inhabitants of Mulli enjoyed a relative prosperity. The other sites include the two Viking-age, pre-Christian cremation cemeteries of Siiri and Mahittula, and the possible hill-fort of Linnasmäki. Near the Ihala district several other Iron Age sites are situated. The oldest of them dates back to the pre-Roman period (500 BC– 0 AD), but most are contemporary to the sites of Ihala.[3]

The site of Mulli was destroyed in a fire during the 13th century, but later a hamlet evolved on the same spot. This was the hamlet of Ihala, that is first mentioned in documents dating back to the 15th century. The site is mentioned again in later documents and there is written and cartographic evidence of Ihala from the 18th century onwards. The Ihala hamlet was finally dissolved during a land partition reform in the 19th century.[4]

Many of the finds resulting from the excavations held during the years 1994-96 are kept in the archive of the University of Turku Archaeology Department. The materials found during prior excavations and work in this area, however, have been incorporated into collections that are now kept in diverse repositories such as, for example, the National Museum of Finland. Among these items there are artifacts such as cult items from pre-Christian as well as early Christian times, coins of diverse origins, some of which date back to 980 AD, and clothing and jewellery remains, also from the early part of the millennium. Overall, the dating of most of the items in the archive is within 800–1200 AD.

THE ARCHAEOLOGISTS' CONTRIBUTION

Most of the archaeologists who participated directly in the project were students engaged in an MA-level program of studies at the University of Turku. In addition to these students, the project also benefited from the active participation of two of the tutors from the department.[5] The

archaeologists worked mainly in the creation of the content that is included in the archive. Their work could be described as identification and gathering of materials of interest, creating the contents and documentation materials of the archive. The archaeologists also helped the designer to locate many of the archival sources, such as the maps and aerial photographs so that they could be photographed and digitised.

Creating the content included formatting the archaeology reports into HTML documents and selecting the items to be photographed for inclusion, as well as assisting the designer and his/her team in the documentation of the different activities that occurred in as part of the excavation. Some examples of such workshops included reconstruction of ceramics and an exhibition based on the materials. In addition, following suggestions from the designer and with the help of their tutors, they wrote the texts for all the sections of the archive.[6] They also created the classification system that is used in the archive, with the assistance of the designer and their tutor, Sirkku Pihlman. Lastly, they suggested the initial organizational scheme for the materials. From a four-level hierarchy, this hierarchy was later simplified to facilitate navigation.

Documentation: The use of guidelines

Creating archival documentation involved analysis, organization and recording. In the case of cultural heritage materials the methods used depend on the nature, role and perspective of the holders of the information, as well as the information itself.[7] The projected users of the Raisio archaeology archive include researchers in archaeology and other fields of the humanities, educational personnel seeking to create curriculum materials that touches the areas of archaeology, history and folklore, specialists interested in the use of digital technology in the museum; and the public in general. This notion of a polysemous target audience was important to the author who considers that cultural heritage institutions must reach many types of audiences, each with diverse needs. In addition, there is the rationale that the creation of digital repositories of data is an expensive labor-intensive activity that should benefit the community as a whole.

Templates or guidelines were created to assist the archaeologists and content specialists in the writing of most of the textual documentation and narrative materials in the archive. This proved to be a difficult task for the students of archaeology who are trained to write in a highly specialized language and with a very specific target audience in mind. In order to solve this problem, the designer created a set of guidelines. These were discussed in detail during the phase of work performed during the summer of 1998. In general, by adjusting the templates whenever it was necessary, the archaeologists also contributed to their development.

In creating these guidelines, the designer borrowed from two traditions, namely the archival tradition and museum documentation practices. The emphasis on provenance of the artifacts came from the archival tradition. In practice this is reflected in the structure and organization of the Table of Contents (ToC's) in the Media Types section of the archive. This inventory register structure has already been described in an earlier section.

The terms in the classification system reflect this type of approach as well. The items in the archive have been named according to their hypothetical function, as well as in terms of their physical characteristics. These artifacts have retained their original archival nomenclature in the form of the Unique Object ID. In the documentation of the media types, the following elements are Dublin Core compliant: Object/type, Object/title, Current location/ repository name, Repository number, Date/creation.

The image displays two screenshots from a web application. The left screenshot shows a list of 'Studio Photographs' with columns for Name, Archive number, Dating, Place of find, Media, and Photographer. The right screenshot shows a detailed view of a 'GLASS PAINTING (IIV 4419-1)', including a photograph of the artwork and associated metadata such as 'Type: Glass painting (3: 1446)', 'Media: Glass church', and 'Dating: Late 16th-18th Ages'.

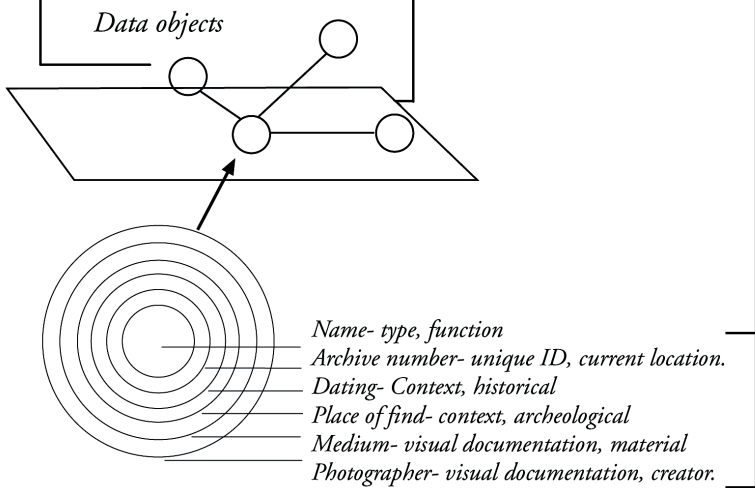


Figure 49: Diagram and photographs depicting the ontology of the archive and media artifact. The categories were created by the designer in collaboration with the archaeologists. The conceptual framework for these categories was derived from the Categories for the Descriptions of Works of Art created by the Getty Information Institute and the College Art Association. The *Name* and *Archive number* elements are compliant with the Dublin Core specifications.[8]


Hotmail - The World's FREE Web-based E-mail

Address: http://64.4.16.250/80/cgi-bin/inter4?...
 Live Home Page Apple Mtp://www.google.com/ Tools Apple Support Apple Store Microsoft MacTopic MSN Office for Macintosh Internet Explorer

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STUDIO PHOTOGRAPHS

CLAY-DISK WITH CORD IMPRESSIONS (TYA 619: 564)



CLAY-DISK WITH CORD IMPRESSIONS (TYA 619: 564)

Type: Fragment of a clay-disk with a cord impression round the hole.

