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A phenomenological analysis of an instructional systems design creative project

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A phenomenological analysis of an instructional systems design creative project

Abstract

This research paper is a phenomenological analysis of a creative project involving University of Northern Iowa undergraduate art students in the planning and creation of visual illustrations, graphic design concepts, .html documents, and imagery for a world wide web intranet/Internet virtual space.

This analysis looks at instructional design as a creative process and the phenomenology of the UNI Art/Cat (Art Resources Technology/Computer Assisted Training) computer laboratory. The mission, goals, and objectives of the creative project, experiential and experimental philosophies of education, and the phenomenologies of the instructional design process are the main considerations. The methodology of this thesis is primarily concerned with action research and research as lived experience.

The generational aspects of computer hardware and software and the affective aspects of the evolution of the infrastructure upon instructional development is examined. This generation of techno-apparatus includes the Macintosh G3 Personal Computer in a network environment, Afta and Hewlett Packard Flatbed Scanners, Polaroid Slide Scanners, Adobe Graphic Design Software, and Symantec Visual Page Web Design Software.

Commentary on the social and bureaucratic considerations in this particular creative project and discussion of the collaboration with UNI Art Department administration, faculty, and students is included with the final conclusions and recommendations.

**A PHENOMENOLOGICAL ANALYSIS OF AN
INSTRUCTIONAL SYSTEMS DESIGN CREATIVE PROJECT**

A Graduate Research Paper Submitted

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

Daniel M. Benson

University of Northern Iowa

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This Study by: Daniel M. Benson

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ABSTRACT

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CHAPTER 1

INTRODUCTION

In this thesis I initiated a creative project involving undergraduate art students in the creation and production of visual illustrations, graphic design works, student and faculty biographies, student and faculty digital portfolios, and art, music, education, and technology related sites of interest into a world wide web intranet/Internet virtual space for the Department of Art. This intranet organizational infrastructure can be utilized in a number of possible ways: 1) to enhance future recruitment and marketing strategies for the art department's academic programs; 2) as a teaching and learning resource to enable undergraduate students to explore and experiment with art, music, and educational technology related resources on the Internet; 3) as an in-house information management system; 4) as a virtual exhibition space for current art faculty and students; and 5) as a public relations billboard for current events such as visiting artists, special speakers and educational programs, and community events of interest.

This documentation is a comprehensive overview of the instructional technology processes I have incorporated into the planning, performance, and execution of this collaborative experience. The participants included myself, Osie L. Johnson, Jr., Assistant Professor of Graphic Design and Illustration, and a number of undergraduate art students who expressed interest in learning

about various types of programming and design concepts for the world wide web and Internet. These concepts include hypertext markup language, dynamic .html, cascading style sheets, web editing programs, Adobe TM programs for graphic design, illustration, page layout and desktop publishing, and web page design. Also a number of the students originally expressed interest in setting up there own ISCSSUN (Information Systems and Computing Services SUN machine web server) accounts to create their own web pages. These individual student pages could then be linked to the Department of Art intranet web structure.

Included with this documentation is a CD-ROM containing .html documents created to support the practicum project as well as .html documents and images used in the final intranet/Internet web site. Also included are a number of instructional web pages to help facilitate self-directed experiential learning.

I incorporated a variety of educational technologies in this instructional process including presentation equipment, slideshows, books, magazines, concept mapping, reflective thinking, cooperative collaboration, brainstorming and especially on-line web-based instructional materials developed specifically for this project.

This creative project involved undergraduate art students, current art department faculty and Dr. William Lew, Head of the Department of Art, in input and ongoing criticism of the developmental process of the project.

This departmental intranet supports the following areas of representation: Art Education, Art History, Drawing, Ceramics, Graphic Design & Illustration, Jewelry Making, Painting, Papermaking, Photography, Printmaking, Sculpture, the UNI Art Gallery, the UNI Art Store, and the Department of Art Administration Office. The organizational structure of this intranet project allows for biographies and artistic statements, representative visual works, and links to other Internet resources for both the undergraduate and graduate students as well as the faculty and staff.

This project allowed me to examine the cooperative and collaborative processes involved in instructional design with teachers in the higher educational environment. It also provided invaluable experience in working with individuals who are colleagues in one of the most competitive disciplines in the academic realm, while testing the receptiveness and tolerance of a current academic department's faculty members towards new educational technologies and the incorporation of them into everyday scholarly life.

Missions, Goals, and Objectives of the Creative Project

It is with the elements of instructional design concepts and World Wide Web design concepts that I approached the Spring 1998 practicum project as both an instructional systems design project and as a creative project. The design of an intranet/Internet virtual space for a University Department of Art is not a simple task; however with patience, tenacity, and imagination it can become a fun and creative project. I went into this project knowing very well that this would be a "prototype" model intranet once it was completed. Hopefully it can be continued by interested faculty and students in the Department of Art in the future.

The mission, goals, and objectives of this project were the following:

- 1) To create the appropriate informational data structure that could be reasonably managed by undergraduate and graduate students, and professors who may not have a great deal of expertise in educational technology and computing.

- 2) To allow representation from all of the faculty and students in the Department of Art who wished to create a visual representation of their own respective works, ideas, philosophies, or thoughts about studio art, art education, and art history.

3) To create a "virtual" marketing tool for the Department of Art that would allow faculty and students to reach prospective students and visiting professors and artists via the Internet and the World Wide Web.

4) To create an "electronic billboard" whereby current events could be posted for the members of the University community and the community at large.

5) To give representation to the UNI Gallery of Art which has many excellent artworks in the permanent collection and various shows and exhibits during the academic and calendar year.

6) To give the undergraduate students involved in the project a chance to develop interest in .html programming, web site design and construction, and also to familiarize them with the various programs that are used in this type of instructional development project.

7) To create an open collaborative atmosphere whereby the UNI Department of Art faculty could share their respective ideas about art and the visual representation of various artworks.

8) To create an interest in the faculty members in using various multi-media formats in the sense that we use these applications in the educational technology discipline and to allow for an integration between the best of two distinct worlds: art and technology in the academy.

9) To allow a place where on-line courseware can be developed by the professors in the UNI Department of Art who teach in the areas of art history and

art education. This type of courseware could be interactively connected to many valuable sites that exist on the World Wide Web for art history, art education, museums, and individual professional artist's homepages and web sites.

As a graduate student in educational technology I have come to appreciate the benefits of using educational technologies in curriculum development and instruction of learners. With my profound interest in the visual arts (especially painting, printmaking, and film and video), the UNI Department of Art became the most interesting educational atmosphere in which to do a project of this type.

CHAPTER 2

RATIONALE

In view of the considerations of my current academic research interests, which include specifically the mediums of painting, film, digital imaging technologies, distributed data and information networks (such as the Internet and various highly developed scientific, educational, and government intranets), distance education, and collaborative creative projects, I decided to conduct my thesis research about a practicum project. This project was done with Assistant Professor Osie L. Johnson, Jr. and a group of undergraduate art students at the University of Northern Iowa Department of Art. It is titled: Developing an Intranet and Internet Web for the University of Northern Iowa Art Department.

This project was a method of creating a representational exhibit of that which I witnessed (teaching and learning experiences by students and faculty in the UNI Department of Art). I created this representational place on the World Wide Web/intranet virtual network space for use and continued development by others who may find distributed networks and representational multi-media interesting in their own personal academic experiences. Representation is one aspect of learning that Aristotle wrote about many years ago. Mankind loves to create representational images whether they are visual or mental:

Speaking generally, poetry seems to owe its origin to two particular causes, both natural. From childhood men have an instinct for representation, and in this respect man differs from the other animals in that he is far more imitative and learns his first

lessons by representing things. And then there is the enjoyment people always get from representations. What happens in actual experience proves this, for we enjoy looking at accurate likenesses of things which are themselves painful to see, obscene beasts, for instance, and corpses. The reason is this. Learning things gives great pleasure not only to philosophers but also in the same way to all other men, though they share this pleasure only to a small degree. The reason why we enjoy seeing likenesses is that, as we look, we learn and infer what each is, for instance, "that is so and so." If we have never happened to see the original, our pleasure is not due to the representation as such but to the technique or the colour or some other such cause.

We have, then, a natural instinct for representation and for tune and rhythm—for the metres are obviously sections of rhythms—and starting with these instincts men very gradually developed them until they produced poetry out of their improvisations. (Aristotle, 1927: 13-15).

The Internet is a place where learning can happen by imitation and representation of visual images, concepts, and analogies. The natural instinct which Aristotle speaks about seems to be inherent for users of the World Wide Web and the Internet in doing visual representational research. The World Wide Web and Internet are starting to mimic the non-virtual world in the sense of informational structure and organizational content. It is, however, a much more dynamic and fluid learning environment than ever before witnessed in American education (or elsewhere for that matter). I believe we will only see the use of the Internet increase for purposes of learning and self discovery of existing world knowledge bases.

Since I am looking at this practical experience from a phenomenological position of experience I will examine a number of scholar's interpretations of phenomenology. The recognized father of phenomenology is Edmund Husserl:

Phenomenology is a philosophical discipline initiated by Edmund Husserl (1859-1938). Husserl represents one of the most influential figures of thought in the 20th century, next to Analytical Philosophy and Marxism. Husserl, Heidegger, Scheler, Levinas, Merleau-Ponty and Ricoeur are among its main representatives.

Methodologically, it aims at a form of description that most accurately renders phenomena of any kind, and therefore, its analyses are rigorously oriented towards the given evidences of experience.

As a philosophy of concrete experience it also criticizes the prejudices and the biased scientific character of modern philosophy.

In its regard for the dimension of the life world (Lebenswelt), phenomenology opens up possibilities for an alternative conception of the subject and of reason; a conception which wants to restore the importance of everyday experience and daily life practices. Over the decades, phenomenological thought underwent a multitude of transformations and conceptual reorganizations.

Ever since its programmatic formulation by Husserl at the turn of this century, and with its critical rereading by Husserl's disciple Martin Heidegger, and a worldwide reception of its philosophical claim, phenomenology has influenced theoretical discussions until the present day; and it has shaped theoretical practice in the philosophical domain as well as in the natural or human sciences. Examples of this are hermeneutics (Ricoeur, Gadamer), political philosophy (Arendt, Castoriadis, Taylor), structuralism, Marxism, analytical philosophy (Chisholm), philosophy of language and linguistics (Jacobson), arts and literature (Gombrich, Ingarden), psychoanalysis (Lacan), psychotherapy and psychiatry (e.g. Daseinsanalyse), artificial intelligence (Dreyfus), music (Ansermet), sociology (Schütz), etc. (Gruppe Phänomenologie, 1998).

Max Van Manen in his book "Researching Lived Experience" explains phenomenology:

Lived experience is the starting point and end point of phenomenological research. The aim of phenomenology is to transform lived experience into a textual expression of its essence in such a way that the effect of the text is at once a reflexive re-living and a reflective appropriation of something meaningful: a notion by which a reader is powerfully animated in his or her own lived experience (Manen, 1990, p. 36).

I agree with this assessment or understanding of phenomenology; it should be a way for the researcher or the scholar to express as humbly as possible, without much rhetorical pretense, the essence of learning that has been gained from a particular 'lived experience'. For this reason, considering the current state of the institutional and educational environment at the University of Northern Iowa and also with consideration of the differences in students' and professors' personalities, aspirations, ambitions, experience, and research interests, I decided to look at the instructional systems design process within my practicum project as a phenomenon.

Alexander Pfander, in the book "Phenomenology of Willing and Motivation, and Other Phaenomenologica" in the chapter on 'Logic and Phenomenology' states the following:

For only from the point of sight of the thinking subject and only as intentional counterparts of that consciousness are objects visible to it from its standpoint. Phenomenology leaves aside all knowledge obtained elsewhere and all the sciences of these objects, because it places itself in thought before the beginning of all such science. From the point of sight moved into the thinking

subject it looks first at the intentional objects and the opinions of that subject, particularly at the acts of consciousness which pertain to these objects and the modes of thought of the opinions. Indeed, even the subject into which it transfers its point of sight is left behind unheeded. Viewing in this manner it takes inventory first of what there is to be seen within the scope so staked out. It does not raise at all the question of the reality of what can thus be intuited, not even with regard to the acts of consciousness, but only pays attention to the what and the properties, as well as the mutual relations, of what is to be found there.

The most cautious and most circumspect description of what is intuited is then followed especially by the tracing of the whole, both between the elements of the same stratum and between the elements of different strata.

In particular, the way in which certain elements or complexes stand in relation to certain others as their ultimate fulfillment and foundation is pursued in detail and by cautious probing. Thus phenomenology passes constantly through the different spheres: namely, those of the acts of thinking, the consciousness of objects, the opinions, and the intentional objects (Pfander, 1967, p. 66).

I believe that it is very important to keep an open, non-judgmental environment for learners within the realm of higher education. Considering the nature and newness of Internet based distance education processes, the phenomenological approach seems quite appropriate. We can focus on the thinking subject who in a sense encounters numerous virtual representations of different objectified worlds, theories, educational propositions, evolving educational trends, individual and collective research interests, and institutional agendas on the Internet.

This gives us the first two spheres of the phenomenological process: the thinking subject and the objects of consciousness (the learner who is using the

World Wide Web as an educational tool and the elements that the learner finds).

The question that one encounters is of course the validity of knowledge

discovered on the Internet and in existing nueral computer networks. It is from

this philosophical point that individuals should examine the causality of

presented truths in the existing genre of time:

Aristotle gives a most clear formulation of the general law of causality. When all conditions that make an event possible are given, then this event occurs at once and without exception. He even knows Leibniz's law of sufficient reason in its dual sense. Here, too, the necessity must be rooted ultimately in a law of contradiction. It is a different question, however, whether we are *a priori* certain of it, or whether we have to take the path of empirical confirmation for lack of the necessary intuitions. We shall later return to this point since we must to some extent clarify Aristotle's concept of efficient cause.

A few more remarks are in order concerning Aristotle's doctrine of immediately obvious necessary truths. Since they are all said to have the character of the law of contradiction, they seem to be related to those propositions that Kant called analytic judgments *a priori*. But Kant also held that there are affirmative judgments *a priori*. Indeed these judgments are what best conform to his view that in an analytic judgement the predicate is contained in the concept of the subject and that it is interesting to see that this explanation is hardly satisfactory since, as Aristotle justly noted, the proposition "A is A," taken affirmatively, cannot *a priori* be considered a general truth. But something else must be mentioned in connection with the doctrine that the necessary truth only of negative judgments is *a priori* obvious.

The following is a necessary consequence of this doctrine: if nothing but particular positive facts are given, which may be used together with the general negative propositions as premises of arguments, then we can never conclude any general essentially other than Aristotle describes in his syllogistic.

Let us finally also consider the objection that Kant advances against the Aristotelian version of the law of contradiction, namely, that addition of the clause "at the same time" restricts the law by limiting it to things that are in time. Particularly for the Aristotelian

position this objection seems well taken; for, according to Aristotle, not all that is, is in time. But under a more correct conception of time than his or Kant's the opposite may perhaps turn out to be true.

The insertion of the clause "at the same time" will then appear as the removal of a restriction since it intimates that the proposition holds not only for what is at present (and is conceived in the temporal mode of the present), but also for that which is conceived in any temporal mode of past or future (Brentano, 1978, p. 32).

In the world of virtual temporality that a learner encounters within the educational experience when using distributed networks such as the Internet and other highly evolved educational intranets, indeed we must look at the change of traditional timeframe based learning. I believe that Aristotle's comments reflect the plethora of concerns, which we have seen in much of the current research being done in higher education on Internet learning and distance education via the World Wide Web. Brentano points out that the temporality of present tense propositions many times hold true for both the past and future as well.

Intellectual functions have a certain dependence upon bodily functions. In the images of the sensory part the human mind grasps the concepts that are contained in them. It thus changes from something that can experience thoughts into something that actually thinks. Thus the mind cannot influence the sensory part until it has itself been influenced by the sensory part.

This now is the circumstance that prompts Aristotle to attribute to the human mind, not only the capacity for thinking and willing but also that active force referred to above. He assumes that prior to all thought an influence must proceed from the mind to the sensitive organ in which the images are located in order that the latter may then be able to react upon the mind. This and nothing else is the function of the active intellect ("nous poietikos"). There are several who want to make this active intellect into a

higher thinking capacity of the mind; some even take it to be a special undivided higher intelligence, possibly even the deity itself, which illuminates all human minds or even the deity itself. In reality the (“*nous poietikos*”) does not think at all; rather, through the influence that it initially exercises upon the sensitive part, it changes our mental capacity for thought from something that is merely potential into something that is actually engaged in thinking. Once this has happened the mind with its emotive and intellectual activity also exercises manifold conscious influences upon the sequence of images and affections (Brentano, 1978, p: 110).

It is this manifold consciousness of the emotive and intellectual activity upon the sequence of images and affections that are transmitted via the World Wide Web which seems to create such an interest in learners who choose to incorporate it into their own discipline-specific educational processes. The Internet is an “active” learning environment when it comes to thinking and problem solving. The self-consciousness of knowing, not knowing, finding answers to known and unknown questions, and of course self-discovery are ever present in individuals who use computers and distributed electronic networks in the educational process.