Use: Probably a weight for upright loom warp yarns.

Site: Rainso, Ihala, Mulli abode.

Period: Viking Age / Crusade Age / Early Middle Ages.

Dating: 980-1220 A.D.

Weight: 245.7 g

Photographer: Antti Huitunen

More than 67 kg of fragments of clay-disks have been discovered in Mulli abode. The disks have been shaped in clay and there is a hole in them. After shaping the disks were usually burnt. These items have been presumed to be, e.g., weights for nets or mouthpieces for bellows. In Mulli, clay-disks were most probably used as weights for warp yarns of upright looms when a fabric was woven. Clay-disks are known in Finland from the 4th century to the 13th century in abodes, cemeteries and prehistoric castles.

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.

Sources:

- Andersson 1996: 28, 32, 35, 38, 39, 50, 51, 69-72.
- Antell.
- Bender Jørgensen 1991.
- Cleve 1943: 160.
- Kivikoski 1973: Abb. 377, 630, 986.

Other pictures:

- TYA 279: 30 (clay-disk in situ)
- TYA 619: 319 (clay-disk with stick impressions)
- TYA 619: 326 (clay-disk with hole impressions)
- TYA 619: 331 (clay-disk with stick impressions)
- TYA 619: 543 (clay-disk with finger impression)
- TYA 619: 557 (clay-disk with cord impressions)
- TYA 631: 265 (clay-disk with circular cross impression)
- TYA 631: 1514 (clay-disk with circular cross impressions)
- TYA 642: 532 (clay-disk with finger impression)
- TYA 642: 1331 (unburnt clay-disk)
- TYA 642: 1770 (clay-disk with stick impressions, detail)

Other related topics:

- Ceramics
- Textile work
- Tools and utensils
- Trade, handicraft
- Vertical looms

Coordinates: x=101, y=504, 3rd layer.

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Internet zone

Figure 50: Screen with captions created by the archaeologists. The screen depicts a caption created for the Media artifacts section. It contains taxonomy information that is important for the archaeologists, as well as general narratives that may be of interest to the general public.

Sources that can be used to obtain additional information, as well as links to related images in the archive connect the materials with other domains of knowledge.

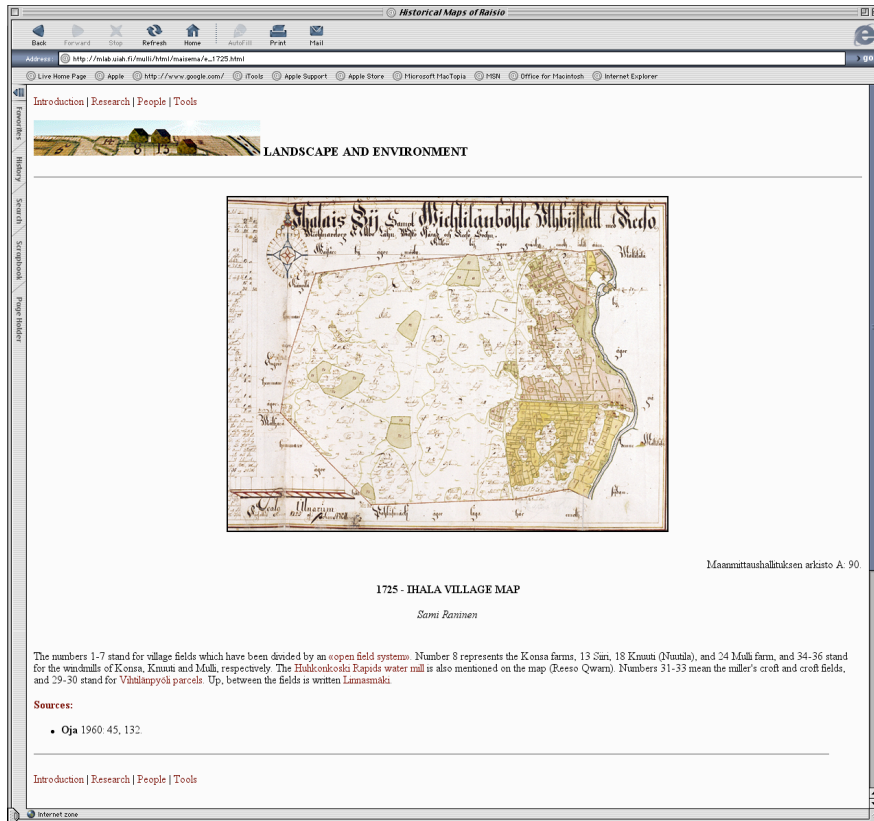


Figure 51: Screen with captions created by the archaeologists. A brief narrative provides the viewer with information about this historical artifact as well as provides links to other sections and narratives in the archive.

From the museum documentation tradition, the designer borrowed a visual resources approach. This approach focuses on the use of images as part of the educational experience, focuses on description of objects, incorporates vocabularies (such as the Art and Architecture Thesaurus.[9]) and uses nonstandard classification systems.[10] This approach was implemented in the form of multilayered templates. As already mentioned, these templates were used by the content specialists when creating the documentation, such as the captions, labels, and narratives that accompany each of the objects in the collections. The captions created for the photographs, for example, consist of descriptions of the object “in hand,” as well as of information pertaining to related areas of knowledge. The captions are structured into three layers that range from technical, discipline-specific information about the item depicted, to linked narratives meant for a wider audience, and finally to interdisciplinary resources such as related sources and bibliographic materials. With this approach, the designer hoped to allow for the possibility of showing a

multitude of artifacts extracted from diverse repositories. The categories created through this method were also used to determine the search strategy for the search engine that was implemented.

Aside from the highly technical and discipline-specific knowledge, the narratives created by these scholars also contain general information that may be of interest to those who are not specialists, but who have an interest in archaeology and history. The objective was that the contents and presentation of these materials would not be limited to specialists, but that they would allow for the possibility of reaching a broad spectrum of potential users.

Working with the archaeologists

Creating the Mulli archive was a difficult but satisfying experience. Among the most problematic issues encountered was the physical distance, and separation, from the colleagues in Turku. The use of a telematic system was one of the solutions that we attempted during the beginning of the project. This did not really work out for various reasons, the most important of which was the lack of funding at the Department of Archaeology in Turku. This lack of funding translated into a lack of infrastructure or human resources necessary to test and implement the system properly. As has been noted elsewhere, instruction and the sharing of information through one of these systems is a task that requires careful planning. Due to the lack of physical presence, a traditional lecture format does not work. This is especially true if the material presented consists of abstract concepts that are difficult to present.