The absolute remains the extreme for self-consciousness. Knowing itself thus, self-consciousness knows itself as a knowledge which essentially struggles for the absolute, but in this struggle fights its way to a constant subjugation. “Consciousness of . . . its existence and activity is only an agonizing over this existence and activity”: the knowledge of failure is what drives its own essence. Thus, self-consciousness is unhappy, just at that place where it unfolds unto its own essential character; it is the unhappy consciousness. Self-consciousness cannot really conceive and grasp itself as something absolutely unchangeable, which finds itself (its truth) neither in the object nor exclusively in the subject of this object. It finds itself rather in a higher self, which

knows itself as the unity of the first self-consciousness and consciousness of the object, or as spirit, or-in its preliminary form-as reason. If this occurs, then "a self-consciousness exists for a self-consciousness. Only thus is it in fact self-consciousness; for only in this way does the unity of itself in its otherness become explicit for it . . . "With this the concept of spirit is already extant for us." For "reason is the certainty of consciousness (i.e., of self-consciousness) that it is all reality.

Granting all the reservations and reductions, we have here a relation which corresponds to what was already announced in perception. Perception stands and mediates between sensibility and understanding in such a way that perception takes up sensibility and already attests to understanding, although in the negative way of resisting it. Correspondingly, in a higher connection, self-consciousness (B) is located between Consciousness (A) and Reason (C). Self-consciousness takes up consciousness in itself as its truth, but in such a way that self-consciousness simultaneously attests to reason-this again only in the (negative) way that, as it continually attempts to overpower reason, self-consciousness drives itself to continual defeat and remains unhappy in this failure.

The unhappy consciousness is neither simply unhappy nor first made unhappy afterwards. Rather, this consciousness is not yet happy, but in such a way that it knows about happiness precisely in knowing about its unhappiness. The knowing of unhappiness is not a relative, abstract confirmation that a disagreeable condition is extant. It is knowing's restlessness, the disruption of not being able to achieve happiness. Thus, in a certain manner true being (the absolute) already arrives at certainty in self-consciousness (Heidegger, 1988: p.140).

The internet and the world wide web pinpoint the physicality of human beings and the relationship of the body to learning, awareness, reception of facts, opinions, ideologies, mental constructs, and information processing. The Internet and the World Wide Web reflect these qualities specifically because the elemental concerns of web programmers are human conceptual concerns. The computer-generated learning environment is created by human beings for

human learners. We can exist outside of the computer networks and still efficiently operate inside them. The "real" world and the "virtual" world of data and information are no longer as separate as they used to be in the past. Much research has been done in the areas of HCI (human-computer interface) and CMC (computer moderated communication) regarding learning and training and we can surely expect increased growth in this area of education.

There are two senses, and two only, of the word 'exist': one exists as a thing or else one exists as a consciousness. The experience of our own body, on the other hand, reveals to us an ambiguous mode of existing. If I try to think of it as a cluster of third person processes-'sight', 'mobility', 'sexuality'- I observe that these functions cannot be interrelated, and related to the external world, by causal connections, they are all obscurely drawn together and mutually implied in a unique drama. Therefore the body is not an object. For the same reason, my awareness of it is not a thought, that is to say, I cannot take it to pieces and reform it to make a clear idea. Its unity is always implicit and vague. It is always something other than what it is, always sexuality and at the same time freedom, rooted in nature at the very moment when it is transformed by cultural influences, never hermetically sealed and never left behind. Whether it is a question of another's body or my own, I have no means of knowing the human body other than that of living it, which means taking up on my own account the drama which is being played out in it, and losing myself in it. I am my body, at least wholly to the extent that I possess experience, and yet at the same time my body is as it were a 'natural' subject, a provisional sketch of my total being. Thus experience of one's own body runs counter to the reflective procedure which detaches subject and object from each other, and which gives us only the thought about the body, or the body as an idea, and not the experience of the body or the body in reality.

Descartes was well aware of this, since a famous letter of his to Elizabeth draws the distinction between the body as it is conceived through use in living and the body as it is conceived by the understanding. But in Descartes this particular knowledge of

our body, which we enjoy from the mere fact that we are a body, remains subordinated to our knowledge of it through the medium of ideas, because, behind man as he in fact is, stands God as the rational author of our *de facto* situation. On the basis of this transcendental guarantee, Descartes can blandly accept our irrational condition; it is not we who are required to bear the responsibility for reason and, once we have recognized it at the basis of things, it remains for us only to act and think in the world. But if our union with the body is substantial, how is it possible for us to experience in ourselves a pure soul from which to accede to an absolute Spirit? Before asking this question, let us look closely at what is implied in the rediscovery of our own body. It is not merely one object among the rest which has the peculiarity of resisting reflection and remaining, so to speak, stuck to the subject. Obscurity spreads to the perceived world in its entirety (Merleau-Ponty, 1962: p. 198-9).

Some of the particulars we must face, consider and encounter when using the instructional design process for the Internet are similar to these propositions.

“A is A taken affirmatively, cannot *a priori* be considered a general truth”

(Brentano, 1978, p. 32). In fact the best expectations are the unexpected.

Perception as what is mediated is mediated not only in the sense of being inevitably detected in sense certainty, but also at the same time in the sense of being that which is placed in the middle. That means that, if we grasp perception's absolute objectivity only from the side of sense certainty and perception's absolvent origin, then we conceive that perception should be conceived as the middle term between, so that we must here already look to the other side within perception, as middle and between, is to be mediated further and beyond in the direction of its absolvent future. As the middle, perception is precisely a transition toward; in perception the movement of absolvence is, as it were, really and truly unsettled.

Perception knows no rest. Hence, that toward which perception moves must already emerge in perception itself. Perception itself is not to be taken as an inevitable outcome, as indeed it was with regard to sense certainty. What perception is

going to be belongs already to perception. Perception is only what it is in its having been and its future (Emad and Maly, 1980, p. 81).

Perception indeed knows no rest when one is engaged in Internet learning. Perception is in a continual stasis of transition whenever the mind is engaged in CMC (computer-human communication). The computer stimulates areas of the brain differently than other areas of teaching; likewise the Internet stimulates areas of creative imagination differently; albeit similar to other traditional creative educational methods (such as art studio, theatre and acting, or creative writing classes). I believe that the individual learners bring as much of their own perceptual nuances to the discourse of virtual on-line learning as they seek and find on the transmitting end.

Any exploration of phenomenology as research method needs to be set in a wider context of research and what Kuhn (1970) calls a paradigm shift. The research paradigm shift is only part of a larger paradigmatic shift which is taking place in the Western World in the late twentieth century. The move from modernity to post-modernity, from nationalism to globalization, from cultural supremacy of one group over others to the concept of multi-culturalism and the acknowledgement of cultural diversity, from an understanding of one faith and its dominance in society to acceptance of multi-faiths, are some of the major changes taking place in the world in which we live and which we have to accommodate.

The research paradigm shift has more to do with major shifts in the way knowledge is constructed and created. Associated with this is the further question of whose interests are served by the dominant paradigm? Research has been dominated in the last hundred years or more by what is commonly known as the scientific method. Also known as positivist or quantitative research its emphasis is on objectivity, neutrality, measurement and validity. To live in the scientific method means to live within an understanding of the beliefs, values and techniques that guide

scientific inquiry' (Lather, 1991). Those working within the scientific framework also accept the conventions, language and methods of carrying out research in this way. Those living within the scientific paradigm judge other ways of carrying out investigations as too open to multiple interpretation, too biased, too subjective, simply not scientific or rigorous enough (Campbell, 1998).

Human science is concerned with action. Hermeneutic phenomenological reflection deepens thought and therefore radicalizes thinking and the acting that flows from it. Almost all serious and original thinking is ultimately revolutionary (in more than the political sense). Phenomenology is a philosophy of action especially in a pedagogic context. Pedagogy itself is a mode of life that always and by definition deals with practical action.

We must always act in our living with the learners for whom we have a pedagogic responsibility. The phenomenological attitude gives to educators a certain style of knowing and understanding. I believe it is a kind of theorizing of the unique that sponsors a form of pedagogic practice that is virtually absent in the increasing bureaucratized and technological spheres of pedagogic life. When we know and act correctly this creates a kind of pedagogic thoughtfulness and pedagogic tact.

Another very important aspect of distance learning via distributed intranets or the WWW/Internet is the predominant presence of visual multi-media formats. These visual multi-media formats serve to enhance and promote mental imagery and spatial visualization in the respondent learners that use the WWW/Internet for learning, research, and creative self-exploration.

Roger N. Shepard in his article, "Externalization of Mental Images" in the chapter, "Some Reasons for the Special Effectiveness of Mental Imagery", makes the following observations:

The effectiveness of nonverbal processes of mental imagery and spatial visualization in certain kinds of creative works can perhaps be explained, at least in part, by reference to the following interrelated aspects of such processes: their private and therefore not socially, conventionally, or institutionally controlled nature; their richly concrete and isomorphic structure; their engagement of highly developed, innate mechanisms of spatial intuition; and their direct emotional impact (Coffman, W.E. and Randhawa, B.S., p. 157, 1978).

The use of the World Wide Web and distributed computer networks by the learner in higher educational settings seems to be similarly private, concrete, and somewhat isomorphic in nature. Web browsers are definitely very visual/spatial in cognition, and perception principles (regarding the neural processing of digital information) are considerably dynamic and fluid in nature. The computer monitor creates a certain illusion of space in very little actual space once a person has learned to read it in that way.

To amplify a bit on the first of these aspects, it seems reasonable that the most novel ideas and radical departures from traditional ways of thinking are not likely to arise within the very system of verbal communication that is the primary vehicle for maintaining and perpetuating established ideas and entrenched traditions.

Rather, the challenges to such a system are likely to come from outside the system itself, perhaps particularly from the idiosyncratic probings of a few unique individuals who, for reasons of a congenital predilection for visual-spatial over verbal thinking, often together with a degree of early isolation from the standard socialization afforded by the peer group and/or formal schooling, are less constrained by tradition (Coffman, W.E. and Randhawa, B.S., p. 157, 1978).

The Internet communication medium is also ideal for individuals who fit into this congenital predilection for visual-spatial over verbal thinking or who prefer to study in quieter or more isolated or distant environments.

The richness of concrete visual imagery, together with its structurally "isomorphic" relation to the external objects, events, or processes that it represents (Cooper & Shepard, 1978; Shepard, 1975; Shepard & Podgorny, 1978; Shepard & Chipman, 1970; Sloman, 1971) may well permit the noticing of significant details and relationships that are not adequately preserved in a purely verbal formulation. As Galton (1883) well put it, "A visual image is the most perfect form of mental representation wherever the shape, position, and relations of objects in space are concerned (p. 113)."

The spatial character of visual images makes them directly accessible to powerful competencies for spatial intuition and manipulation that have developed during the eons of evolution of our pre-human ancestors in a three-dimensional world, long before the first appearance of any sort of linguistic competency. The ability to carry out mental rotations is presumably illustrative of one such competency (see Shepard, 1975, pp. 112-116).

Vivid mental images, because they provide psychologically more effective substitutes than do purely verbal encodings for the corresponding external objects and events, have a greater tendency to engage the affective and motivational systems.

This is undoubtedly why powerful emotions of fear, anger, and desire tend to be more strongly determined by the vividness with which one concretely pictures the relevant object or event (a plane crash or a terminal illness, in the case of fear) than by the probability that one abstractly assigns to that event by verbal reasoning.

This is also why many current methods of behavior modification (systematic desensitization, implosion, etc.) make such heavy use of imagery to extinguish fears, overcome phobias, etc. (Coffman, W.E. and Randhawa, B.S., p. 157, 1978).

I am interested in reflective teaching, which has the aim of transforming education, a factor that entails revision of the traditionally dominant scientific aims of explanation and understanding. This becomes placed in the service of the transformative process itself. It isn't that traditional academy-based researchers in education have been unconcerned about practice and improvement. Most traditional academicians see their job as gathering and publishing knowledge (Taylor, 1996) which, through the process of this knowledge being digested and applied by others, will in due course bring about change for the better. In this detached and practice independence of the researcher is cited as a virtue; involvement being denigrated as a possible source of contamination of the data or of the research method.

Action research replaces university-based, context-independent researchers with teacher-researchers who reflect and act upon the context in which they are working. Doubts are raised about the validity of externally generated educational theories, since the appropriate knowledge [cannot be of a law-like, general nature, but will always be intimately related to specific contexts... can never be based on 'pure' observation, but will always be bound up with contextual, here-and-now judgments (concerning the interpretation of particular data)...] can never be established, finalized, and codified in abstract theories, because it will always be developing alongside and within professional practice (Parker 1997: 38-39).

All of these ideas are concerned with the phenomenology of learning by using one's perception, awareness of consciousness, visual imagery, and non-verbal skills to understand new things. These things will always differ from individual to individual, class to class, and discipline to discipline within the academy. With the use of the Internet and the World Wide Web individual learners can find their own respective ground of interests in learning, comprehension, and understanding. Educational technologies can serve to supplement and enhance traditional based education methodologies in all areas of curriculum development in almost all disciplines. In the case of art and technology, the computer creates an additional avenue for artistic exploration that is different but similar to the traditional "hands-on" approach incorporated into studio classes. This can be beneficial as it teaches students not only how to be flexible, but also how to manage different modes of working through learning situations.

CHAPTER 3

METHODOLOGY

On March 6th, 1998 I met with the undergraduate art students who were interested in participating in the practicum project which I had set up with Assistant Professor of Graphic Design, Osie L. Johnson, Jr. Osie and Phil Fass, Assistant Professor of Graphic Design had arranged for a spokesperson from Team Technologies, Inc. to come and speak with Osie's afternoon illustration class.

At 1:00 p.m. the speaker addressed the students and explained .sgml and .html (which is a .sgml dtd) programming and the original design purpose of DTD (document type definition). His conversation then addressed Dynamic .html and Cascading Style Sheets which is the newest trend in web development and programming coding practices. After an explanation of his company's current business organization and marketing strategies he then showed the students a few web sites that have been developed or revamped by Team Technologies, Inc. He also mentioned that there would be internships available at Team in the near future.

At 2:00 p.m. he ended his presentation and at that time I addressed a number of the undergraduate art students present in the Art/Cat (Art Resources Technology/Computer Assisted Training) computer lab. I started by showing them a presentation on web development for intranet/Internet sites. I mainly

focused on instructional design elements and pre-production concerns. We discussed the timetable involved in the development of this intranet/Internet site, which is approximately two months. It was decided that we would accomplish whatever amount of work that we could consider feasible in this time frame since I was planning on writing my research paper about the practicum experience. I then gave the address to the index page of the on-line materials, which I have developed for the practicum students. This site is titled "Developing an Intranet and Internet Web for the University of Northern Iowa Art Department" (look at [<http://www.uni.edu/artdept/gd/practicum.html>]). This graduate class for the practicum is 240:297:01 Practicum in Educational Technology. This is for the spring 1998 semester and the professor of record is Dr. Robert R. Hardman. The following students showed interest in participation: Chad Little, Janell Edwards, Cory Thorson, Kevin Kesling, Jerel Krueger, Kyle O'Brien, Dan Hulsing, Chad Lovan, Chad Young, and Dave Ackerman.

I explained the purpose, mission, and vision of the practicum project was to develop a cutting edge state of the art intranet/Internet Web. This could honestly represent in a multimedia format the current artistic visions and philosophies of the art faculty, the present art student population, and also the mission and purpose of the UNI Gallery of Art.

The intranet/Internet web will also explain in a summary format the available degrees and programs administered throughout the Department of Art. Hopefully this will help to increase state, national, and international recognition of the University of Northern Iowa Department of Art, its degree programs, current faculty, and examples of undergraduate and graduate student works. If it is developed correctly it will also be a viable recruitment and exhibition tool as well as an educational and instructional tool for art students.

It was at this time that we took photographs of the participants who were present with a digital camera which Chad Little happened to have that day. I immediately edited these visual representations of the practicum participants in Adobe Photoshop and wrote a new web page in Adobe PageMill which I had linked to the practicum pages on-line in about an hour.

On Friday, March 12th, I met with four of the people who were to be involved in helping with the practicum project. Some of the participants could not attend due to previous responsibilities or obligations. This was also the day that Spring Break 1998 started immediately after classes. I met with Janell and showed her how to use a number of software programs including Adobe PageMill, Symantec's Visual Page, and Fetch (ftp (file transfer protocol) software for the Macintosh).

I also met with Chad Little and Chad Lovan for a short time and showed them a copy of the materials requisition form that I had written to give to Osie so that he could have them copied and distributed to the faculty as soon as possible.

We hoped to get pre-scanned materials from the faculty in digital format if possible; however, we will accept hard copy images and text if this is the only alternative means of developing the virtual web space. I requested a likeness (photo or some type of portraiture) for each of the faculty members, slides or photos of representative current works, a short biography, resume, vita, or artist's statement, and any examples of student works which the professors feel would viably represent the University of Northern Iowa Department of Art. I also requested any URLs that faculty members may have that they would like included on a link page for there specific area of emphasis. These areas of emphases are Painting, Printmaking, Sculpture, Papermaking, Jewelry Making, Art Education, Art History, Graphic Design and Illustration, Printmaking, Drawing and Ceramics. I wanted to represent the Art Office, Art Store, and Art Gallery in the intranet/Internet Web.

Osie submitted a digital file with his likeness for the participant web page and I added that. I also edited a photograph of myself using Adobe Photoshop and Adobe Gallery Effects and replaced my original photo with this more artistic portraiture.

I also requested photographs from the participants who had not yet submitted them and added some e-mail addresses to my personal distribution list which I created for the practicum. This distribution list allows me to communicate with all of the participants regarding meetings, progress that we are making, and other developments.

I then helped Janell Edwards and Chad Little download and save the following software programs on their Iomega Zip disks: Graphic Converter (a freeware program), Symantec Visual Page (Demo Version), and Fetch (a freeware program). Graphic Converter is a program for changing image file formats and doing basic editing. Visual Page is the state of the art WYSIWYG .html editor that incorporates frames and JavaScript into the writing of the .html pages. Fetch is an ftp freeware program for the Macintosh used to upload files to a web server. These were the programs that we will be using to develop the intranet/Internet web once we start to get materials from the faculty members, the Art Office, the Art Store, and the UNI Gallery of Art.

I then sent an e-mail to the practicum participant's distribution list explaining that we had met at 2:00 on Friday, March 6th and that we would meet again on Thursday, March 26th at 2:00 p.m.

On Thursday, March 26, 1998 I met once again in the Art/Cat Computer Lab to discuss the practicum project with the participating students who were able to attend at that time. Kevin Kesling, Chad Little, Osie Johnson, and I

discussed the practicum project. We decided that we would wait until we started to receive materials from the Department of Art Faculty and then decide on the development of the web site organizational schemata. I verified that all of those present had copies of the following software programs: Symantec Visual Page Demo Version, Graphic Converter, and Fetch 3.0 for the Macintosh.

Osie mentioned that he had requested that the faculty submit their materials to us by March 30, 1998. We decided that we would meet again on March 31st at 2:00 p.m.

I felt that it was important that the practicum participants learn about the higher end web editors such as Symantec's Visual Page and Macromedia Dreamweaver since these programs would allow for development of very sophisticated web sites. I also planned to explain the newest file transfer technologies that were currently under development.

This included ATM (Asynchronous Transfer Mode), a method of organizing information sent over a network at speeds of up to 655 MB/sec. ATM's largest advantage is the low cost; it can also use a variety of wiring schemes, theoretically it can run over standard telephone wiring, neatly sidestepping the enormous cost of rewiring entire buildings or cities. ATM can handle any digital data, making it able to carry anything from voice conversations to file transfers to video.

ADSL (Asymmetric Digital Subscriber Lines) run over regular telephone wire and enjoy the same benefits as ATM. Asymmetric means that the speed of the information coming to your computer (or home)(the upstream flow) is 9MB/sec, while the information flow from your computer (or home)(the upstream flow) is .8MB/sec. While this may seem much slower than ATM, one should remember that .8MB/sec is roughly 30 times the speed of normal 28.8 modems. We will probably see more ADSL developed in the near future that will be readily available than ATM.

Cable modems are gaining widespread acceptance in certain markets today. These are easy to setup and the speed is around twice that of the T1 level (3MB/sec), cable modems may supplant ISDN as the Cadillac of home Internet connectivity. Other benefits include low cost and connection that is always live. It remains to be seen how cable companies will be able to manage the demand as more and more users come online.

LMDS (Local Multipoint Distribution Service) has a potential of 30MB/sec and really holds its own in terms of speed against competing technologies. The largest advantage to LMDS, is the fact that it is a radio-based technology, allowing for on-the-go connectivity. Large acceptance of this technology may still be a few years away, however we will eventually be surfing the Web everywhere from cellular units.

A few of the business groups that are starters in high tech file transfer technologies include the following:

4-Sight LC	800-2-4SIGHT	www.4sight.com
Digital Art Exchange	800-329-6266	www.dax-it.com
Group Logic	800-476-8781	www.grouplogic.com
Hermstedt Inc.	800-650-4736	www.hermstedt.com
Wam!Net	800-611-9006	www.wamnet.com

These companies all offer solutions that make efficient and reliable high-speed data transfers a reality with minimal setup, training and maintenance requirements. While one system may fit the instructional needs better than another, each will have its own merits (Desktop Publishers Journal, 1998, p. 56-7.)

The following week I received two packets of materials from Professor Roy R. Behrens (Graphic Design) and Associate Professor Jeffrey Byrd (Photography). I proceeded to create Roy's web page myself as soon as I had time in my busy schedule. I asked Janell if she would like to help with the scanning of Jeff Byrd's text and photographic materials. She said that she could help with this and I demonstrated how to use OmniPage 8.0, an OCR (optical character recognition) software application program for her. She took these materials with her.

I continued to meet with four or five students for the remainder of the Spring 1998 semester, usually on Tuesdays and Thursdays at 2:00 p.m. in the afternoon in the Art/Cat Computer Lab. The remainder of the meetings became quite flexible since as we neared the end of the semester, students had more and more classes and final projects to finish and complete. I did the majority of the web page creation and .html coding and debugging on this project myself. This was to assure the completion of a prototype intranet/Internet web site by the end of the semester. Chad Little was quite ambitious and helped me design the interface buttons for the various emphasis areas of the Department of Art. These I used on the main index page (look at [<http://www.uni.edu/artdept>]).

CHAPTER 4

REVIEW OF THE LITERATURE

Introduction

The purpose of this practicum project was to design and develop an intranet/Internet web space for the University of Northern Iowa Department of Art that can be utilized as both a strategic marketing tool as well as an instructional device that can be further developed into a more comprehensive site eventually. In the immediate future faculty may wish to put materials on this intranet that will supplement their in-class instructional materials.

Instructional Design Theory

With this in mind I will revisit the following concepts regarding instructional design theory and interface design principles and concepts. At the Massachusetts Institute of Technology Nicholas Negroponte, Seymour Pappert, and others are conducting research within the digital domain that will "create a learning revolution" (Cassell, J.; et. al., 1997).

To create a true learning revolution, we must create technologies that support a new vision of learning and a new vision of the individual learner. In working towards this goal, the following principles can be used as a guide.

Individuals learn by direct exploration. The traditional view is that children learn about the world directly (by crawling, touching, chewing; e.g.: by

exploration) until preschool, but then they need to be "taught" more advanced ideas. One goal is to develop digital technologies that enable students to continue to learn ever more advanced ideas by direct exploration and experimentation. For example, students who live in remote villages should be able to contribute directly to their community's agricultural efforts by using computers connected globally to the Internet, and locally to sensors, to run experiments on the quality of soil, air, and vegetation (Cassell, J.; et. al., 1997).

In the same vein, I believed that exposing the undergraduate students that I worked with to various WWW web sites that explain different aspects of .html, Java, and programming for developing intranet/Internet sites that they would be able to explore and learn a great deal on their own.

Individuals learn by direct expression. New media enable students to relate their own stories and ideas, and then relate them to a much broader and more diverse audience, rather than having adults do the talking for them. The traditional view is that students should focus on "absorbing" ideas from adults, not on expressing their own ideas. Most of what students know about themselves and their culture is what they hear from adults. Another goal is to go beyond this traditional view and to develop digital technologies that enable students to express themselves to others through storytelling, communicating, designing, and inventing in new ways. This in effect, enables them to find their own voice (Cassell, J.; et. al., 1997).

Self expression by students is a very important aspect of my own personal educational philosophy. I imagined that with creating their own web sites the students could express in a visual format their own ideas, concepts, and understandings.

Individuals learn by direct experience. In the future, students will no longer have to rely only on their parents for reports of the great big world out there. Instead, they can experience it directly through their own personal contacts with other people around the globe. Through electronic eyes and ears, they can see how the other side of the world looks and sounds. This experience will help to diminish the impact of national frontiers, although local cultures, what students experience in their own schools and homes, will always remain important. Perhaps most important, students will develop a different sense of themselves as intellectual agents, as valuable members of real and virtual communities. Students will become accustomed to expressing themselves across boundaries of geography, culture, language, and time (Cassell, J.; et. al., 1997).

The experience of using the virtual technologies to experience different information structures and knowledge bases around the world help to eliminate boundaries and open up new ways of thinking. I imagined that this would help increase interest and involved in using different educational technologies in this project.

Individuals need to learn knowledge within a global, multicultural learning environment. Most technologies support only a limited set of cultural styles and approaches. With global connectivity there is both a need and an opportunity for more encompassing approaches, encouraging participation by learners from all different cultures. This goal is to develop new digital technologies that provide multiple paths of entry and multiple patterns of use, while encouraging learners around the world to share and learn about one another's cultural traditions (Cassell, J.; et. al., 1997).

I also saw this as an opportunity to expose the art students to different ways of looking at things, different ways of working towards making art and also in using the technology for different purposes.

Individuals will eventually be able to learn in a multilingual environment. To date, the great variety of languages spoken around the world has been perceived as a major obstacle to the development of a global community. With global connectivity comes an ever greater need for learners to "speak a common language," and an ever greater opportunity to learn more about one another's languages, and about language in general. This goal is to develop new tools that enable learners to communicate with one another across linguistic boundaries, while supporting their learning of other languages, and enhancing the value of their own (Cassell, J.; et. al., 1997).

I spent some time exposing students to various software programs and applications that can be used via the Internet to access audio and video files in the form of music, speech, and moving pictures. This understanding can increase interests in foreign languages and music available from other cultures around the world.

Individuals will be able to learn in a multi-modal atmosphere. The channels of communication between learners and computers have been extremely limited: keystrokes and mouse clicks in one direction, text and graphics in the other. By enabling computers to understand and produce gestures and other forms of nonverbal communication, this will enrich the nature of the interaction between the learners and computers. By the same token, computers that understand verbal and nonverbal communication can help to open up computing to a broader range of ages and cultural traditions (including non-literate people). Even students who cannot (yet) type, can certainly speak and gesture in the direction of their computers, and understand the speech and gesture that the computer returns (Cassell, J.; et. al., 1997).

I believe that it is important for students to look ahead and grasp some kind of understanding about where educational technologies will be in the near future. This may allow them to consider new learning possibilities, which may increase the potential awareness of existing educational knowledge bases around the globe.

There is an extensive history of instructional design theory concepts in both higher education and corporate training. Instructional design theory has evolved throughout the decades as have most other dynamic educational theories that are concerned with learning, memory, retention, and understanding. The following synopsis is a brief history of the evolutionary process of instructional systems design processes over the last nine decades of education and training. It is taken from a highly developed instructional design web site that resides on a web server at San Francisco State University (Foreman, K., 1997). Presently and during the 1990's we have seen much of the constructivist and experiential learning approach.

While the cognitive approach promoted the cognitive aspects of learning, the need to understand how human beings acquire knowledge has been the underpinning of the constructivist and experiential learning approach. The Piagetian notion of the learner constructing knowledge from interaction with the environment is central here, and this need for concrete experiences can also be seen in the ideas of Dewey. Problem solving is a key element in constructivism. Learning comes through experience, which leads to the formation of hypotheses, which leads to a testing of the hypothesis through further experience. This approach entails far less teacher control than either the behaviorist model, which requires teacher-control of sequence, or the cognitive model, where the teacher is the primary source of input. The constructivist approach is currently in vogue in classrooms throughout the United States (Foreman, K., 1997).

The aspects of knowledge construction, interaction with a virtual environment, and concrete experiences, which Dewey and Piaget's theories embrace, are pertinent when considering the design and creation of web-based

instructional sites. The development of the new procedures and learning involved within a project such as this, is a type of hypothesis formation and testing. This could be seen in the experimental and exploratory phase of this project.

In the 1980's David A. Kolb broke new ground with his instructional design theory that delineated four distinct learning styles. This did help to increase the awareness in educators and trainers that not everyone learns and envisions their own particular understanding of concepts in the same way.

David A. Kolb is primarily interested in experiential learning. Kolb synthesized the models proposed by Piaget, Dewey and Lewin and developed what is now known as a learning-style inventory. Kolb saw four learning styles: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Learners seemed to fall into any of these four styles, but Kolb noticed that school type instruction was primarily focused in the quadrant delineated by the reflective observation and abstract conceptualization axis. Kolb's work on learning styles led to teachers becoming aware that not everyone learned alike and that it was in the educator's interest to train students to problem solve real-life problems and not just remember useless facts (Foreman, K., 1997).

In designing and creating web sites for educational purposes students in this project ventured through one or more of Kolb's learning styles. The concrete experience is represented by the interaction and usage of the new software programs and procedures as well as active experimentation in trying different methodologies and procedures to reach different individual goals. Abstract conceptualization I witnessed at various times when students were thinking of

ideas and concepts to develop within graphic design projects which could then be placed on web sites. Reflective observation is usually observed when one or more students are comparing individual works from a competitive or comparison viewpoint. This helps them to recognize as well as acknowledge the value their peers creative works as well as giving new insights into their own.

In the 1970's Jean Piaget, Robert Glaser, and Robert Gagne were the leading instructional design theorists. Piaget looked specifically at development stages in cognitive development, doing much work with his own children. Robert Glaser was very interested in the differences between criterion-referenced measures and peer-referenced measures. Robert Gagne had great interest in task analysis on the instructional design process as well as a taxonomy of learning outcomes and specific learning conditions for each of nine distinct events of instructional categories.

Jean Piaget (1896-1980) is known for examining the cognitive development in children, contrasting their cognitive processes with those of adults. He is the first to postulate that there are stages in cognitive development: sensory-motor, preoperational, concrete operational, and formal operational. Piaget also firmly believed that knowledge acquisition is a process of continuous self-construction. He saw knowledge as neither completely internal (the nativist viewpoint) nor completely external (the empiricist viewpoint). Rather, the individual continually reconstructed knowledge as he/she interacted with the world. Children actively work with the environment and acquire knowledge through their actions.

The information processing viewpoint took much of its analogies from the computer. Learning was viewed as the process of receiving information, processing it for immediate or future use,

and then retrieving information as needed. Studies at this time researched the existence of long and short term memory and the storage capacity of short term memory. Phenomena such as forgetting and retrieval cues in recall were also studied. The cognitive information processing approach brought to instructional design the need for organization in presentation and making learners aware of their own meta-cognitive processes. Organization was needed to help learners store information in long-term memory and to facilitate future recall; meta-cognition was needed to help learners take advantage of different strategies for processing information.

Robert Glaser coined the term "instructional system" and was chiefly concerned with the breach between psychological research on learning and educational practice and the development of the science of instructional technology. He is credited with the first use of the term "criterion-referenced measures," a form of evaluation that departed from the "peer-referenced measures" that came before.

As an instructional psychologist, Robert Gagné was primarily interested in determining what knowledge and skills are required for a person to effectively perform a given job. Gagné introduced the idea of task analysis to the instructional design, and this is reflected in his breakdown of instruction into nine events. His instructional theory includes two other components: a taxonomy of learning outcomes and specific learning conditions for each outcome. Although his early ideas were rooted in the behaviorist tradition he later incorporated information processing ideas into his theory.

Below is Robert Gagné's "nine events of instruction" categories.

<u>Event of Instruction</u>	<u>Learning Processes</u>
Gaining attention	Attention
Informing the learner of the objective	Expectancy
Stimulating recall of prior learning	Retrieval to working memory

Presenting the stimulus	Pattern recognition; selective perception
Providing Learner Guidance	Chunking, rehearsal, encoding
Eliciting Performance	Retrieval, responding
Providing Feedback	Reinforcement, error correction
Assessing Performance	Responding, retention
Enhancing Retention and Transfer	Retention, retrieval, generalization (Foreman, K., 1997).

Piaget's different stages of cognitive development are mirrored in a similar fashion when students embrace a technology development project such as this one. Examples observed during this project include: sensory-motor (use and application of the computer hardware and software); preoperational (planning, conceptualization, and exploration of existing web sites and visual constructs), concrete operational (decision-making, selection, and application of various formats for visual, audio, and interactive representation in the digital format); and formal operational (testing, evaluation, and comparison of individual creations).

The different events of instruction (or tasks) of Robert Gagné's learning theory are also relevant to this web development project. The first step I observed is how various Internet sites 1: (gained the student's attention). I of course 2: (informed the learner's of the expectant objective) at the beginning of the project. Revisiting web sites and remembering prior developmental processes of course helped to 3: (stimulate recall of prior learning and engaged retrieval to working memory) for the students involved in this project. Presenting the students involved in the project with web-based instructional materials and presentations on instructional development and production planning at the beginning of the project 4: (presented the stimulus and gave examples of pattern recognition and selective perception to the students). The way that I designed the web-based instructional materials for the students 5: (provided learner guidance by allowing them to view the materials in portions or "chunks" of information; example web pages (gave them rehearsal skills), and experimentation with .html (gave them encoding) skills in a dualistic sense. The two aspects are the .html programming encoding as well as the encoding process that develops in the mind when creating web pages (from changing spoken and written language into a computer language). I believe that when students are given a project or assignment such as developing an individual or collective website, creating a newsletter or flyer, or developing a small format book, that these types of tasks 6) (elicit performance). These type of projects

would also 6: (engage the students) in retrieval of various elements such as text frames, graphics, digital multi-media, and digital slides of artworks. One can observe how the students are 6: (responding (reacting) in these types of learning situations. I believe that this helps them in learning self reflection skills and self assessment behaviors (not to mention peer comparison, commentary, and adjustment). It is also important to provide feedback of some type when looking at students work-in-progress and at various stages of the project. This type of reinforcement is extremely necessary in .html development since many times I would have to make error corrections in .html commands or UNIX commands. It is important to get the students to do these corrections and let them remain in control of the computer. They will not learn and retain the various motor-skill functions and mental processes if the teacher or instructor "takes control" and does everything for them. I found that 7: (assessing performance) is very important in a project such as this type. This is harder to do with a volunteer graduate project than if one is designated as an authority or expert "professor or instructor" I found. With some students lack of the grade reinforcement (or monetary reinforcement for that matter) creates an apathetic environment. Many of these students of course are at an age where they have many "issues of growth" to work through. These types of humanistic factors must be considered and weighed by the individual teacher or professor in any type of classroom teaching environment. I found that if you can get students to 7: (respond) to your

comments and questions that they are more likely to 7: (retain) the knowledge you are trying to get across to them. Like most things in this world, the more practice the better one gets. Repeated attempts to learn something new or different will help in the 7: (retention, retrieval, and generalization) of new knowledge bases, skills, and understanding.