In addition to the problem of the physical distance, there was the ideological separation between the disciplines, which at some points resulted in communication problems. These communication problems were more pronounced in instances in which the implementation of design concepts required a departure from the more traditional manner in which the archaeologists were used to working. This was especially true not only with regards to the use of the classification and index as an interface to the data, but also with regards to the idea that the creation of the contents of the archive would not involve the production of one narrative, or storyline:

...the index is the tool how the user can make searches to the materials, isn't it? And the material does not have to be in any order? I have understood all the time that we should organize the material (pictures and captions as well) into different categories which can be seen on the screen and when you click that category, for example, fishing you can have a link to the picture of fish bones and to its caption. But if we have an index, the user can create

his/her own searchwords, meaning her own categories. Have I understood correctly? We can talk more about this at Krokila then.[11]

All the same, because of their professional attitude, commitment and generosity, working with the archaeologists was a very interesting and rewarding experience for the designer.

SUMMARY

The Internet and the World Wide Web constitute the beginnings of a global information infrastructure that opens the opportunity to create and implement new strategies for the communication of scientific endeavors. Where it was previously necessary to create different documents and create different products for different audiences, it is now becoming possible to create knowledge bases that contain a wide variety of materials, yet presents them in an appropriate fashion and according to the needs of particular audiences. However, in order to create these types of repositories, collaboration among diverse disciplines is necessary.

Projects that involve collaboration are not easy to realize. This is partly because of the complexity involved in bringing diverse parties together to work on a single task. Each discipline has its own practices, ideologies, and worldviews. In such situations, the ideal of a common objective may not always be clear, or sustainable across prolonged periods of time. It is important to define common spaces, methods and tools, as well as become cognizant of the differences that exist and how these can translate in to opportunities for working together.

Notes to chapter nine:

1. C. Renfrew, "Introduction," *Virtual Archaeology: Great Discoveries Brought to Life Through Virtual Reality*, (London: Thames & Hudson, 1997).

2. S. Raninen and L. Diaz, "Designing Classification: An Overview from the Illuminating History Project," in *Virtual Archaeology: Proceedings of the VAST Euroconference* (Arezzo, Italy, 24–25 November 2000), F. Niccolucci, ed. (Oxford: Bar International Series, Archaeopress, in press).

3. For more information and a view of these sites the reader is referred to the following URLs in the "Archaeology Sites" section of the Ihala/Mulli Digital archive:

http://www.mlab.uiah.fi/Mulli/paikat/e_paikat.html (April 6, 2001).

http://www.mlab.uiah.fi/Mulli/paikat/e_mulli.html (April 6, 2001).

http://www.mlab.uiah.fi/Mulli/paikat/e_kansakoulunmaki.html (April 6, 2001).

http://www.mlab.uiah.fi/Mulli/paikat/e_siiri.html (April 6, 2001).

http://www.mlab.uiah.fi/Mulli/paikat/e_mahittula.html (April 6, 2001).

4. The following URL, in the “Research” section contains a narrative by Sami Raninen about the vicissitudes of the Ihala hamlet:

http://www.mlab.uiah.fi/Mulli/html/tutkimus/e_mulli_ihala.html (April 6, 2001).

5. Professor and Archaeologist Jussi-Pekka Taavitsainen, and Sirkku Pihlman Archaeologist and head of Museology at the Department of Cultural Studies at the University of Turku.

6. Archaeologist Sami Raninen also edited the final English translations of the captions and other narratives.

7. E. Lanzi and H. Besser, “Introduction,” in Vocabularies: Enhancing Access to Cultural Heritage Information (Los Angeles: Getty Information Institute, 1998), 8.

8. W. Kessler-Cromwell, “Crosswalks: metadata mapping, and interoperability: What does it all mean?” in Introduction to Metadata: Pathways to Digital Information, M. Baca, ed. (Los Angeles: Getty Information Institute, 1998), 21: “The Categories for the Descriptions of Works of Art (CDWA) offers an extensively articulated and very inclusive taxonomy of cultural heritage information.”

9. The Art and Architecture Thesaurus (AAT) is a controlled vocabulary created by the Getty Information Institute. For more information see:

<http://www.getty.edu/research/tools/vocabulary/aat/> (October 21, 2001).

10. Lanzi and Besser, 13.

11. Ann-Christin Antell, M.A. in Archaeology, personal communication (December 1998).

Conclusion

BETWEEN ART, DESIGN, AND ARCHAEOLOGY

In the physical sense, boundaries point to in-between territories of intense activity, spaces of transition where everything is in constant flux: Identity, economy, and sovereignty, for example, are up for negotiation at the boundary between two states. Boundaries can operate at the individual and personal, as well as at the collective and social level. At the level of individual physical boundaries, the reach and extent of the body is implied. Boundaries can also be those defined by periods of time. In this manner they frame states of being, such as the significant moments of time in the individual's life-cycle. Thus, "being at the boundary" is accompanied by the presence of ritual and other *rites de passage*. At the collective and social levels, boundaries come into sharp relief during times of upheaval and change. For example, in the case of the realm of knowledge production, intense scrutiny might reveal the occurrence of deep paradigmatic shifts.

The work presented in this monograph deals in many instances with the issue of the boundaries between disciplines and the subsequent effect on collaborative endeavors. The emergence of the Information Society is a phenomenon in which the boundaries of space, time, and knowledge have been contested. In this volatile landscape the new disciplines that have arisen from the intersection of traditional forms of knowledge are examples of the impact of new instruments, such as the computer, for information production, and communication in areas related to the production of knowledge. In the words of Herbert Simon:

Those of us who have lived close to the development of the modern computer... have noticed the growing communications among intellectual disciplines that takes place around a computer. We have welcomed it because it has brought us into contact with new worlds of knowledge—helped us combat our own multiple cultures of isolation. This breakdown of old disciplinary boundaries has been much commented upon, and its connection with computers and information sciences often noted.[1]

It is plausible to argue that this breakdown of boundaries, and the emergence of these new disciplines, stems from a need to fill in gaps of knowledge deemed necessary to further develop the Information Society's infrastructure. For in the drive to create innovative products and ever-more complex systems, the search for new ideas and explanations concerning how both humans and computers can interact better, becomes a priority. As new disciplines and areas of knowledge come into being, they also generate needs for new conceptual tools and models. These tools may be created anew, or they may be borrowed through what has been called methodological

opportunism.[2] At the same time, traditional forms of knowledge, seeking to maintain their relevance, evolve: they also aspire to use new tools being created for other disciplines. So they look beyond for examples, for guidance—whether in the form of methods, role models, or simply for basic instruction. In doing so, they are transformed.