In the 1960's David Ausubel theorized that knowledge acquisition and retention involved subsumptive, superordinate, and combinatorial learning. This mainly evolved into content or 'advanced organizers' which are still seen in many textbooks in higher education today.

David P. Ausubel emphasized the importance of making learning meaningful for the learner. His model of knowledge acquisition and retention involved three processes: subsumptive, where meaning and new examples were added to an existing concept; superordinate, where new umbrellas for existing concepts were created; and combinatorial, where additional background was added to a more global understanding of a concept. Because of this view of knowledge acquisition and retention, new information needed to be presented in such a way that aided subsumptive, superordinate and combinatorial learning. In order to make learning meaningful, Ausubel encouraged the use of content organizers and sequencing to the enhancement of learning and problem solving. The organization of most college textbooks owe a lot to Ausubel's ideas of content organizers. These content organizers are also known as advance organizers, and present an overview of the material to be covered in a textbook chapter (Foreman, K., 1997).

Ausubel's ideas of subsumptive (addition of new meaning and examples), superordinate (concept umbrellas), and combinatorial (global background to a concept) can be seen in various stages of a web site development project such

as this one. One is continuously adding new meaning to a home page or collective web site whenever it is updated or various elements are changed.

In my own personal situation I continuously seek out and find new software applications, novel multi-media web sites, innovative Internet based radio and television web sites, and especially various film archival web sites on film genre, film analysis, film history, film festivals and the continued evolution of film (entertainment, educational, and documentary) in the 21st century. These learning episodes help students and myself to further our knowledge about things that interest us, spark our imaginations, or create conscious or subconscious motivational schemata for finding new knowledge bases.

The World Wide Web contains millions of concept umbrellas if one happens to know how to look in the right places. In this genre of learning I had to help some people look in the right places for certain things, while reminding them that these examples were in no means inclusive of all of the possibilities. Many times this superordinate knowledge was exchanged between myself and the students who were learning and participating in this project. I have learned as much from the students about certain areas to look for things in the virtual world as they have from me. My experience allowed me to show the students how easily link pages that one is developing for educational or training purposes can be changed, modified, or updated almost immediately to reflect the interests of the entire group of learners.

The World Wide Web is probably one of the largest combinatorial (global backgrounds) that exists in the world of knowledge bases, information, and archival information today. A good teacher or learning facilitator has to help the students develop skills that are similar to “selective attention processes” whenever using the web however. A type of “virtual intuition” develops after thousands of hours of using the WWW and the Internet for research however. I recommend that learners remember that technology is not (yet) a part of the natural world, but is a human construct (or tool). As such it is as imperfect as everything else in this world that was not created by the Almighty. With that said, I believe people just have to use common sense in judgement and selection of appropriate knowledge bases. This of course leads us to what is “common” and “sensible”? That however is another philosophical discussion that I will not further indulge in within this paper.

Benjamin Bloom introduced the idea of higher order cognitive skills and his famous taxonomy in the 1950's. This led to an examination of attitudinal and psycho-motor objectives.

Benjamin Bloom recognized a taxonomy of educational objectives. His objectives covered only verbal and intellectual skills, but they paved the way for thinking of educational objectives as a learning hierarchy. Robert Gagne's nine events of instruction incorporates Bloom's taxonomy. Bloom recognized the difference between simply knowing a fact and knowing how to apply, analyze, synthesize and evaluate it.

Bloom introduced the idea of higher order cognitive skills. Following Bloom's lead, others created taxonomies of attitudinal objectives and psycho-motor objectives (Foreman, K., 1997).

Taxonomies such as Bloom's can definitely be used when using the WWW and Internet. Information on a screen is simply of no use if one doesn't know how to apply it, analyze it, synthesize it, and evaluate it appropriately for whatever business, non-profit organization, or governmental business that they may be working within. I witnessed much of this behavior going on while people were viewing web sites during this project. The evaluations were of course as different as the various perspectives of the professors and students that I have met here at UNI. This is natural human nature at work and I believe that the technology will never change that aspect of individual differences in what people select, like, or choose to do.

In the 1940's B.F. Skinner's experiments in operant conditioning opened the door for the systematic design of instruction (or the breaking down of instruction into discrete components).

B.F. Skinner is best known for his experiments in operant conditioning. He extended his theories about operant conditioning to the process of learning and paved the way for the behaviorist approach. While few instructional designers and technologists today would agree with Skinner's narrow view of learning as stimulus/response and the programmed instruction movement that developed out of it, Skinner and the behaviorists made some very important contributions to the instructional technology field that continue to resonate today. The focus on observable outcomes is one product of the behaviorist movement.

Instructional design uses observable outcomes as key elements in setting goals and in evaluation. In addition to the concept of observable outcomes, Skinner's work paved the way for systematic design of instruction, the breaking down of instruction into discrete components.

Behaviorism was introduced into American psychology in the early teens and proposed that only objective data of behavior was valid for study. B.F. Skinner is probably the best-known of the behaviorist school with his studies of stimulus-response. Skinner viewed learning as a process of reinforcing behavior until the target behavior is achieved. Reinforcement could come in different forms, including positive reinforcement to encourage a desired behavior or negative reinforcement to discourage an unwanted behavior. In the field of education, behaviorism manifested itself in the programmed instruction model. All instruction was broken down into discrete steps or behaviors, each of which was reinforced until it was learned. In foreign language instruction, this approach was called the audio-lingual method, which relied primarily on rote repetition. Ultimately, behaviorism was rejected because it did not account for cognitive processes that influenced learning. However, behaviorism's legacy includes task analysis, emphasis on observable goals in evaluation, and the use of criterion-referenced measures (Foreman, K., 1997).

From the standpoint of behaviorism, I believe that this project exemplified or reflected a number of elements of B.F. Skinner's theories of human psychology. Positive and negative reinforcement, task analysis, observable goals and outcomes, and the development of the use of criterion-referenced measures for success were all evident within this web development project. I imagine that the students would have been more ambitious in creating .html documents and images for the project if it would have been reinforced with a grade (or more fully integrated into their existing graphic design curriculum).

Task analysis was something that I looked at from various angles of

interpretation. Tasks can be arranged from simpler to more complex rubrics to bring the students to a level of efficiency and a sense of self accomplishment. Observable goals and outcomes for evaluation are important in the sense that once the criteria are developed students know what the minimum requirements are for success in a given project or class. These criteria can then be a reference point or "benchmark" from which the instructor or professor can extend the expectations if necessary.

Kurt Lewin did significant work in organizational behavior and in looking at group dynamics. His ideas work best in a practice or simulation type situation.

Kurt Lewin is best known for his work in the field of organization behavior and the study of group dynamics. His research discovered that learning is best facilitated when there is a conflict between immediate concrete experience and detached analysis within the individual. He saw this essential conflict as a key to organizational change and improvement. His cycle of action, reflection, generalization, and testing is characteristic of experiential learning. However, because there is little tolerance for mistakes in the real-world of business, Lewin's ideas have been adapted so that the mistakes can be made in a "practice" situation (Foreman, K., 1997).

If one is going to teach with the idea of creating a conflict between the immediate concrete experience and detached analysis within the learners I think that care should be taken to maintain the appropriate level of conflict. For some individuals too much conflict may cause a disruption or barrier in the learning process.

If an experiential learning episode is designed by the teacher or instructor it should be made clear to the students that it is a "simulation or practice" situation whereby the participants can "learn from their mistakes". This requires a teacher who has the appropriate degree of self esteem and empathy for the students whom they are mentoring or instructing.

F.C. Bartlett made postulations about interrelated patterns and individual's prior experience.

F.C. Bartlett is credited with postulating the idea that our knowledge of the world is organized into a network of inter-related patterns based on our prior experience. He called these patterns schemata. Bartlett also conducted a series of experiments to show how existing schemata can influence learning and recall. His experiment laid the groundwork for current theories on how cultural and socio-economic factors influence learning (Foreman, K., 1997).

From what I have observed in this practicum project I believe that it is true that knowledge of the world is organized into schemata. The design of schemata or "patterns" is more important to some learners than others however. Cultural and socio-economic factors of course influence learning greatly, just as they influence different types of teaching. Recognition of these aspects of Bartlett's learning theory may be one of the elements that teachers should strive for; this may help them understand what types of instruction processes are likely to be successful with different types of individuals.

Edward Thorndike proposed quantitative measurement to the study of memory, learning rate, and effectiveness.

Edward Lee Thorndike (1874-1949) was the first to propose using measurement as the key to scientific progress in education and psychology.

He applied quantitative methods to the study of memory, learning rate, learning in adults, and conditions which lead to effective learning. He is often called the "father of modern educational psychology."

The work of B.F. Skinner is built upon Thorndike's initial research in stimulus-response; however, Thorndike's interests were much broader and his five principles of the technology of instruction include areas not considered by most behaviorists: self-activity, motivation, mental preparation, individualization, and socialization (Foreman, K., 1997).

I definitely think that self-activity, motivation, mental preparation, individualization, and socialization were present in one form or another with all of the students that I was involved with during this practicum project. The nature of most art students is to succeed and they all have distinct and unique intellectual skills, are engaged in self-activity, have a high degree of motivation and mental preparation, and like to indulge in both individualization and socialization at appropriate times.

John Dewey is of course most famous for his ideas that education should be a social tool for preparing individuals for their future roles in society. Dewey also advocated the use of the arts within education.

John Dewey (1859-1952) can be credited with many elements of current thought with regard to instruction and instructional design. Dewey envisioned education as a social tool, a means to prepare children for their roles in society. He also saw the ideal form of education as one in which children used concrete experience with objects and processes that they would come in contact with in daily life to learn about principles and abstract ideas. Problem solving, which required reflection and the testing of hypotheses, was also central to his idea of how children best learn.

Dewey was the first proponent of relevance in education. He felt that relevance would motivate young learners. Dewey's emphasis on hands-on learning is still followed today, and the shift towards real-life learning and meaningful learning stems from ideas he proposed at the beginning of this century (Foreman, K., 1997).

Real-life learning was one of the goals that I had sought to engage the practicum students in when developing an intranet/Internet project. This type can be meaningful in different ways to different individuals and a high level of relevance can be seen with students researching and searching for various information and knowledge bases on the Internet. Many times I was very interested and surprised at what these art students could find or come up with in the terms of creative ideas for using the World Wide Web.

Professor Hoffman, who teaches in the area of instructional technology at the University of San Diego College of Education (Hoffman, B., 1997) has developed the following acronym (model) for concise and appropriate design of curriculum, materials, and the evaluation and assessment process in higher education. Upon finding this particular model I was impressed with its uniqueness and originality, therefore I included it in this overview of the history of instructional technology.

The letters A-D-D-I-E stand for the steps or stages in the instructional design process: analysis, design, development, implementation and evaluation. The definitions of the different stages are as follows:

Analysis: in the analysis stage of the instructional design process, it is important to find out two things: (1) who are the learners, or "audience," for this workshop or course; and (2) what is the goal or intended outcome of the instruction? These are called audience analysis and goal analysis (Hoffman, B. 1997).

Design: once it is known who the learners are and what the goal of the workshop or course is, some decisions can be made about: (1) what should and should not be included in the content of the course; (2) what steps of instruction are appropriate for the various types of knowledge being learned, and (3) what type of media, or mode of presentation, is appropriate for the course or workshop. These are sometimes known as subject matter analysis, lesson

planning (or choosing the steps of instruction), and media selection (Hoffman, B. 1997).

Development: with the content outlined, the steps of instruction assigned, and appropriate media selected for course or workshop delivery, development of the instruction can proceed. Sometimes this is carried out all at once, or, with a large project, it may be done by doing rough sketches, or rapid prototypes, which can be tested with the audience and the goals before a lot of time (and money) is spent developing a finished product. Which ever method is selected the end result is a course or workshop that is ready to be delivered to the learners (Hoffman, B. 1997).

Implementation: this is the part of the instructional design process that is most familiar to us as learners; the delivery of the instruction itself. The chosen content is presented to the learners using appropriate media, and the results are then evaluated (Hoffman, B. 1997).

Evaluation: there are two related evaluations going on simultaneously in most instructional design situations: (1) evaluation of how much and how well the students learned; and (2), perhaps more important for the instructional designer, how well did the workshop or course work? Does it need to be modified before it is given again? What needs to be changed? The content? The steps of instruction? The media or the representations of the content used (Hoffman, B. 1997)?

As you can see, the ADDIE process doesn't have to be a step-by-step linear process. It really should be one in which there is continual analysis and evaluation (Hoffman, B. 1997).

The ADDIE model can be applied to web site design easily: analysis of information that is discovered, design and collage of various visual elements in web page construction, development of concepts to be constructed using visual information, implementation of a intranet for end-users (other students and faculty) and evaluation of the final project (creation) as a viable tool to be exercised in an academic intellectual environment.

Another instructional design teaching model is the ARCS model. The ARCS acronym stands for Attention, Relevance, Confidence, and Satisfaction (Borich, 1992). The attention component is a vital and important part of the model. Borich (1992) identifies this as the part of the instructional design (lesson plan) where the teacher or instructor works on acquiring and holding the students' attention. There are many different strategies which can be utilized in this component. These may include such things as acting out the role of the devil's advocate as information is presented, changing the pace or style of the presentation and planning activities that require student participation (Borich, 1992).

Relevance is the second component of the ARCS model. In this part, the teacher must make sure that the content in the course is perceived by the students as being applicable to their respective lives. The teacher can demonstrate the importance of the course material by showing enthusiasm for it (Borich, 1992).

Confidence is the third component of the ARCS model. In this component, teachers build up the confidence of their students in the course by providing opportunities for success from the start of the course. Strategies for building success include: (a) assisting students in setting realistic goals for themselves, (b) providing clear and specific criteria for evaluation, and (c) providing effective feedback to the students (Borich, 1992).

Satisfaction is the final component of the ARCS model. In this part, teachers provide opportunities for students to apply the concepts studied in real life situations. Learner satisfaction can also be increased by giving the students options for how they can complete course objectives as well as by providing extrinsic rewards and verbal praise for students' progress (Borich, 1992).

Attention is gained from interaction with both the technology and the information and data that is discovered on the WWW and relevance is a pertinent individualized factor for most students who use the Internet. Confidence can be achieved by reaching a certain level of task completion and from learning about artists, culture, music, and technology.

Satisfaction is the element that can be difficult to judge at times with artists and art students as well as with other academicians. One can sense whenever learners display this attribute most of the time however.

Interface Design Theory WWW Sites

Having extensively covered the process of instructional design of courseware materials, curriculum development, and the various historical philosophies of instructional technology I will now move towards a more modern and current concern. This is the concept or theory of interface design. Interface design is extremely important when designing instruction materials for use in CAI (computer assisted instruction), HCI (human computer interface), or CMC (computer moderated communication). It is also one of the most important concerns when teaching graphic design and visual communication to students in higher education. However for this graduate research paper I am specifically interested in interface design as it applies to the World Wide Web intranet/Internet space that I am developing within this practicum project.

Interface design involves the look-and-feel of the things around us and how we use it to get information and/or communicate. It is basically a way to design the HCI (human-computer interface) so that the computer application program or web site interactive visual layout is easy to use, practical, and functional.

This interface may of course vary depending on the particular goals and objectives that the instructional designer wishes the learner to reach for the particular discipline specific courseware being developed. The following are WWW sites that provide help and assistance in developing interface design for individual or collaborative projects.

Publish RGB On-line

[<http://www.publish.com>]. Magazine for electronic publishing professionals' features: articles, techniques and tips, useful links, product reviews, and upcoming events.

Communication Arts Graphic

[<http://www.commarts.com/index.html>]. Arts magazine web site has: web pix, galleries, creative listings, chat rooms, design competitions, etc.

Sun WWW User Interface Design

[<http://www.sun.com/sun-on-net/uidesign.html>]. Sun publishes their fundamental concepts of interface design, with examples from their in-house archives. The site also provides technical support for Java developers, as well as solutions and product information.

Design Interaction Paradigms

[<http://designparadigms.www.media.mit.edu/projects/design-paradigms/>]. MIT researchers consider design interaction paradigms, probing the nature of the interaction between human and computer during the design process.

Yale Center for Advanced Instructional Media Gallery

[<http://info.med.yale.edu/caim/>]. Current projects, and publications: including on-line Web Style Manual and Visual Design of the User Interface. C/AIM develops medical & scientific illustrations, education and training, information design, and interface design for electronic publications and networked information systems.

Core: Industrial Design Network

[<http://www.core77.web>]. Industrial design web site posts: articles, projects, educational program descriptions, design forum, games, firm list, and employment.

Adobe Tips & Techniques

[<http://www.adobe.com/studio/tipstechniques/main.html>]. Adobe provides informative how-tos for all Adobe software.

Sun Guide to Web Style

[<http://www.sun.com/styleguide>]. Sun creates a cookbook for building better web pages, drawn from the experience and observations of their own personnel.

Multimedia Authoring Searchable Database

[<http://www.mcli.dist.maricopa.edu/authoring/index.html>]: Maricopa Community Colleges is devoted to multimedia authoring and web development resources. Categories include: relevant issues, information sources, and media-specific topics.

The previous web sites are given as expert examples of resources that the instructional designer can use for specific purposes. There are of course many, many more if one wants to spend the time to research them.

Instructional Systems Design As A Creative Project

For this particular instructional design practicum project I was mainly concerned with design concepts for the World Wide Web. This usually entails the creation of .html documents, images, sounds, and other types of multimedia to be used in the development of particular web sites. Below are a few of the fundamental design concepts for creating web sites for the World Wide Web.

These major findings from an extensive usability study done by Sun

Microsystems:

1) You cannot succeed on the WWW just by putting some cool stuff out there. People are suffocating from information overload, so WWW designers have to become much more user-oriented and provide value-added information to attract traffic to their server.

2) Many times the value of less is more, but if everything is highlighted, then nothing has prominence. It is the responsibility of the web editor to prioritize the information space for the user and to point out a very small number of recommended information objects. The beauty of hypertext is that the user can then browse the information space further and dive deeper into the specific information of interest to that individual user.

3) People have very little patience for poorly designed www sites. As one user put it: "the more well-organized a page is, the more faith I will have in the information." Many other users told us that they would be out of a server, never to return, if they got too many server errors or "under construction" signs.

4) Users don't want to scroll: information that is not on the top screen when a page comes up is only read by very interested users. In our tests, users stated that a design that made everything fit on a single page was an indication that the designers had taken care to do a good job. Note: Our usability studies in 1997 have revised this conclusion somewhat. Scrolling is still bad, but not as bad as it used to be.

5) Users don't want to read: reading speeds are more than 25% slower from computer screens than from paper, but that does not mean that you should write 25% less than you would in a paper document. You should write 50% less! Users recklessly skip over any text that they deem to be fluff (e.g., welcome messages or introductory paragraphs) and scan for highlighted terms (e.g., hypertext links) (Sun Microsystems, 1998).

The instructional design methodologies and interface design concepts were the major elements that I considered in the planning, design, and execution of this instructional systems design creative project. I have witnessed that different individuals may come to an understanding of new knowledge bases differently in different circumstances, and in different environments.

Human beings are fluid, ever changing entities. I believe that the Internet and the World Wide Web are also like living entities in the sense that it grow, change, evolve, and are continually dynamic learning environments.

CHAPTER 5

SOFTWARE AND HARDWARE ENVIRONMENT

In implementing a project such as this one the largest most significant consideration is whether or not appropriate hardware and software will be available for the development team members. This is crucial for a number of reasons. There will be certain deadlines to meet, data and information changes and upgrading of materials periodically, and a great deal of computer processing of text files, digital images, movie files, sound files, and possibly animation.

In this project the Macintosh G3 personal computer (see APPENDIX E) was used in a network environment using key server technology. Additional hardware included Afga and Hewlett-Packard flatbed scanners (see APPENDIX F), a Polaroid slide scanner (see APPENDIX G), an Apple LW 12/660 PS color printer, and a Hewlett-Packard LaserJet 4M+ black and white printer. Software included Symantec Visual Page (web design software), Fetch 3.03 (file transfer software) and various Adobe software programs (see APPENDIX D) that are currently used for graphic design and illustration (Photoshop, Illustrator, Streamline, PageMill, etc.).

CHAPTER 6

ETHNOGRAPHY OF TECHNOLOGY INFUSION

Department of Art Administration and Faculty

Whenever undertaking any type of instructional design in an institutional setting, there are a number of social and bureaucratic considerations that one must periodically adjust for. This project in the University of Northern Iowa Department of Art was no exception to this rule. The current faculty for the Spring 1998 semester included the following employees: Dr. Grace Deniston and Professor Marianna Delafield who teach in the area of art education. Grace was very accepting to the new technologies that I presented her with and could see the advantages of implementation and incorporation of an in-house intranet/Internet project. Marianna Delafield was rather new to the technology in the beginning of the project. Getting three e-mail accounts with Cedar Falls Utilities led her to further exploration of on-line communication.

After I showed her that I was incorporating visuals along with the textual information provided by the faculty members, she requested that I put a picture of herself and her husband on-line along with her vita.

Dr. Charles Adelman, Mr. Allan Shickman, and Ms. Ann Paulk were the professors who were teaching in the art history area. Charles mentioned to me at one point that he thought what I was doing was a very important and interesting project.

Dr. William Lew, Mrs. Elverda Bender, and Mrs. Nancy Sheerer were the personnel in the art administration office.

Professor Jo Ann Schnabel teaches ceramics. She sent me an e-mail immediately after Osie and I distributed the materials requisition forms to the faculty. She believed we should restrict the on-line representation to the professional faculty and leave out the support staff (such as custodial employees).

Professors Steve Bigler and Crit Streed, and Barb Fedeler all teach in the studio area of drawing. Crit Streed has been very accepting of the new educational technologies and in fact is one of the leaders in writing grant proposals for new equipment acquisition. Last year she was awarded a new Macintosh PowerPC computer, an Apple flatbed scanner, and an Apple laser printer. This year she was awarded a memory upgrade for her computer, an Iomega ZIP drive, and a digitizing tablet and stylus for creating artwork on the computer. Crit expressed that she would write a new statement to put on-line and along with a new self portrait.

Professors Roy R. Behrens, Phil Fass, and Osie L. Johnson, Jr. teach in the graphics, design and illustration area. Roy submitted a very professional packet of materials for the practicum project. He included a hard copy of the text that he wanted on-line, the text files on a floppy disk, and also designated the text that he wanted linked with a list of hypertext transport protocol addresses.

He also included a photographic self-portrait, a copy of BALLAST (his quarterly review mini-publication), and a 35mm slide of an original artwork to be placed on his web page development.

Osie submitted a photograph of himself at the beginning of the project and then submitted a more creative illustration after finals were over. Phil Fass submitted nothing for the practicum project during the Spring 1998 semester.

Phil's main interests seem to be in publication design, book making, increasing the undergraduate students' awareness of design history and design principles, and teaching practical and functional use of computer application programs applicable in the graphic design industry. Phil is well equipped to learn the new educational technologies used in web programming and design interface.

Professor Delores Chance was teaching in the area of jewelry making and metals to cover for Professor Tony Yuen who is teaching for a year at the University of Iowa. Since I perceived that Delores had been hired as an adjunct to cover for Tony I did not bother her with explanations about technology but instead created a page with an existing image of Tony Yuen along with his professional vita. These were already in the ISCSSUN account for the art department so I incorporated them into the intranet project.

Professor Joan Soppe was teaching papermaking during the Spring 1998 semester. I heard nothing but praise for her teaching methods from her students.

I approached her one day and asked if I could take photographs of her and her class since I had a digital camera on hand, and she thought it was a great idea. I developed quite an extensive visual display for the papermaking area of the intranet (see Art Department Intranet Photos supplemental materials on CD-ROM).

Professor Aaron Wilson is the new professor in printmaking. Aaron was highly interested in using computer graphics in the printmaking process and expressed interest in the project.

Professors frje echeverria, Crit Streed, and Megan Lipke teach in the areas of painting. frje already had a web page developed that I had taught him how to create the previous summer. I simply talked him through the process while he sat at the computer and created a web page, uploaded the .html documents and image files (.gifs), and tested it in Netscape TM. This web page of frje's I then linked to the Department of Art intranet page for painting.

Crit Streed also had a web site developed that was created by a former student in California. I had helped her set up an ISCSSUN account the previous year and transferred the .html documents and image files (.gifs and .jpgs) to the www.uni.edu domain the previous year.

This she opted not to connect to the Department of Art intranet/Internet web site since her photograph and artist statement were not current. frje, Crit, and Megan all expressed interest in developing new web pages and image files to put on the departmental web site at a later date.

Professors Richard Colburn and Jeff Byrd teach in the photography discipline. Jeff submitted an extensive amount of professional materials for the practicum project. These include an updated vita or professional statement, various photographs of his performance works, and information about one particular performance.

Professor Tom Stancliffe and Shop Technician Marc Moulton both teach and work in the sculpture area in the UNI Department of Art. Marc had developed quite an extensive space for current sculpture students as well as alumni of the UNI sculpture program that was already on-line. These pages needed a few corrections and additions that I had to modify somewhat. I was able however to incorporate this existing on-line informational data structure into the new web page design model. Marc also had his own ISCSSUN account and a highly developed series of personal web pages that were incorporated into the new design model.

Shawn Holz is the new director of the UNI Gallery of Art, and was interested in creating a state-of-the-art-virtual presence for the gallery. I perceived that he very much wanted to develop materials on his own.

In the future, the gallery director would hopefully be maintaining and updating the gallery's web pages after they are developed. This would allow changes in the on-line presence as various shows are exhibited over the timeframe of the academic calendar year. It would also provide a venue to increase exposure of the activities that the UNI Gallery of Art offers to the University community.

Mrs. Pat Howard is the supervisor of the UNI art supplies store in Kamerick Art Building. There were existing photographs of Pat in the ISCSSUN account, one of which I edited for size and resolution and used on the web page for the UNI art supplies store. I then corresponded via e-mail with Pat asking her if there was any appropriate information that she would like represented on-line. We corresponded on this subject and eventually she wrote an informational caption for the art store web page and sent it back to me via e-mail. Pat has just recently been introduced to technology such as the World Wide Web and E-mail and she has made a good effort to make use of these tools to promote the presence of the Art supply store in Kamerick Art Building.

Undergraduate Art Students

The following students participated in the Spring 1998 Practicum project in developing an intranet/Internet web space for the UNI Department of Art: Chad Little, Senior, Graphic Design emphasis, Janelle Edwards, Junior, Graphic Design and Painting emphasis, Cory Thorson, Senior, Graphic Design emphasis, Kevin Keseling, Senior, Graphic Design emphasis, Chad Lovan, Senior, Graphic Design emphasis.

Chad Little was quite interested in the practicum project and involved himself as much as possible. I had Chad helping me design layout pages that we could possibly use for the main index page or for individual emphases index pages. Chad also developed the link buttons that are on the main index page for the UNI Art Department web site and these we incorporated into the final project (see link buttons at [<http://www.uni.edu/artdept>]).

Janelle Edwards volunteered to help me scan image and text materials for the project and I demonstrated the use of OmniPage 8.0 for her benefit. OmniPage 8.0 is an excellent OCR (Optical Character Recognition) software program for scanning text formats. Janelle later returned the materials and apologized for not having scanned them and not having the time to complete the tasks that she had undertaken.

Corey Thorsen, Chad Lovan, and Kevin Keseling were all interested in learning about web programming and development so I demonstrated various programs which will enable them to create their own web pages in the future. The programs that I helped them acquire and show them how to use were Symantec's Visual Page 1.1.1 (Trial Version), Graphic Converter, and Fetch 3.0.3 for the Macintosh. We downloaded these programs from the Internet and I helped them all save them on ZIP format storage disks. Corey, Chad, and Kevin all expressed interest in the practicum project and wanted to help; however they all had conflicting work schedules with the days and hours the rest of us met. This was basically due to Osie's teaching schedule and his other University commitments as well the location where the others worked. We usually met on Tuesdays and Thursdays at 2:00 p.m. in the afternoon. This worked for Osie and the rest of us that could come at that time.

I did as much as possible to work with each one of them individually when time and schedules allowed. I feel that they all gained awareness from this web programming and design practicum project.

Academic Timeframe

Whenever one plans a project that will be completed during a one-semester timeframe it is wise to consult with the University's calendar for that semester. This is important since there are many events other than holidays that occur such as extracurricular activities, community activities, and social and fraternal functions. The different agendas (departmental, institutional, professorial, administrative, and student) for a particular semester seem to be continually evolving and changing during that timeframe. One should accept the fact that this may also happen with any practicum or other types of technology implementation projects and be able to be flexible and adjust accordingly whenever needed.

The Spring 1998 academic semester went quite well for this project despite a great deal of institutional, college, and departmental changes that seemed to be ongoing. The practicum project did what I had hoped it would do, create a basic on-line organizational structure from which further development and progress can be addressed in the future. This "virtual backbone" may allow professors, students, and the art administration to put materials on-line for continual accessibility and development if the need and desire to do so is present.

I do believe that anyone who undertakes similar educational technology projects in an educational or institutional environment should look closely at the social and bureaucratic considerations within the institute, department, college, or institution wherein the project will occur. It may be a good choice to also do a preliminary needs assessment from faculty and administration beforehand. The only difficulty with this is that a needs assessment will probably take just as long as it would to do the actual technology project. All the factors must be weighed together and independently, and if one feels that there is sufficient support by interested individuals to complete the project then success is possible.

As with many academic departments in higher education much of what actually happens (the etic) can be seen as a phenomenon of human interaction, learning, give and take, and a continuity of discourse, paperwork correspondence, e-mails, memos, committee meetings, agreement and disagreements, finally leading to some type of consensus that seems appropriate for the total group environment. This process I believe should operate as smoothly as possible with as little disruption to the educational goal of teaching the students, who are the consumers and eventually become the products of whatever educational institutional processes they experience.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

In this chapter I will look at the overall phenomenology of this interactive instructional systems design creative project. Phenomenological anthropology refers to a way of doing ethnography and ethnology which emphasizes the study of consciousness. Speaking generally, a phenomenological study is one that is grounded in the direct experience of aspects of one's own consciousness. This is what I attempted to do with the intranet/Internet practicum project working with the undergraduate students in the UNI Department of Art. I was concerned not only with the students' and faculty's' consciousness, but also with my own consciousness, intuition, and perceptual nuances in evaluating and assessing interest, ambition, and achievement levels of the group as a whole while working on this practicum project. For it is within these individual consciousnesses that understanding, learning, and comprehension of new philosophies, ideologies, knowledge, and systemic processes or skills come to fruition within the human minds of the learners.

In a more strict philosophical sense, phenomenology refers to any method for the study of consciousness that (1) grounds knowledge about consciousness in intuition as the prime source of insight and as the final arbiter of truth about consciousness, and (2) recognizes the possibility of, and seeks knowledge about, the essential structures of consciousness (Spiegelberg, 1982: 5-6).

The consciousness of the students throughout this practicum project seemed to be quite intuitive and they all exhibited a great deal of ambitious interest in learning about the new educational technologies available for web site development.

As an educational anthropologist I have become more and more interested in the full range of human experience and the ways in which faculty, students, and administrators in higher education interface and interact with each other. With this concept in mind the relevance of the works of William James is suddenly pertinent and important to any type of summary conclusions and recommendations. James, a famous 19th century psychologist, is best known for his views on pragmatism. But James also developed a very broad approach to the study of experiential reality; an approach he (1976:22 [1912]) called a "radical empiricism:"

To be radical, an empiricism must neither admit into its constructions any element that is not directly experienced, nor exclude from them any element that is directly experienced. For such a philosophy, the relations that connect experiences must themselves be experienced relations, and any kind of relation experienced must be accounted as "real" as anything else in the system (Taylor, 1994).

This practicum project was as real as anything else in the system (in terms of special instructional projects in the UNI Department of Art during the Spring 1998 semester) and many of the relationships experienced by the students and faculty connected people in a new type of discovery process of learning.

In terms of distinct criteria, I can make a few suggestions here as to what I would recommend in the future if another such instructional systems design project were to be undertaken. The criteria I would stratify along these parameters: (1) needs assessment, (2) pre-testing of participants knowledge base, (3) consideration of the participants motivational desire to succeed in completion of the project, (4) quantity, quality, speed, and availability of hardware and software equipment, (5) individual meetings with faculty to assess what types of materials and representation is required, (6) increase allocated size of the UNIX server account to accomodate Quicktime TM movies, audio files, and other types of experimental multi-media (such as animation, collaborative chat rooms, Shockwave TM, and RealAudio TM and RealVideo TM), (7) better allocation of time for participants to work on various aspects of the project, and (8) an ongoing critique from an expert source outside of both the UNI Department of Art and the University and Cedar Falls/Waterloo geographic domain.

A needs assessment would allow the coordinator of an instructional systems design project to better understand the wants and needs of a current faculty or group of educators within an individual department or college. Since much of what dictates and creates an educational environment within the academic atmosphere is the intellect, minds, personalities, and attitudes of the employers, it is always wise to consider the breadth and scope of the group's abilities and flexibility in accepting new knowledge and ways of learning. In many environments security and employee longevity can sometimes tend to cause stagnation.

A needs assessment will allow the instructional designer to determine beforehand whether or not the existing faculty or group of educators are likely to be receptive to new educational technologies or interested and accepting of them. A more personalized process could be utilized that would allow for individual feedback from faculty members and office personnel within a department or college. The different areas of expertise and specialization in some disciplines could allow for a variety of ideas and on-line (or distributed electronic neural networks) resources to be used in a project like intranet/Internet web site development.