From these collaborations emerge areas of intersection between disciplines such as art, design, and archaeology that are not traditionally seen as relevant, but which during periods of upheaval rise to prominence. It may be that the existence of networked information environments, such as the Internet, has facilitated cross-fertilization and multidisciplinary collaborations. The myriad of projects in archaeology, the humanities and social sciences in general, that utilize new media technology originally developed for art and design production are examples of these collaborations. In these in-between territories, artists and designers work together with scholars, such as archaeologists, to create coherent and effective information and communication artifacts.

The artifacts resulting from these collaborations have laid out the initial foundation. However, they provide but a narrow view from which to view a vast universe, still to be discovered and surveyed. The pace of change unleashed by the forces of technological advancement will not abate. Still the necessity for a systematic assessment of the roles of the different participants in collaborative work remains. What happens in-between art, design, and archaeology? This is, indeed, an inquiry that can supply those involved with valuable information: new heuristic devices that can help us gain a better comprehension of complex spaces of interaction. Carving new meanings, engendering new dialogues, revealing the essence of the subject matter and content, are as much a part of the task of the artist and the designer, as of those involved with the humanities and the sciences.

The development of digital media and information technology is altering the very fabric of many professions including art, design and archaeology. The disciplines in the humanities and social sciences have always made use of images in their research. In the opinion of this author, what is now at stake is what the role of the artist and the designer will be in the new configurations that arise. Within the newly emerging edifices of the virtual how will the artist and the designer evolve into the “new breed of artisan/professional, using both skill and intellect.”[3]

As we have attempted to demonstrate, the role of art and design need not be limited to the creation of objects. Artists and designers can be powerful agents of innovation, who work on the creation of new processes, activities, communities, and tools. As John Dewey noted, the artist thinks and engages in intellectual inquiry in such a manner that the thinking occurs in “the very qualitative media he works in, and the terms lie so close to the object that he is producing that

they merge directly into it.”[4] By studying the way in which artists work, we gain insight into the dynamics of creativity and how these extend into the realm of the cognitive.

The instrumentality that is part of design can, in turn, be applied in conceiving new activities and processes from the interaction of already existing communities working with the new digital tools. These new activities can generate new objects to support already existing communities, as well as further engendering new ones.

Then there is also the question of how to create the future networked virtual environments that offer valuable and meaningful content. The fulfillment of this vision rests on the enabling of successful collaborative efforts. This is because the degree of complexity inherent in information artifacts requires these to be conceived and realized within rich, complex, networks of multiple disciplines. These networks can only be actualized through collaborative endeavors that feature actors from diverse knowledge fields who share a common objective. This is why the author decided to make this work one that would elaborate and ponder on conceptual items such as artifacts, boundaries, and collaboration. In this author’s opinion, a lot of lip service is paid to collaborative approaches, however, there is little actual data from projects that have involved participants from diverse disciplines working together to solve a problem:

It may be relatively easy to assemble a multi-disciplinary team, but to ask the participants to work constructively and efficiently together over a period of time demands an interdisciplinary attitude. This suggests integrating approaches from other disciplines, allowing for ‘multiple sightings.’ It further suggests designing a system that allows for all to design, with some addressing meta-design issues, while others address the details.[5]

The project “Illuminating History: Through the Eyes of Media” is an example of an actual project that did involve multidisciplinary participants working towards a common goal.

Collaboration is an important component in the design and production of complex information artifacts. It is important, however, to realize that these are conceptual structures operating at the metaphorical level through language. They can be useful to the process of design in that they can enable us to create the multivalent information artifacts and tools we desire. It can also help us in creating better products, more efficiently. Consider the situation of the programmer and the designer working in the creation of a Web site. The programmer may not know much about aspects of visual composition. The graphic designer may not be aware of the existence of techniques for creating dynamic applications. By collaborating, they can pool their skills together

and create a much better product than if working apart. But desire is not enough. It must be complemented with a will to act.

Throughout this work an approach to collaborative design that makes use of the notions of the artifact and of the activity has been proposed. Artifact is a conceptual structure that can be used in understanding how the different aspects of knowledge come together in the creation, or design, of a new object. This understanding can promote and facilitate the design process. In Figure 51 below, there is a sample of different items from the current study. These have been organized along the lines of Marx Wartofsky’s three-tiered hierarchy. The knowledge of the archaeologist is implicit in the Primary artifact, namely the unearthed fragment, the newly discovered mark. As the fragment is restored, and reconstructions are made of it by archaeologists, artists, and designers, the fragment is transformed into a Secondary artifact. In this state, the fragment is brought into the narrative and discourses of our present. It may be used as an example, to illustrate life in an ancient society. It is made a part of history. When the present and history are brought side by side to coincide, it may be that a Tertiary item is created. An archaeology exhibition, or a digital archive, that inspires and promotes new forms of knowledge, new artifacts, is a Tertiary artifact.

	Material domain	Immaterial domain
Primary artifact	Fragment of disk loom	Marks on disk loom
Secondary artifact	Restored disk loom	Digital reconstruction of disk loom
Tertiary artifact	An archaeology exhibition	A digital archive of archaeological materials

Figure 51: Wartofsky’s three-tiered hierarchy as applied to items from the current study.

There is a need to continue developing models and explicit working knowledge of how to institute multidisciplinary collaborations.[6] We need to understand how and where disciplines intersect, as well as the areas of divergence that are integral to their essence. We need to know where one actor’s work ends and where another begins. We also need to understand the different perspectives of each discipline such as, Who are the different actors? What is the nature of their

role? Are they overt, active participants? Or is their role an implicit one, of restraint? What tools do they use to produce knowledge? How do they use them? What are the overall mechanics involved in the creation of knowledge? How do the knowledge objects produced by each discipline differ? What discursive formations exert pressure and shape the final outcome or objects of the activity?