Pre-testing of the instructional system design project's participants existing knowledge base about such things as .html programming, use of web design and graphic design software, telecommunications terminology, existing virtual electronic resources that they may know about, and organizational structures of databases would be very beneficial. This would allow for the instructional designer or curriculum developer to address the capabilities, aptitudes, and prior knowledge of a particular group of learners involved in a project and then adjust the curricula and instructional sequence accordingly. Although this happens automatically with a caring, open-minded teacher or professor who can "see", a pre-test may possibly give the instructional designer or educator "an edge" in doing a creative project as well as create an additional buffer of accountability.

Talking with the prospective participants of any type of an instructional systems design process beforehand (as well as doing a follow-up) is a good idea. This will allow the instructional designer to assess the prospective participants' motivational desire to succeed. This is highly important and some type of binding verbal (or even possibly written) agreement or contract should be arranged with the project participants. This will help assure that individuals who are truly interested and committed to this particular vein of learning and creative project development will follow it through to completion.

In any type of instructional systems design projects such as computer presentation programs, CAI (computer assisted instruction) implementation, web development and programming, intranet/Internet interface design, database design and management, and other types of creative projects implementing technology the most important and crucial factor many times will be the quantity, quality, speed, and availability of appropriate hardware and software.

The hardware equipment must be of sufficient processor speed and computing power, have enough RAM (random access memory), cache, and backside cache, and have enough storage capacity to complete the ISD (instructional systems design) project in question. I would recommend that brand name computers such as Silicon Graphics, Macintosh, Sun, Hewlett-Packard, IBM, or UMAX be used.

A good quality machine will have fewer problems and difficulties than a clone model and also repairability and customer support services are more readily available. Quantity is always a factor in an instructional systems design project. There should be an appropriate number of workstations or PC's available for the participants in a creative learning project.

It is important to make a fairly reliable estimate at the beginning of an ISD project as to how much time will be spent in total hours, as this will affect the quantity of computers needed to complete the project.

One should also consider other possible uses of the computing units in question and such things as scheduling and computer lab hours (if applicable). This goes hand in hand with the availability aspect mentioned earlier. The computers should be available to the participants of an instructional systems design project at the appropriate times.

The speed of the computing units is another important factor for a number of reasons. The largest one is that in doing web site development and programming one may be working with seven or eight computer applications at once and multi-tasking between them simultaneously. For example, I have worked in Adobe Photoshop TM, PageMill TM, Fetch, Netscape TM, and Microsoft Word all at once to incorporate text, images, and .html code together. At the same time Fetch is used to upload files to the UNIX World Wide Web server and Netscape Navigator TM is left open on the desktop to preview newly created web pages, images, and other multi-media formats that have just been uploaded to the UNIX World Wide Web server.

It would be well worth the time to meet with faculty members and office personnel after the completion of a needs assessment and before the beginning starting point of the ISD creative project. This would allow those who have an interest in becoming involved in technological enhancement of their courseware by using the web site to offer input and submit materials beforehand.

Individual and collective schedules as well as personal lives may have to be considered in this type of pre-project meeting however.

One of the main recommendations that I would make is to increase the allocated size of the departmental or college account on the UNIX server to accomodate quicktime movies, sound files, and other types of experimental multi-media (such as animation, collaborative chat rooms, Shockwave TM, and RealAudio TM and RealVideo TM). This would allow for a more interesting web site development process, would give the participants a chance to learn a variety of other multi-media programs; and depending on which mix of elements was incorporated could also make the intranet/World Wide Web development much more functional and interesting to use.

Another important recommendation I would make is that an appropriate allocation of time for participants to work on various aspects of the instructional systems design creative project. For this project there never seemed to be enough time for the undergraduate art students and especially for myself. This was partially because I was taking 15 graduate credit hours and working approximately twenty hours a week. This is quite a heavy schedule into which to fit an ISD creative project of this scope and breadth. I did manage to do it somehow though. The existing curriculum course load requirements expected of the undergraduate students was quite heavy. Many of them would often work until ten o'clock at night to complete assignments for their classes.

In the future elements of a creative project of this type could be incorporated into various aspects of the existing graphic design curriculum.

One final recommendation is that in future creative projects of this type I would arrange to have an expert resource person in web site design initiate an ongoing critique of the accessible work as it becomes available on the Internet. I would want this individual to be located in a business, governmental, or educational entity outside of both the UNI Department of Art and the University and Cedar Falls/Waterloo geographic domain to ensure validity and eliminate potential bias. It would also be interesting to be critiqued by someone who is an expert in educational technology and web site design and development but not necessarily an expert in artistic criticism. Periodic e-mails or other correspondence between an expert consultant and the individuals working on the project would help to enhance the overall aesthetics and functionality of the final web site prototype.

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APPENDIX A: TELECOMMUNICATIONS NETWORKING TERMINOLOGY

Acceptable use policy (AUP)

A written agreement, signed by students, parents, media specialists, teachers, and administrators, that specifies access privileges, rules of online behavior, and conditions of Internet use.

Analog communication

A communication format in which information is transmitted by modulating a continuous signal, such as a radio wave. Voice and video messages originate in analog form since sound and light are wave-like functions. Thus, they must be converted into digital messages in order to communicate along digital communications formats or media.

Anonymous ftp (file transfer protocol) site

A server that allows the public to log on and download files without having an account or a user ID on that server.

Archie

A database listing programs and data files available at anonymous ftp sites on the Internet; to use it, the user must know the exact file name or a substring of it.

ARPAnet (Advanced Research Projects Agency Network)

U.S. government network that the U.S. Department of Defense started in the late 1960's as an experiment in wide-area networking (WAN) that could resist interruptions caused by enemy attacks. The Internet started from this network.

Asynchronous communication

A method of sending and receiving information broken into small packets; messages sent to someone asynchronously are meant to be read at the receiver's convenience.

ASCII (American Standard Code for Information Exchange)

A set of computer characters that became a de facto worldwide standard to achieve compatibility in sharing information among computers. Putting a text file in ASCII format reduces it to basic elements, such as upper- and lower-case letters, numbers, punctuation, and some control characters but without graphic characters.

Backbone

the main communication channel in a network wiring scheme, so called because often other communication lines connect to it like ribs connect to a backbone.

Bandwidth

The difference between the highest and lowest frequencies available for a network signal. A measure of information-carrying capability of a transmission wire; the range of transmission frequency that a network can use. Wider bandwidths can carry more information.

Baud

A unit of signaling speed equal to the number of discrete conditions of signal events per second. Baud is synonymous with bits per second if each signal event represents exactly one bit.

BBS

See bulletin board system.

Bit rate

The speed at which bits are transmitted, usually expressed as bits per second, or BPS.

BITNET (Because It's Time Network)

An international computer network created to connect research and higher education institutions.

BPS (or bits per second)

(See baud.)

Bookmark

A feature of WWW browsers and Gopher client applications that permit identification of favorite or important locations by the end user.

Browser

A software application that allows users to use the Internet service such as the World Wide Web.

Bulletin Board Service (BBS)

A computer service modeled after a community bulletin board. A user can connect to a central "host" computer, post or read messages, or upload and download software.

Chat room

Public or private area on a computer network where members type messages and receive immediate responses.

Client

A computer that can request and receive services, information, and applications, including file transfer from a server computer.

Client software

A software program that is used to contact and obtain data from a server software program on another computer. Usually each client program is designed to work with specific kinds of server programs. (See also Server.)

Codec

An electronic device that converts analog video signals into a digital format for transmission, and vice versa.

Commercial network

A telecommunications network that is run for profit by a specific company, as distinguished from the Internet.

Compression

A technique to make information more compact so that it requires less space to store or transmit. When speech is compressed, for example, pauses are eliminated. Compression is generally expressed as a ratio. For example, a 10-to-1 ratio means that the information requires one-tenth of its original space.

Computer conference

In computer networking, a conference is an on-line discussion group established by topic. (See also BBS, Chat room.)

Computer mediated communication (CMC)

One of many terms used to describe communications through electronic exchanges; sometimes referred to as telecomputing or educational telecommunications.

Connectivity

Usually refers to a degree or level in which one computer can interact with another computer or an on-line service. Lower-level connectivity usually supports only the exchange of email, while a more advanced level of connectivity may support FTP, Telnet, and World Wide Web services.

CU-SeeMe

Video conferencing software that allows users to see and hear each other online, in real time; it was originally developed by Cornell University.

Cyberspace

This term was coined by writer William Gibson in his novel The Neuromancer. He defined cyberspace as a "consensual hallucinations of visually realized data achieved through plugging into a global computer network." (Gibson, W., 1984. The Neuromancer. New York: Putnam Berkeley Group, Inc).

Digital Communications

A communications format used with both electronic and light-based systems that transmits audio, video, and data as discrete bits of information.

Digital video

A format used to store, manipulate, and transmit moving images into digital signals. Codecs are used to convert traditional analog signals into a digital format.

Digitize

To change analog information to a digital format that can be stored, manipulated, and compressed by a computer. Speech, music, and still and video images are commonly converted into digitized form.

Distributed network

A network that relies on multiple computers to provide various resources to other computers in the network. The Internet depends on distributed networking.

Domain

Hosts and local area networks are categorized and grouped by their similar functions; for example, educational institutions are distinguished by the ".edu" suffix.

Download

to copy a file, email, or other information from a server to a client. (See also upload.)

Electronic mail (email)

A network application for exchanging mail messages (usually text) over various types of networks using various network protocols. Messages can be addressed to an individual, as well as to large number of people. (See also mailing lists.)

E-mail address

A specific electronic address that designates a person or service at a specific network site; an email address usually includes a user name, the symbol @, the specific machine locations, and a domain name.

Emoticons

Creative graphical representations that writers use to inform the reader of emotions, moods, or subtleties that might be part of the message. These are typically created out of punctuation marks or other symbols.

ERIC (Educational Resources Information Center)

A federally funded information system that provides access to education related information. There are 16 clearinghouses, each concentrates on a specific area. For example, the Clearinghouse on Information Technology sponsors the ASKERIC project, which offers Internet based resources, answers to individual queries, and archives research papers and articles.

Ethernet

A type of local-area-network (LAN) originated by the Xerox Corporation. It specifies the types of wires connecting the network and the format in which information is packaged.

FAQ (Frequently Asked Questions)

FAQ's are documents that list and answer users' most common questions; many areas have FAQ lists or files that users can access to get more information

Fiber optic cable

Very thin, flexible glass rods that use light signals to transmit information. Fiber optic cable has much higher capacity than copper or coaxial cable, and is resistant to interference or noise. Fiber-optic cable has the bandwidth to accommodate high-speed, multimedia networking.

File

A body of information (text, graphics, or a program) that can be passed from one computer to another.

File server

The computer that provides access to files for all computers in a local area network.

Flame

A message sent over a computer network that is derogatory, obscene, or inflammatory.

FTP (File Transfer Protocol)

A standard technique for moving files between computer systems on a network; a program that supports file exchange over the Internet. Many Internet sites have established repositories of material that can be accessible through FTP.

Gateway

A dedicated computer that provides a link between separate networks, allowing information to pass between them.

Gopher

This is the name of an Internet service that provides access to Internet resources; it presents information in menu form from all over the Internet. It also allows searches on the Internet for hosts, directories, or files based on keywords.

Groupware

A software program that supports the simultaneous or asynchronous sharing of information among a group of computers. Groupware may allow users to communicate with each other or to edit text and graphics in a single document from their individual computers.

Hacker

A person who learns about computer systems is termed a hacker, however, the term is also used to denote someone who breaks into closed computer systems. Occasionally this "hacking" is for illegal purposes.

Home Page

The first or main page of a site, organization, or other entity on the World Wide Web. Home pages are often linked to other pages.

Host

A computer that runs server software.

HTML (Hypertext Markup Language)

A set of codes placed in documents so they can be displayed on the World Wide Web.

HTTP (Hypertext transfer protocol)

The protocol used to transport hypertext documents across the Internet; HTTP protocol is used in the World Wide Web.

Hyperlink

An electronic connection between a word or image that appears at one location to information that is stored at another location.

Hypertext

A system for linking documents in a non-linear way. Words in the document can be linked to other documents or to parts of the same document. On World Wide Web pages, the highlighted words are linked to other pages. Users can either read the Web-page serially, or "jump" from one page to another without typing special commands, but by simply pressing on the highlighted ("hot") word.

Information literacy

The ability to access, evaluate, and use all types of resources, print and non-print, which includes digital resources.

Information superhighway

The vast network of worldwide interconnected telecommunications systems.

Internet

A worldwide collection of interconnected electronic networks that support a common set of data communications protocols: Transmission Control Protocol (TCP) and Internet Protocol (IP). The Internet evolved from ARPAnet.

IRC (Internet Relay Chat)

Synchronous (in real time) chat using communication with computer keyboard (no voice or video). These chats are often focused on specific topics.

ISDN (Integrated Service Digital Network)

Network that accommodates digital transmission of voice, data, and video over standard copper telephone lines. It can provide data transfers at speeds of 64,000 BPS at almost the same cost as a normal phone call. Basically, it is a regular copper-wire telephone line that has been tweaked to transmit voice or data using digital instead of analog signals.

ISTE (International Society for Technology in Education)

The International Society for Technology in Education (ISTE) was founded in 1989 by a merger of two technology organizations, ICCE and IACE. It is the largest organization for technology using educators and represents 40,000 educators. ISTE supports its members through periodicals, classroom tested books and courseware, and membership journals. It offers an annual international conference and supports legislative initiatives, and has various Special Interest Groups.

Knowbots

Software programs that act as "smart agents" to carry out functions such as searches for desired information on the networks.

Keypal

A name for an email partner, often connected for educational purposes; also termed penpal.

Keyword(s)

A descriptive word or words that are used to locate specific information on a topic; electronic access to resources is especially dependent on choosing appropriate keywords.

Leased-line

Refers to a phone line that is rented for exclusive use between two locations. the highest-speed data connections require a leased line. (See also: 56 K, T-1, T-3.)

Listserv

A specific automatic mailing program that can run on any Internet server. It distributes email to users who share common interests and whose ID's are stored together. Any mail sent to a list on the listserv is automatically distributed to everyone on that list.

Local area network (LAN)

A network linking computers in close proximity; LAN's facilitate communication and sharing of computer resources, such as printers or storage drives.

Login

Noun: the account name used to access a computer system.

Verb: the act of entering and leaving an electronic communications system; access generally requires also a secret password.

Mailbox

A file or directory on a user's host computer that holds the user's email.

Mailing list

A system that allows the sending of topic-specific email to multiple mail destinations.

Modem

A device that allows two computers to communicate over telephone lines. It converts digital signals from a computer into analog sound waves that can be sent over ordinary telephone lines; a similar device at the other end converts the analog signal into a digital format. These processes are known as modulation and demodulation, respectively, which gave rise to the abbreviated term modem.

Mosaic

An early multimedia World Wide Web browser. There are now many variations including Netscape Navigator.

MUD (Multiple User Dimension)

Internet-based role-playing games and adventures. MUD's online imaginary worlds are built from words and look like parts of stories; participants can explore, change, or add on to the game at the same time.

Multimedia

A combination of video, sound, text, animation, and graphic images in a computer-based environment.

NCATE (National Certification Association for Teacher Education)

This organization approves Colleges of Education and oversees the programs, faculty, and requirements.

Netiquette

A standard of behavior for users of electronic networks, informal in nature, and constantly evolving.

Network

A shared communications system that supports digital communication among connected computers.

Network Administrator

A person who helps maintain a network.

Newsgroup

A topical discussion group located on a network. Individuals submit messages to a newsgroup and read messages that are posted there.

On-line

Being actively connected to a network or computer system; usually being able to interactively exchange data, commands, and information.

Point-to-point protocol (PPP)

A protocol that enables a computer to use the Internet protocols (TCP/IP). PPP is gaining in popularity over the SLIP alternative. IT is best known as a protocol that allows a computer to use a regular telephone line and a modem to make a TCP/IP connection and thus directly access the Internet.

Protocol

The set of specific communication standards that allow one computer to communicate with other computers.

Router

A device (sometimes a specialized computer) that stores addresses of network hosts and forwards packets of data between networks. In order to access the Internet's resources, a local-area-network needs its own router. Routers spend all their time looking at the destination addresses of the packets passing through them and deciding on which route to use to forward them.

Search engine

A type of software that facilitates locating files and information based on keywords and descriptors.

Server

A computer that provides a specific kind of service to client software running on other computers. The term can refer to a particular piece of software, such as a WWW server. (See also client.)

Service provider

An organization or network that offers connectivity to telecommunications services; this may or may not be commercial.

SLIP (Serial Line Internet Protocol)

A standard for using a regular telephone line (a "serial line") and a modem to connect a computer as a real Internet site.

SMDS (Switched Multi-megabit Data Service)

A new standard for very high-speed data transfer.

Snail mail

Commonly refers to mail delivered by the US Postal Service, in contrast to electronic mail.

Synchronous communication

Interaction, via electronic means, at the same time (in real time).

Sysop

(system operator)

A person in charge of a network system or BBS.

T-1

A leased-line connection capable of carrying data at 1,544,000 BPS. It is still not fast enough for full-screen, full-motion video, for which you need at least 10,000,000 BPS. T-1 is the fastest among commonly used lines to connect networks to the Internet.