The matrix presented in Figure 52 below, represents an initial approach to outline aspects of activity. It illustrates areas of commonality between art, design and archaeology, as well as distinctions. The structure has been adapted from Kari Kuutti’s formulation of a classification of an activity using Activity Theory. The six-element structure of the activity system as outlined by Kuutti has been maintained with slight modifications of the terminology.[7] The elements depicted in the three columns represent a different point of view, or attitude, towards the six concepts represented in the rows. The manner in which these are organized allows us to observe the points of divergence, as well as the instances where they may share a common ground.

	<i>The Artist</i>	<i>The Designer</i>	<i>The Archaeologist</i>
Instruments	Recording tools and media Representation tools Conceptual tools and methods	Representation tools Recording tools and media Conceptual tools and methods	Inscription tools Measuring tools Excavation tools Recording tools and media Conceptual tools and methods Representation tools
Actor	Creating Expressing Communicating Representing	Understanding Interpreting Representing Communicating	Observing Documenting Communicating Interpreting
Object of activity	Art objects Art activities	Artefacts • Products • Processes • Concepts	Archaeological record • Facts • Typologies • Narratives • Visual materials
Rules/ Discourses	Art object as distinct from regular artefacts.	Defining what is the discipline of design.	Instrumental use of archaeological knowledge.
Community	Art world: • Critics • Patrons • Institutions • Audience	Market User Target audience General audience	Academia Museums Collectors The State
Organization of labour	Independent, co-ordinated group action.	Independent, co-ordinated group action, hierarchical group action.	Co-ordinated group action, hierarchical group action.

Figure 52: Different aspects in the activity of art, design, and archaeology.

The chart was created with the objective of better understanding how the different elements of the activity system of the multiple actors differ, yet also resemble each other. The implicit assumption was that such an understanding might lead to recognizing points of convergence. As extensions of ourselves, we use tools to change the world. They in turn shape the way we are. The history of our practices, or our history as beings in action, is embedded in the instruments that we use.

The rules of the activity can be open and explicit, or they can be of an implicit discursive nature. The designer can facilitate collaboration by mediating between the rules and the different communities involved in activity. But in order to do this, s/he must understand how rules influence a community and how this in turn is reflected in the object produced. S/he must also be able to discern when the rules are explicit and openly accepted. In addition, s/he has to be able to recognize, because they are implicit and discursive, when rules have become naturalized, transparent, or invisible to those who are members of the community.

How a community is defined and who gets to be a member varies from discipline to discipline. Understanding these variations is important for the designer who wants to engage in collaborative work. Some of these variations can be observed by looking at how the organization of labor influences the relationship of each member of the community with regard to the object of the activity. Who gets to work with the object, when and how are important aspects that define the nature of the work performed by the different members of the community.

Further research might reveal that there exist points of intersection that offer opportunities for fruitful collaboration. Collaboration can subsequently provide one with new ways to look at his/her discipline. However, many of the opportunities for collaboration exist in spaces residing in-between disciplines. In-between is the space of the heterogeneous. It is the point in the landscape from which the different entities can be examined, in an almost simultaneous manner. As a form of learning, collaboration can expand one's horizon: One gets to visit other disciplines, learn other languages.[8]

But in-between is also the condition of being neither here, nor there. It exemplifies the epitome of uncertainty. Uncertainty is related to the speed of change in our rapidly shifting technological base. Uncertainty is also present in the notion of design as the discipline concerned not with how things *are*, but how they *should* be. Uncertainty is that which we face when we take a leap of faith beyond monolithic discourses and into the realm of the dialogic, of the relative. Uncertainty is one of the reasons behind the search for new research paradigms, new ways of looking at the world, not only in art and design, but in the sciences as well. Uncertainty is related to treading the new ground, the unfamiliar landscape of fluctuating boundaries. That moment of disclosure, where the new emerges, may very well be lodged there, in between.

As a discipline concerned with the invention and the creation of material culture, design is an area of knowledge that can enrich our lives. It can also assist in finding solutions to some of the problems engendered by the complexity of contemporary society. This is especially true in the

case of work that requires collaboration between disciplines. In this type of endeavor, design can provide frameworks for research and development that are inclusive. This was the case with this project. It included the activities of art, archaeology, and of design itself.

A review of the activity of archaeology provided insight into the community and areas of negotiation that the designer entered when s/he agreed to work in this project. A review of the activity of art revealed a historical connection between the tools of the designer, and those of the artist. This historical connection allowed the designer to describe the contribution of art to the project. This is important, since this is an area that is usually marginalized into the category of nonverbal, or tacit knowledge. Also, it leads directly into contemporary discussions regarding the nature and agency of the practice of design itself.

It is possible that, in the future, design can make use of methods such as Activity Theory. However, a lot of work remains to be done before a truly productive relationship can be established. New instruments and models must be created that facilitate its application within design. New discursive foundations in design that allow us to better articulate the space for collaboration and the space between the diverse areas of knowledge are also necessary. There is an urgent need for new frameworks of knowledge that enable us, not only to investigate, but also, to *create*.

Notes to chapter ten:

1. H. A. Simon, The Sciences of the Artificial, 3rd edition (Cambridge, Mass.: The MIT Press, 1996), 138.

2. A. Findeli, “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. (Helsinki: University of Art and Design Helsinki/UIAH, 1998), 67: in the context of urban planning researchers, Findeli discusses how “...they imitate, borrow and mimic the methods and models used elsewhere, with more or less success.”

3. M. McCullough, Abstracting Craft: The Practiced Digital Hand (Cambridge, Mass.: The MIT Press, 1996), 256.

4. J. Dewey, Art as Experience (New York: Perigee Books, 1980), 16.

5. K. Krippendorff, ed., “New Design Principles,” Design in the Age of Information: A Report to the National Science Foundation (NFS), Design Research Laboratory, North Carolina State University, 1997, 35.

6. Ibid., 44. See also: S. Kim, “Interdisciplinary Collaboration,” in The Art of Human-Computer Interface Design, B. Laurel, ed. (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1990), 39.

7. K. Kuuti, “Identifying potential CSCW applications by means of activity theory concepts: a case example,” in Proceedings of the Conference on Computer-Supported Cooperative Work (CSCW) (New York: ACM Press, 1992).

8. Kim, 39.

Appendix 1

JOINT APPLICATION TO THE ACADEMY OF FINLAND

Research program: Research on Knowledge (Tiedon tutkimusohjelma)

Project name: Through the Eyes of Media: Illuminating History
By, Lily Díaz, Pekka Korvenmaa

0 Summary

Through the Eyes of Media: Illuminating History, is a project that will combine methodologies and content from the disciplines of archaeology, anthropology, ethnography, and new media to investigate new representations of information in the humanities.

1. Significance of research

Although archeologists utilize artifacts to learn about the past, there is surprisingly little contact between them, and the artists and designers who produce the objects in today's world. Of interest to this proposal, are the questions of how do archeologists look at, and, for example, illustrate ceramics? How does the view of the archeologist differ from that of the designer? Can the archeologist work benefit from understanding the point of view of the artist and designer in issues such as style and form?

Artists and designers working with New Media possess skills and knowledge that are of value to the development of the Information Society. On a concrete level, information and content are, after all, the raw materials that the new media artist utilizes. At a more abstract level, artists are trained in the cognitive skills involved in pattern recognition, and synthesis of forms and structures that are required to produce not only logical but also effective information and communication products. It is not surprising, thus, that from early on experts have recognized the impact that the artist and designer can effect on the Information Society

Of added significance is how the idea of non-linear access to information allows us to redefine century-long concepts such as text and visualization. These new technologies, and non-linear discursive practices, are being used by artists working with New Media to transform the art object into information. The interdisciplinary collaboration elaborated in this proposal re-mapping of these new information/art objects so as to achieve new representations of content in disciplines such as archeology.

2. Background

The Media Lab represents an investment, on a national scale, by the Ministry of Education. It is situated in the University of Art and Design and its focus is on research and education in the new media. Its initiatives are to undertake practical research in the areas of interactive and multimedia communications; to provide resources for the completion of co-operative projects in the area of New Media; and to provide specialists services for the use of other departments of the University and its educational partners.

The Information Society, with its converging media is a complex environment that requires an interdisciplinary approach to design. This interdisciplinarity is reflected in both research and education at the Media Lab.

The interest of the Media Lab in this collaboration is significant. In the spring, of 1995, we accepted our first Ph.D. student. The topic of research of this student, *The Artist as Historian*, is closely related to many of the areas covered in this proposal. In addition, we have started a pilot project that includes lectures by specialists in these disciplines. This lecture series, *Application of New Media in the Humanities*, will be offered at the Media Lab's New Media Center facility during the Spring semester of 1996. The lectures are given by professionals in fields such as archaeology and cartography and they are targeted to MA and Ph.D. level, research-oriented audiences.

3. Proposal objectives and goals

The objectives of this proposal are:

3.1 To investigate applications of new media technology and how it can be used to create new representations of knowledge in the humanities that make use of the opportunities available through information infrastructures. A concrete example of this idea is to investigate the application of three-dimensional modeling and animation technology for representation and reconstruction of archeological artifacts.

3.2 To develop interdisciplinary approaches to new media research and education that will impact production of media in the humanities. Specific examples of this concept is researchis the use of time-based media, such as digital video clips, for recording of excavation finds.

3.3 To use the synergy resulting from an interplay of diverse disciplines to define a language of inclusiveness that benefits the development of the Information Society in Finland.

These objectives will be accomplished through research and development of a project *Through the Eyes of Media*, that uses digital media to illuminate aspects of history of everyday life in Finland.

This project will synthesize knowledge from scholarly and applied disciplines, create new methodologies, and create an interactive environment that optimizes the use of digital media, and information products. These products will make use of existing, and planned, information delivery structures to optimize the process of dissemination of knowledge.

Within this interactive environment, the archeological point of view will provide the both theoretical and material knowledge about artifacts from the past. Anthropological and ethnographic discourses will supply the building blocks from which educational narratives may be built. New media and computer science research and development will allow us to integrate these disparate elements into a cohesive structure.

4. Current Stage of Research

As already mentioned, in the spring of 1995, the Media Lab accepted its first Ph.D. student. The research student, Lily Díaz, has been working for the past five years in developing methodologies for the applications of new media technology to historical research. Some of the results of this research focus on the areas of new paradigms resulting from a "space-as-information" approach to visualization. Among these is the use of the palimpsest as descriptor of the process by which historical discourse is encoded. Diverse discourses share the same boundaries, but it is the manner in which they are represented that favors the legibility of some and the exclusion of others. Based on hypermedia technology, possibilities for developing tools that allow for us to "read" the texts that have been obscured are suggested.

These results are described in an article "A Simultaneous View of History, The Creation of a Hypermedia Database", published in *Leonardo*, the International Journal of Art and technology in the Fall of 1995.

The current work plan and thesis proposal of the student focuses on development of these themes. The thesis focuses on the use of computer graphics for reconstruction and multimedia for representation of mental models and iconographical comparison of elements in two 16th Century documents.

The student has been active in identifying similar initiatives at a local and international level. In particular, she has concentrated on the international initiatives of the Getty Art History Information Program.

5. Project Description

The project, *Through the Eyes of Media...*, involves a media transfer of archeological, historical and ethnographic data from excavation sites and other repositories in Finland into digital, multimedia, data sets. Some examples of these data sets are digital video clips that visually depict the different stages in an excavation; three-dimensional

models of architectural structures and other artifacts, such as ceramics, that lend themselves to reconstruction and re-interpretation within a virtual reality framework; two dimensional images such as illustrations that have been converted into digital format; recordings of oral information pertaining a site.

The content server will be created at the Media Lab. It will be the hub in a network of information that initially is limited to Finland, but that eventually can extend to international cooperation and research. At the present the project pre-supposes cooperation with the following institutions:

University of Art & Design, Media Lab
University of Turku, Department of archeology
Kansallismuseo (National Museum of Finland)

6. Project Methodology

The development of this project involves three main phases. The following paragraphs describe the development of these phases.

6.1 Surveillance and Knowledge Transfer

Execution of this project presupposes a profound transformation from current scholarly, and artistic practices that are usually personal and individual efforts into a collective and communications-oriented process.

With this in mind, the initial objective of the project is to establish a common language. Acquisition of this tool can engender a sophisticated, and intellectually rigorous, interdisciplinary cooperation among all the parties involved. Therefore, the first phase includes a surveillance by all the participants of the diverse disciplines included in the project. This surveillance will be implemented through a series of intensive workshops designed in such a manner so as to allow for an effective transfer of knowledge between all the scholars.

The objective is not to make artists of historians, or vice-versa, but to establish a basic data base of knowledge common to all participants.

With this goal in mind, a series of workshops that include instruction in all the areas covered by the project will be offered at the Media Lab. Since state-of-the art telematic connections are available at the three university sites, these workshops need not be limited to the physical location of the Media Lab in Helsinki. This will allow for beneficial use of an already deployed technology base. Targeted to the participants in the project, the workshops will also be open to a selected number of participants.