T-3

A leased-line connection capable of carrying data at 45,000,000 bits-per-second. This is more than fast enough to transmit full-screen, full-motion video.

TCP/IP

Abbreviation for the two best-known Internet protocols: Transmission Control Protocol (TCP) and Internet Protocol (IP). TCP/IP are a set of computer commands that dictate how the computers on the Internet will communicate with each other.

Telecommunications

Transfer of information or messages at a distance, using electricity and electromagnetic waves.

Telecomputing

One of many terms used to describe communications through electronic exchanges; sometimes referred to as computer mediated communications or educational telecommunications.

Teleconference

Simultaneous visual and/or sound connections using telecommunications links that allow individuals in remote locations to see and communicate with each other in a conference arrangement. There are many types of teleconferencing, including video-conferencing, computer conferencing, and audio-conferencing.

Telnet

Standard Internet terminal emulation protocol that allows users to log on to remote host computers as "guest" users, providing access to the files as if they were actually at the host site.

Upload

To copy a file, email, or other information from one's personal computer to another computer on a network.

URL

The acronym for Uniform Resource Locator; an electronic address on the World Wide Web.

USENET

Initiated in 1979, one of the oldest and largest cooperative networks. It is primarily used to distribute news and electronic mail.

UUCP

UNIX-to-UNIX Copy Program Protocol. This protocol is used for communication between consenting UNIX systems. It is also a UNIX-based network closely associated with USENET.

Veronica

A Gopher service that allows you to do a keyword search of Gopher menus. It was named after the comic strip character (like Archie).

Video-conferencing

A form of teleconferencing where participants see and hear other participants in remote locations.

Virtual community

A community of people, who share intimacy and duration of relationships, and may or may not ever meet one another face-to-face. They share words, ideas, and information through computer networks.

Virtual reality

A computer-simulated environment in which a user wears gloves, headgear, or other equipment, and has the sensations of moving about and interacting with that environment (for example, exploring an ancient civilization, a building, or a location in space).

WAN (Wide area network)

A computer network in which widely-dispersed computers, such as those across a city or state, are interconnected. WAN's make use of a variety of transmission media.

WAIS (Wide-Area Information Server)

A protocol that allows users to search and access different types of information on many different computer systems from a single interface. This information retrieval system selects databases without the need for users' familiarity with the internal configurations of each, and helps to organize responses on users' machines.

World Wide Web (WWW)

A hypermedia information retrieval system linking a variety of Internet-accessible documents and data files (text and graphics). It is often referred to as "the Web."

Web Site

Individuals or organizations' home page and its connections are considered a site or location.

APPENDIX B: MATERIALS REQUISITION FORM

1998 Practicum in Educational Technology
Development of an Intranet/Internet Virtual Space
for the University of Northern Iowa Department of Art

Request for Materials:

Faculty:

A photo, portraiture, or visual representation of each faculty member who would like to develop a space on the Intranet / Internet site.

A short biography, resume, vita, or statement that explains the personal artistic and/or creative vision for education in the particular emphasis area.

Examples of works may be submitted in digital or hard copy format. We would prefer that works are scanned and saved in .gif or .jpeg format with a 3" x 4" (100 dpi) maximum size.

A list of URL links that you would like included on the link index page for your particular emphasis area. Examples would be photography, sculpture, painting, art education, art history, drawing, or graphic design or illustration resources that already exist on the World Wide Web or Internet.

Students from each emphasis area:

A photo, portraiture, or visual representation of students who want to be included in the Intranet site but who do not plan on creating their own individual web site. (Students who develop their own web site can be linked to the main student page that we develop.)

Examples of works may be submitted in digital or hard copy format. We would prefer that works are scanned and saved in .gif or .jpeg format with a 3" x 4" (100 dpi) maximum size. These examples may be outstanding selections from classes in each emphasis area.

Administration and Office Personnel:

A photo, portraiture, or visual representation of each person who would like to develop a space on the Intranet / Internet site.

A short biography, resume, vita, or statement that explains the personal artistic and/or creative vision for education in the particular emphasis area.

Examples of works may be submitted in digital or hard copy format. We would prefer that works are scanned and saved in .gif or .jpeg format with a 3" x 4" (100 dpi) maximum size.

UNI Art Gallery:

A photo, portraiture, or visual representation of the gallery director if he/she would like to develop a space on the Intranet/Internet site.

A short biography, resume, vita, or statement that explains the personal artistic and/or creative vision of the gallery director and also the vision and mission of the gallery.

Examples of works may be submitted in digital or hard copy format. We would prefer that works are scanned and saved in .gif or .jpeg format with a 3" x 4" (100 dpi) maximum size.

A list of URL links that you would like included on the link index page for your particular emphasis area. Examples would be photography, sculpture, painting, art education, art history, drawing, or graphic design or illustration resources that already exist on the World Wide Web or Internet.

Note: There is presently some information on-line representing different emphasis areas, the UNI Gallery of Art, and Academic Programs available in the Art Department. Please review these information resources and make appropriate revisions in light of current subject content, personal artistic vision, and educational philosophy.

Thank you,

Dan Benson, Masters of Arts in Educational Technology Graduate Program
Osie L. Johnson, Jr. Assistant Professor of Graphic Design/Illustration
Undergraduate Art Student Practicum Participants

APPENDIX C: COMPUTER SOFTWARE PROGRAMS

The Art/Cat computer laboratory in Kamerick Art Building at the University of Northern Iowa supports the following software programs. Included in this appendix is a list of these software programs and a short product description of each current version.

Adobe® Acrobat® 3.0

Adobe® Acrobat® 3.0 software provides the fastest way to publish any document online. It empowers everyone to create and share documents across platforms while maintaining the documents' original look and feel.

Acrobat® 3.0 works with your existing web browser and servers. So all you need to instantly access portable document format (.pdf) files on the web is the free Adobe® Acrobat® Reader software. Since Acrobat® is independent of platforms, applications, and distribution media, it is the ideal basis for your document distribution, archiving, and retrieval strategy.

Acrobat® 3.0 includes a complete tool set for converting electronic files created in your favorite applications into .pdf files and publishing them on your web site, intranet, CD-ROM, or distributing them by e-mail.

Adobe® Illustrator® 6.0

Adobe® Illustrator® sets a new standard of integration and flexibility for the graphics software user. Adobe Illustrator has always been a first-class application on Macintosh, and now it's also a first-class application on Windows with Windows 95 NT logo/compliance. Tool tips, context-sensitive menus, and extensive on-line help are available for both Windows and Macintosh; taking full advantage of the strengths of both platforms. Even keyboard shortcuts, menu layout, and palette behavior are the same. It's never been easier to share files across platforms with colleagues, clients, and service bureaus.

Adobe® PageMaker 6.5®

When deadlines are tight, time is precious. Adobe® knows that your publishing software should help you save time rather than spend it. That's why Adobe PageMaker 6.5 provides all the tools you need to create professional quality publications quickly and easily. No time to lay out your documents from scratch? No problem. Start with one of the professionally-designed templates included with PageMaker to lay out your newsletters, brochures, manuals, press releases, and other publications. The templates are fully customizable, so you can easily modify them to suit the specific needs of your projects.

Need help tackling complicated publishing jobs? The included multimedia tutorials and product tips will help you design even the most sophisticated layouts. Looking for new ideas and fresh content? Get a creative jump start with regularly updated insider tips from the experts at Adobe and ready-to-use professional quality images from Adobe Studios. Plus, get up-to-the minute compatibility updates from Adobe's web site so you can use content from all of the latest word processing and graphics applications in your PageMaker documents.

Adobe® Photoshop® 4.0

Photoshop® software is the de facto standard for digital image enhancement, photo retouching, and image compositing, commanding the loyalty of more than 3 million designers worldwide. Version 5.0 delivers the four most requested features in one elegant upgrade: multiple levels of undo and redo, editable text with character-level formatting, flexible and precise color management controls, and built-in support for spot-color channels. This new version answers the needs of longtime users, while packing more power into its toolset for new users.

Adobe® Streamline® 4.0

Maximum control for converting images faster than a tracing hand, able to leap from raster to line art in a single bound, Adobe® Streamline® software instantly converts scanned black-and-white or color raster images into pliable Adobe® PostScript® language line art. Illustrators, designers, and production artists enjoy even more control, flexibility, compatibility, and efficiency with Streamline® version 4.0, available soon in identical Windows and Macintosh versions.

Adobe® Type Utilities®

Award-winning ATM® software gave the world crisp, clean type on-screen and in print. Now ATM Deluxe® software offers even more, letting you organize your typefaces to suit the way you work. From custom font sets to creating multiple master instances, ATM Deluxe® is packed with powerful features that put you in control.

Adobe® PageMill™ 3.0

With Adobe® PageMill™ 3.0, creating web pages has never been easier. You can build a well-designed, content rich web site without needing to learn .html or master complex applications. A WYSIWYG interface provides a familiar environment for creating colorful, dynamic web pages and it's as easy to use as your favorite word processor. PageMill™ 3.0 uses drag-and-drop simplicity for adding and manipulating text, images, and hyperlinks. This allows for quick and easy integration with your current office and graphics applications, including Microsoft® Word™, Corel® WordPerfect™, Microsoft® Excel™, Adobe® Photoshop™, and many others.

Macromedia® Director® 6

Get a dramatic increase in power, productivity, and platform support for multimedia and web development. Director® 6.5 is the smart choice for rapid visual development of interactive applications for playback on universally accepted platforms, including Shockwave and Java™ for web deployment, Shocked CDs for hybrid CD/web deployment, and CD/DVD-ROM for Windows® and Macintosh®.

Macromedia®Extreme 3D 2®

Extreme 3D 2® is the leading 3D tool for creative professionals. It has everything you need to go from modeling and animation to final rendering and the web. Create organic 3D models, dynamic 3D animations, and 3D graphics for print, multimedia, and the web. Advanced features include metaforms, particles, visible spotlights, and much more!

Fetch 3.0.3

The most common FTP program for the Mac is Fetch. Fetch is a product of Dartmouth Software Development at Dartmouth College and is free to users affiliated with an educational institution or charitable non-profit organization.

Microsoft® Office®

Microsoft® Office® has led the way in creating and defining the suite category. Office® has evolved from separate stand-alone products into a highly integrated set of productivity applications. Office 98 Macintosh Edition® is the most significant release of Office® ever on the Mac platform. Office 98® Macintosh Edition includes Word 98®, Excel 98®, PowerPoint 98®, Outlook Express® and Internet Explorer®. Microsoft® recently renewed their long standing commitment to the Macintosh® market when Apple Computer® and Microsoft® announced a broad product and technology agreement that will benefit our mutual customers on the Macintosh® personal computer platform and ensure that Microsoft® products for the Mac will continue to be available.

Fractal Design® Painter® 5.0

Fractal Design® Painter® is the world's leading paint program. With hundreds of unique brushes, Painter's rich set of painting tools and special effects empowers your creativity. Painter 5 introduces a rich array of new extensible plug-in brushes, amazing special effects with plug-in floaters, flexible new tear-off tools, accurate Kodak color management, and industry-standard masking.

Quark® XPress® 5.0

The layout and design choice of the world's top publishers, QuarkXPress is available in 24 languages, including East Asian versions in Traditional and Simplified Chinese, Japanese, and Korean. These versions offer all the features of QuarkXPress®, plus features specific to East Asian typesetting including vertical text flow, story direction, additional justification controls, the ability to group characters, and support for Rubi.

QuarkXPress® is more than just a page layout software. An integrated publishing package, QuarkXPress lets you combine pictures, text, typography, writing, editing, and printing in one application. What's more, this program gives you total command over page layout. For multi-platform users, Quark® has gone to great lengths to make sure that QuarkXPress looks, feels and acts the same on all three platforms, Macintosh®, Windows®, and Power Macintosh®. In fact, Macintosh® users who have never used a PC before feel right at home using QuarkXPress® for Windows®.

RealAudio® RealPlayer®

The best quality audio and video at 28.8 kbps. RealPlayer Plus® uses PerfectPlay to create a special buffer which offers many benefits:

- 1) Using a fast download process, users with standard modems can access near-CD quality audio and high-quality video normally only available over faster connections.
- 2) The buffer decreases sound and image loss on poor Internet connections, improving audio and video quality.
- 3) One-button scanning for the best live audio and video on the web.
- 4) Choose global scan or select from categories including international, music, news, and sports. You can create your own custom scan list with presets.

SoundEdit™ 16

SoundEdit 16 plus DECK II brings together the most powerful desktop audio tools for a complete digital audio solution. The first software-only recording studio lets users create audio for everything from multimedia to music to the Internet. All at fraction of the cost of traditional systems and no additional hardware or software required.

Stuffit Expander™

Stuffit Expander is an award-winning freeware product. Use it, as is, to expand Stuffit, Compact Pro, BinHex & MacBinary files. Version 4.5 also now adds the ability to mount ShrinkWrap image files (electronic versions of disks) and to decrypt Private File encrypted files. Add the Expander Enhancer from "DropStuff with Expander Enhancer" and Stuffit Expander is PowerPC accelerated, expands more formats (including .ZIP and .tar!), and joins Stuffit segments. Expander also handles segmented and multipart encoded files (ie: BinHex and UUencoded files).

Toast® Folder

Toast® CD-ROM Pro® 3.0 is the world's leading CD mastering software for the Macintosh. Toast is loaded with powerful features that will make your work easier. To get the most out of your new software, please take some time to review this manual. If you encounter any problems while setting up or using Toast, help is available by telephone or e-mail.

ADDENDIX D: THE MACINTOSH G3

Technical Specifications

Processor and memory

- 233-, 266-, or 300-MHz PowerPC G3 processor
- 512K or 1MB backside level 2 cache on processor module; 117-, 133-, or 150-MHz dedicated 64-bit backside bus
- 66-MHz system bus
- Integrated floating-point unit and 64K on-chip level 1 cache (32k for data and 32k for instruction)
- At least 32MB of SDRAM (3.3-volt, unbuffered, 64-bit wide, 168-pin, running at more than 100 MHz, 10-nanosecond cycle time); three DIMM slots support up to 192MB or 384MB
- 4MB of ROM
- 64-bit memory bus

Storage

- One or two internal IDE or Ultra/Wide SCSI hard disk drives
- Internal high-capacity floppy disk drive
- Accepts high-density 1.44MB disks and 800k disks
- Reads, writes, and formats Mac OS, Windows, MS-DOS, OS/2 and ProDOS disks
- Internal 24x-speed (maximum) ATAPI CD-ROM drive

Optional internal ATAPI DVD-ROM drive supports CD-ROMs at 20x speed (maximum) or DVD-ROMs at 2x speed (maximum)

Internal 100MB Zip drive*

Expansion bays for additional storage devices

Desktop models: One or two 3.5-in. drive bays (varies by configuration)

Mini-tower models: One 5.25-in. drive bay

Interfaces

Three 12-inch PCI expansion slots compatible with PCI 2.1-compliant cards

Two high-speed DMA serial (RS-232/RS-422) ports compatible with

LocalTalk cables

Built-in 10BASE-T Ethernet connector; 10/100BASE-T Fast Ethernet PCI card*

Internal and external SCSI buses (up to 5MBps)

Apple Desktop Bus (ADB) expansion port

DB-15 connector for monitor

Communications slot for modem card*

Mini-jacks for 16-bit stereo audio input/output; up to 44.1-kHz sampling rate

Composite and S-video connectors for video input/output*

Graphics support

Built-in 64-bit graphics and multimedia accelerator chip

2MB or 6MB of SGRAM video memory; supports up to 6MB

128-bit 2-D/3-D graphics PCI card with 8MB of EDO VRAM*; provides support for dual monitors

Millions of Colors (32 bit)

Thousands of Colors (16 bit)

2MB

SGRAM

Up to 832 by 624 pixel resolution

Up to 75 Hz refresh rate

Up to 1,024 by 768 pixel resolution

Up to 85 Hz refresh rate

6MB

SGRAM

Up to 1,024 by 768 pixel resolution

Up to 75 Hz refresh rate

Up to 1,600 by 1,200 pixel resolution

Up to 75 Hz refresh rate

8MB EDO

VRAM on PCI card

Up to 1,920 by 1,080 pixel resolution

Up to 72 Hz refresh rate

Up to 1,920 by 1200 pixel resolution

Up to 75 Hz refresh rate

Video capabilities*

24-bit video input

Support for NTSC, PAL, and SECAM

Up to 320- by 240-pixel capture at up to 30 frames per second

Maximum capture size of 640 by 480 pixels

24-bit video output

High sample rate on output signal eliminates need for external and analog filtering

Support for NTSC and PAL

Digital audio/video (DAV) connector

Electrical requirements and agency approvals

Line voltage: 100 to 125 V AC or 200 to 240 V AC, RMS single phase, automatically configured

Frequency: 50 to 60 Hz, single phase

Power: 230W maximum for desktop, 240W maximum for minitower; not including display

EPA Energy Star and Blue Angel compliant (desktop models only)

ADB power requirements

Maximum current draw for all devices: 500 mA (maximum of three ADB devices recommended)

Mouse draws 10 mA

Keyboard draws 25 to 80 mA

Environmental requirements

Operating temperature: 50° to 104° F (10° to 40° C)

Storage temperature: -40° to 116° F (-40° to 47° C)

Relative humidity: 5% to 95% noncondensing

Maximum altitude: 10,000 ft. (3,048 m)

Size and weight

Desktop Models

Minitower Models

Height

6.2 in. (15.6 cm)

15.2 in. (38.6 cm)

Width

14.4 in. (36.5 cm)

9.6 in. (24.3 cm)

Depth

16.9 in. (43.0 cm)

17.8 in. (45.2 cm)

Weight**

22.7 lb. (10.2 kg)

33.1 lb. (15.0 kg)

(Note: Asterick * denotes available Macintosh options. Double asterick **

denotes weights of two different Macintosh G3 models (233 Mhz and 266 Mhz;

and 300 Mhz units) dependent on full option package.)