6.2 Definition of Scope:

The second stage in the project will be to define the scope of the contents, the extent of its development by the group, the range of the multimedia data sets, and how all these elements will be integrated. Whereas from the scholarly point of view this stage this can involve a critical analysis and definition of parameters of the contents, from the design point of view, it can involve a pre-production analysis. In terms of the new media, this stage also includes interface design and multimedia pre-production.

Initially we have recognized the main area for content-development as the history of everyday life in Finland. In our project, this area can be depicted through a media transfer of archeological remnants of the Raisio archeology sites. This site concentrates, among other things, in history from the point of view of two thousand years of continued habitation. It contains archaeological remnants of diverse typology, such as loom weights, 16th century ceramics, 17th century coins, an inhumation cemetery, a cremation cemetery, and a medieval church. In addition, there are other archival repositories throughout Finland, such as cartographic materials and demographic records, that can allow for a rich ethnographic, visual narrative about the topic of everyday life in Finland.

The final results of this stage will allow for outline of a methodology to optimize the process of design of information products used for representation of knowledge in the humanities. For example, does the artist understand the significance of certain data for the archeologist? Is the archeologist cognizant of the creative capabilities of the media? Ultimately the product designed will reflect this new level of understanding.

6.3 Production

The content server created will exist as a node on the Internet that can be accessed, as a Web site, from multiple locations.

Since thorough records and archived materials will be kept of all the stages in the project, we propose that selected materials be published in electronic, and book format, so that they can be used by those interested in applying the results of the research. With this in mind, we will approach publishers, such as the MIT Press, who output material in the area of technology and art.

In addition, the knowledge acquired can be shared with colleagues in Finland through presentations and workshops.

The materials can also be presented in forums from diverse disciplines such as, the College Art Association Conference, the SIGGRAPH conference, and the Doors of Perception conference in Amsterdam.

Lastly, we propose that a conference should be planned to share the results, and exchange knowledge of this new area of research with local and international colleagues.

Ultimately, the final results of this project will allow for the creation of items such as:

6.3.1 We will create an electronic museum catalog that connects the Kansallismuseo (National Museum of Finland) and its collection to diverse physical sites within Finland, and to other international locations. The catalog will also integrate materials from disparate locations, and further the understanding of the country's historical heritage.

6.3.2 Educational materials targeted for high school instruction that can be transmitted electronically to diverse locations in Finland, and outside, and that provide first-person, interactive experience with historical data.

7. Project Timetable

The present proposal requests support for a two-year period of research and development. During this period, the content server will be created, using the procedures outlined in the preceding sections. At the end of this period, there will be an evaluation of the project. If approval, and subsequent funding is received, we will continue to the final stage. This stage encompasses a five year period and it will include the creation of the electronic museum catalog and the new media educational materials..

7.1 If approved for funding, the initial stage, phase one of surveillance and information transfer will be completed during the months of September through November of 1996. The month of December of 1996 will be utilized for review and organization of all archival materials created. In-depth records of the proceedings and all materials resulting from the courseware will be archived, so that they may be used by others interested in creating similar curricula.

7.2 The second stage, phase two of scope definition and pre-production, will take place in the six months following the completion of phase one. At this point, a complete project outline will be produced. This outline will be an in-depth map of the project. It will include, among other things, a cognitive framework of all the areas and corresponding data to be included in the server. Scenarios in multimedia format that illustrate the development process and functionality of the different tools that will be deployed in the field, storyboards describing program flow of the server's interface and tools, will also be created.

7.3 The third phase of construction of the content server will commence during the summer of 1997, and will last through the remainder of the two-year period budgeted (or until the spring of 1999) It will comprise of the integration of all the research, methods and content materials into the server.

In addition, during this period of time, contact with Kansallismuseo (National Museum of Finland), educational institutions interested in developing curricula with the materials created, and other funding sources will intensify. The objective will be to secure the appropriate funding and conditions to implement the concept of the electronic museum catalogs and educational materials.

7.4 During the fourth phase, we will work with Kansallismuseo (National Museum of Finland) in the creation of a prototype for the electronic catalog. In addition, we will be available for consultation with them in the area of deployment of new technology inside the museum space.

7.5 The final stage of the project involved the creation of a presentation module. This module will be used to demonstrate to an audience of teaching professionals how the tools created, namely the content server and the electronic catalog can be used to generate curriculum material.

Appendix 2

From a base Map to a VRML Model

By Mika Mannervesi and Lily Díaz

The task: to create a numerical height model for a virtual model out of base map information.

Initial information

There is a municipal base map already in numerical form on the area in question. The map is maintained with Stella* map program that functions subordinated to MicroStation CAD program. The graphic presentation of the locations on the map is in dgn-format.

In principle all the locations on the base map contain the height information required for the formulation of the height model. In this case, however, the model was created merely on the basis of contour lines.

Omitted objects

2D-objects that do not contain any height information. Scattered height points, because they did not provide considerably more information from the point of view of the precision of the model. Edges of roads, ramps and other man-made objects, because the model was to be designed so that it could also be used to represent moments in history.

The construction of the height model

The model was produced using TerraModeler- program. A 3D irregular triangle network (a TIN model) that represents the ground of the area concerned was constructed out of the contour lines. A grid model – that is, a net consisting of all the points situated at even intervals on the (assumed) ground – was counted on the basis of the triangle network. The accuracy of the model can be adjusted by altering the intervals of the nodes. The grid model was then transformed into a XYZ-file (in ASCII form) in which every node of the net is represented.

The lines of the file are of the following format:

```
565300.000 707300.000 2.172.
```

The numbers on the line are Y-coordinate (eastern coordinate), X-coordinate (northern coordinate) and height above sea level.

How to transform the terrain model into VRML

An object of the ElevationGrid type following the VRML 2.0 standard was constructed out of the height model. In the following example *xDimension* determines the quantity of columns in the network model and *zDimension* determines the number of lines. *xSpacing* and *zSpacing* correspondingly determine the distance between the points along the coordinate axes. The three-dimensional terrain model itself is counted on the basis of the height values of the nodes of the network that in the following example are listed in square brackets.

Some VRML code

```
geometry      DEF EG EleavationGrid {  
color         NULL  
normal       NULL  
texCoord     NULL  
creaseAngle  0.8  
height       [8.490, 10.402, 12.744,  
             ...  
             1.034, 0.845, 0.845]  
xDimension   31  
xSpacing     10  
zDimension   31  
zSpacing     10  
}
```

The XYZ file contains all the height information needed for ElevationGrid. The coordinate values were arranged in lines from north to south and inside the lines from west to east. Of all the information in the arranged file only the height values were preserved. They were separated with commas and printed into a ASCII file. The VRML determinations required for ElevationGrid (the size of the grid and the distance between the points) were added to the file after which the height model could be viewed using a browser.

Appendix 3

ILLUMINATING HISTORY: THROUGH THE EYES OF MEDIA.

Multimedian käyttö Raisiossa
Jari Näränen, huhtikuu 2, 2001

Internetissä oleva multimedia on ollut käytössä museon avajaisista lähtien. Sitä on museossa esitelty kutsuvieraille ja yleisöllä on ollut mahdollisuus tutustua siihen omatoimisesti museon ollessa avoinna. Niin ikään teos on esitelty ja sen www-osoite annettu raisiolaisille opettajille, jotta voisivat käyttää sen sisältämää aineistoa opetuksessa. Museossa multimedian sisältämää aineistoa on käytetty myös tietoaarkistona, etenkin sen sisältämät korkealaatuiset kuvat ovat monesti olleet tärkeä osa opastusta ja sen suunnittelua.

Tulevaisuuden suunnitelmissa on ottaa multimedia osaksi opastusta, elävöittää sen avulla kerrontaa hyödyntämällä sen kuva- ja videotallenteita. Sen ympärille on tarkoitus myös rakentaa tehtäviä sisältäviä opetuspaketteja kouluille. Koulut voivat valmistautua museovierailuun tutustumalla aineistoon jo koulussa internetin välityksellä, museossa annettuihin tehtäviin voidaan hakea vastauksia internetistä joko museovierailun aikana tai myöhemmin koulussa. Aiomme hyödyntää multimedian materiaalia laajasti pitäen mielessä sen, että museokäynnin tulee lapsille olla mielenkiintoinen elämys.

The use of the multimedia on the internet in Raisio
Jari Näränen, April 2, 2001

The multimedia on the Internet has been in use since the opening of the museum. It has been presented to invited guests, and the general public has been able to explore it on their own during the opening ours of the museum. The work has also been presented, and its www-address has been given to teachers in Raisio to enable them to use the materials it contains in their teaching. In the museum, the material contained in the multimedia has also been utilized as an archive, especially the high quality photographs have often been an important part of guided tours and their planning.

In our future plans is to include the multimedia as part of our guided tours, to enliven the narration with its photographs and videorecordings. We also plan to construct teaching packages with assignments for schools. Schools can prepare for the museum visit by getting acquainted with the materials already in the school through the internet, answers to the assignments given in the museum can be searched through the internet already during the visit or later in the school. We aim to take advantage of the multimedia broadly, keeping in mind that the museum visit must be an interesting experience for children.

Appendix 4

MAKING HTML PAGES AND INPUT FILES FOR THE 3D GALLERY

By Janne Pietarila

'Script 1' is a Perl script that is run twice: once for making Finnish files, and once for making English files. It takes as an input a language (Finnish or English), URL to the 'Script 2', and names of the input and output files. It works like this:

1. Print HTML header to the output HTML file (gallery_finnish.html or gallery_english.html).
2. Set variable ID to 1.
3. For each table row in input HTML input files:
 - A. Extract all the given information about the picture:
name, archive no., dating, URL to the HTML file containing the picture, etc.
 - B. Transform that URL to a path in the local file system and use that path to load the picture HTML file into the memory.
 - C. From that HTML file extract URL to the actual picture file and transform that URL to a file path in the local file system.
 - D. Output to the output text file (fi_input.txt or en_input.txt) the following information:
 - the ID variable
 - path to the picture file
 - URL to the picture file
 - URL to the HTML file containing the picture(Each line of out text file has these field separated by tabs.)
 - E. Print HTML to the output HTML file (gallery_finnish.html or gallery_english.html). Example of HTML input for one picture:

```
<tr>
<td><input type=checkbox name=painting value=42></td>
      <td>Jaw of horse</td>
      <td>TYA 642: 2858</td>
      <td>980&#150;1220 jKr.</td>
      <td>Mulli site</td>
      <td>slide</td>
      <td>Antti Huittinen</td>
</tr>
```

- F. Add one to the variable ID.

4. Print HTML footer to the output HTML file (gallery_finnish.html or gallery_english.html).

The important thing is that 'Script 1' is run only when HTML input files have been changed.

Creating VRML nodes from HTML files

The 'Script 2' is Perl script that handles the user input from the gallery page (gallery_finnish.html or gallery_english.html). The script receives from the HTML form the following information:

- the IDs of selected pictures
- the name of the input file (fi_input.txt or en_input.txt)
- the language (English or Finnish)
- which submit button was pressed ('Enter gallery' or 'Save configuration as HTML page')

1. Check the number of the selected pictures: if it is less than ten or more than sixteen, print the HTML page which advises the user to select suitable number of pictures.

2. Check which submit button was pressed, if it was 'Save configuration as HTML page' output an HTML page containing all the received information in the hidden input tags and instructions what to with this page. So basically the generated HTML page contains the IDs of selected pictures in the hidden tags and one submit button to enter the gallery. Exit the script.

If the script gets this far, it is known that the input is valid and the aim is to output VRML.

3. Output some static VRML (from normal VRML files) which are always the same independent input (like the island, the trees, and the sea) and some VRML PROTOs which are used later.

4. Read the input text file (fi_input.txt or en_input.txt) and for each ID extract corresponding picture path, picture URL, and HTML page URL.

5. For each picture:

A. A command 'identify' (part of ImageMagick, see <http://www.imagemagick.org/> for more information) is used with

the picture path as an argument to get width and height of the picture.

B. From dimensions of the picture calculate the dimensions of the border.

C. Output a Transform node with an instantiated a PROTO called 'WallWithPainting' as its child. The fields of 'WallWithPainting' include URL to the picture, URL to picture HTML page, and numbers describing the dimensions of the picture and the border. The node creates a 3 meters wide and 4 meters high wall section with a painting.

At this point the script has output a VRML world with some walls, paintings on walls, and trees on an island.

6. Output outer walls, glass walls, floor, ceiling, doors. The only thing worth noticing is that some elements have to be made bigger (an outer wall section, the glass wall, the floor, and the ceiling) and the door has to be moved depending on the number of the selected pictures. The floor and outer wall textures have to be scaled so that they always look right independent of the size the polygon they are mapped on.

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