APPENDIX E: AFGA FLATBED SCANNER

Product Technical Specifications

Scanner type: Desktop, flatbed

Maximum resolution:

600 horizontal x 1200 vertical ppi optical

2400 ppi by interpolation

3600 ppi in line art

Sample depth:

12 bits for gray

36 bits for color

Density range:

3.0 D

Max. density:

3.2 D

Scanning speed:

Line art: 4 ms/line

Halftone B/W: 4 ms/line

Grayscale: 8 ms/line

Color: 15 ms/line

Maximum scanning area:

Reflective: 210 mm x 355 mm (approx. 8.5" x 14")

Transmissive: 203 mm x 254 mm (8" x 10")

Lamp: 8 W daylight fluorescent light

Warm up time:

35 seconds

5 min. for stable operation

Power supply:

Line voltage: 90 to 254 V

Frequency: 47 to 63 Hz

Power consumption:

40 W maximum

Dimensions:

(L x W x H):

600 mm x 410 mm x 200 mm

(23.6" x 16.1" x 7.9")

Weight:

16,1 kg (35.5 lbs)

Interface:

SCSI-2 interface - double connector

Image memory:

1 Mbyte (optional 2 Mbyte)

Transmission speed:

2 MB/s

Environment:**Operating temperature:**

10°C to 40°C

(50°F to 104°F)

Storage temperature:

-25°C to 55°C

(-13°F to 131°F)

Relative humidity:

20% to 85%

Surrounding space:

15 cm on each side

Compatibility:

Win95, WinNT, Win 3.11

Macintosh System 7.1 or greater

3rd party software available from Caldera and Mentalix

Included software:

PC:

Agfa FotoLook 3.0 for the PC & FotoSnap

Agfa FotoTune Scan

SoftCopy

Macintosh:

Agfa FotoLook 3.0 for the Macintosh & FotoSnap

Agfa FotoTune Scan

SoftCopy

Year 2000 compliance:

All Agfa software included with this scanner is Year 2000

Compliant. All OEM suppliers (Adobe, Ulead,

MicroFrontier, Caere, MetaCreations, and Visioneer) who

bundle their software with Agfa desktop scanners have

stated that their products are fully Year 2000 Compliant.

APPENDIX F: POLAROID SLIDE SCANNER

SprintScan 35 Plus Product Specifications:

Media:

35mm positive and negative, mounted and unmounted transparencies
and strips

1" x 3" glass slides with optional PathScan Enabler

Sensor Technology:

Single-pass, RGB CCD

Optical Resolution:

Min: 128 dpi; Max: 2700 dpi

Data Conversion:

12-bit A/D conversion per RGB; 8-bit output to host

Density Range:

0-3.4 OD

Scan Time (Typical):

Under a minute (varies with system)

Signal Processing:

Hardware based, real-time color processing and sharpening

CCD Calibration:

Automatic uniformity correction and dark field subtraction

Light Source:

Fluorescent (1000 hours)

Interface:

SCSI-2 (50-pin and one 25-pin connector)

Power Requirements:

30 W (idle), 35 W (scanning) @ 115 VAC, 60 Hz

Operating Voltage:

Voltage: 100-240 VAC;

USA: 105-130 VAC;

Japan: 90-110 VAC;

Europe: 210-250 VAC;

Frequency: 48-62 Hz

Operating Temperature:

10-40 C (50-104 F)

Operating Humidity Tolerance:

20%-80% (non-condensing)

Accessory Film Holders:

35mm 6-at-once film strip holder; PathScan Enabler for 1x3 inch glass mounts (optional)

Dimensions:

5 x 7 x 10 inches; (12.7 x 17.8 x 25.4 cm)

Weight:

2.5 Kg, 5.5 lbs.

Certification:

UL, ULC (Canada), TUV, CE, FCC: Class B

Software Interface:

Macintosh: Photoshop plug-in module;

Windows: TWAIN module

Software Features:

Image Size Controls:

Crop, resize, resolution and orientation

Maximized preview size, preview rotation, (remember preview on

Windows only)

Image Adjustment:

Color correct, saturation, auto exposure, cast removal, sharpen, scene analysis for enhanced handling when scanning negatives

Scan Features:

Scan to disk option, Scan again

Warranty:

1 year parts and labor

System Requirements:

Macintosh Macintosh II, Quadra, Power PC or Powerbook computers

(use appropriate Powerbook SCSI cable as required)

System 7.0.1 or higher

Minimum 12 MB RAM

8-bit color

Recommended:

Power PC

System 7.5

32 MB RAM

24-bit color monitor

System Requirements:

Windows

386 SX, 486 or Pentium processor

DOS 5.0 or Later

Windows 3.1 or Windows 95

10 MB RAM

8-bit color display adapter

ASPI compliant SCSI-2 interface board

Recommended:

Pentium processor

DOS 6.0 or later

Windows 95

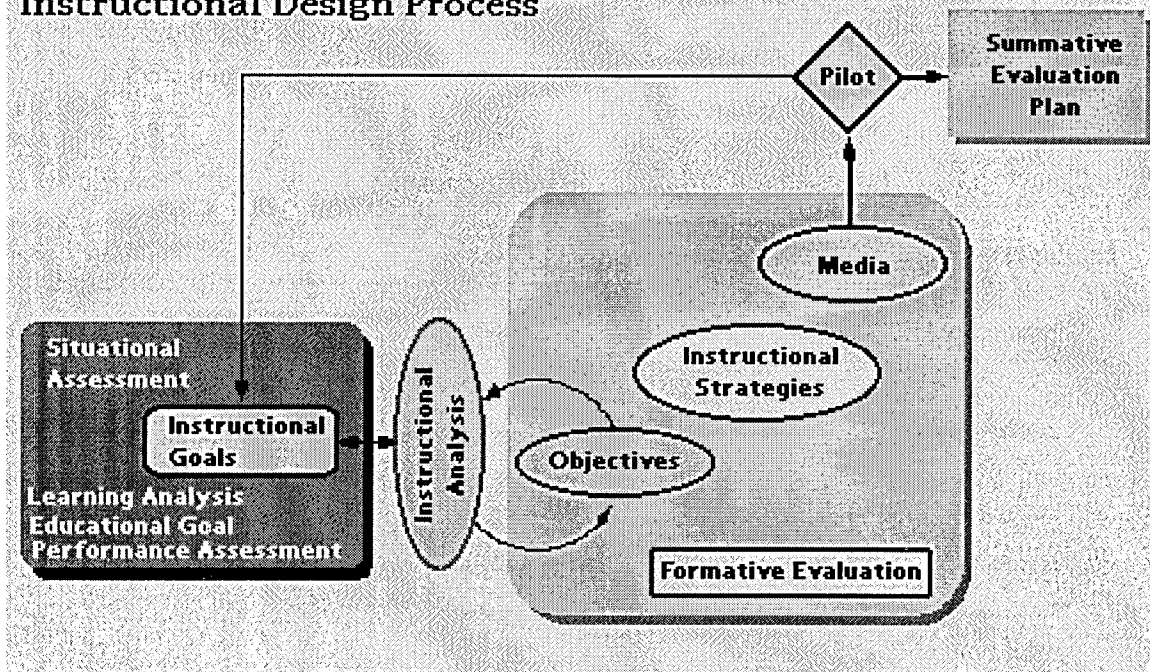
32 MB RAM

24-bit color

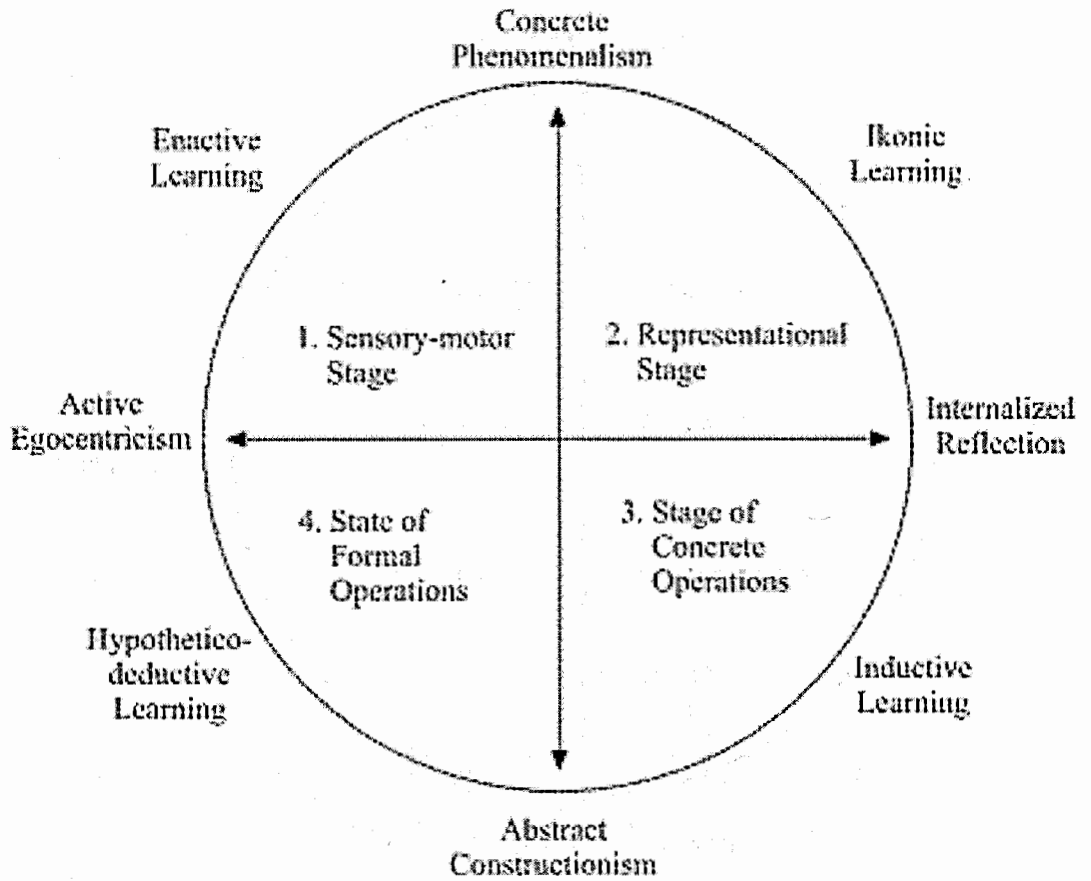


APPENDIX G: INSTRUCTIONAL DESIGN FIGURES

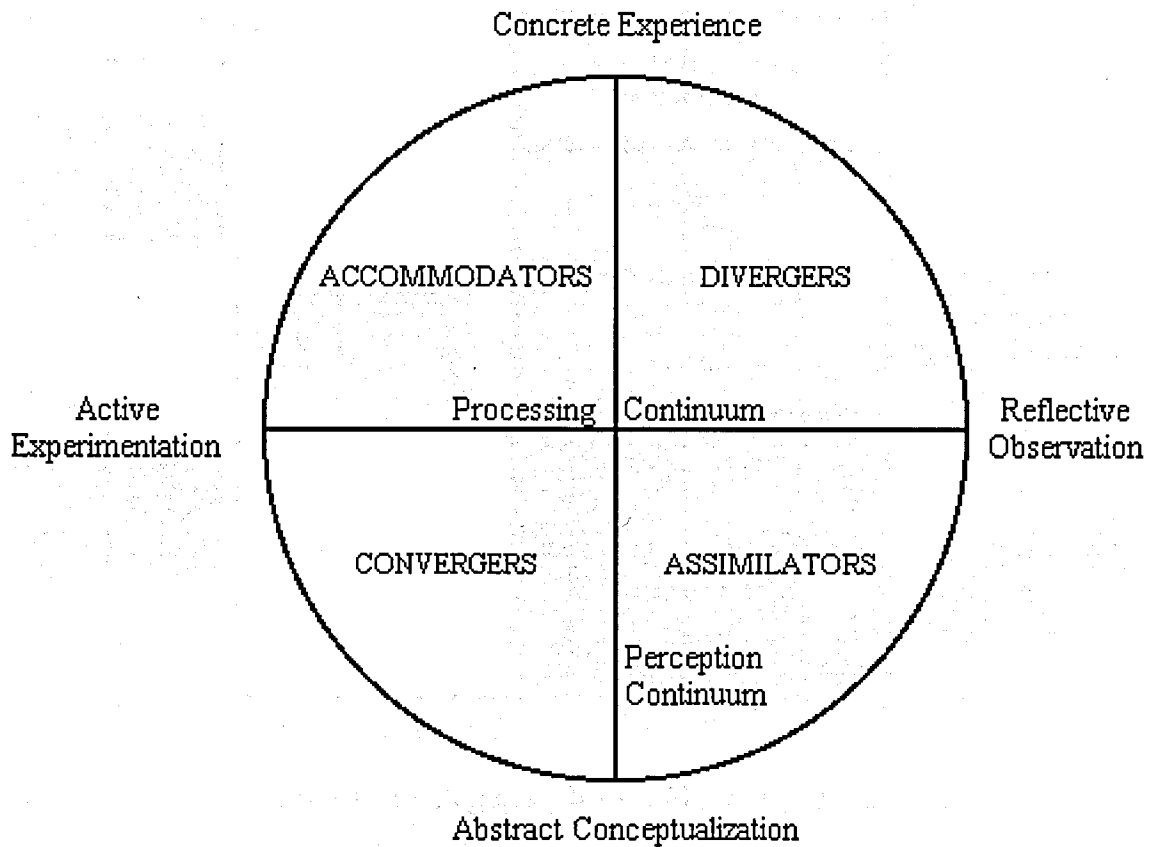
Components of Instructional Design Process



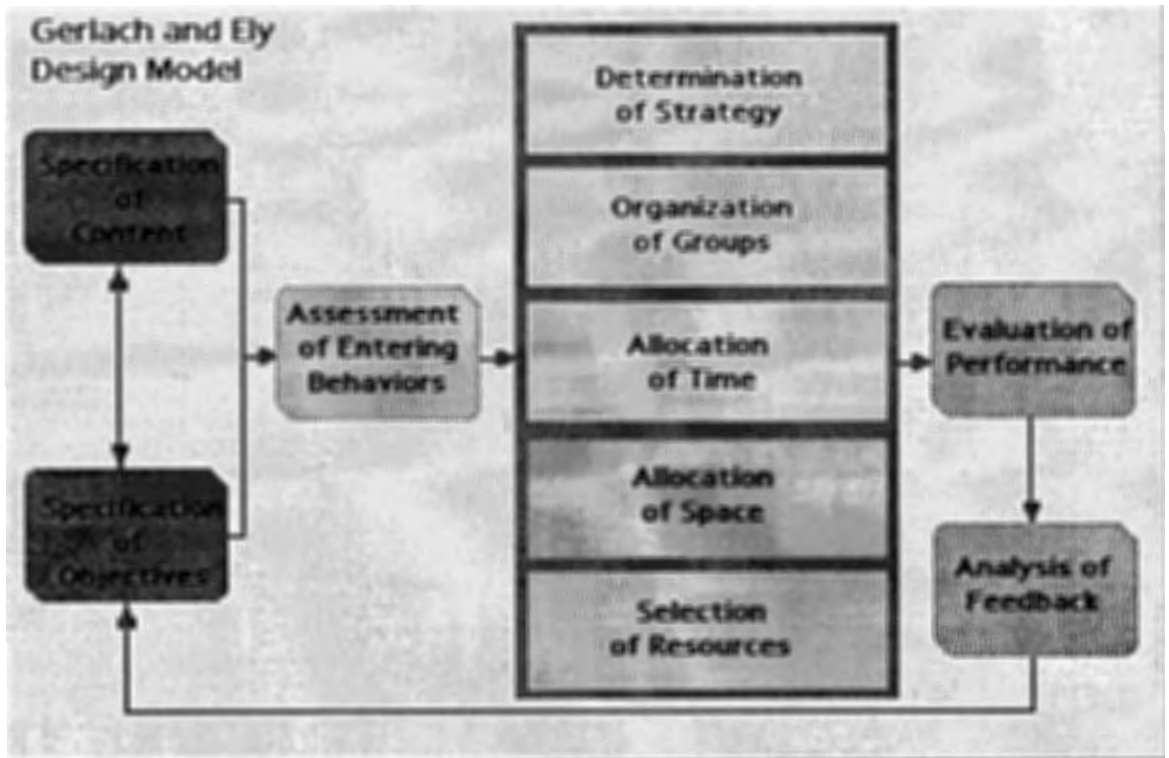
Components of the Instructional Design Process (Foreman, K., 1997)



Piaget's Instructional Design Model (Foreman, K., 1997)

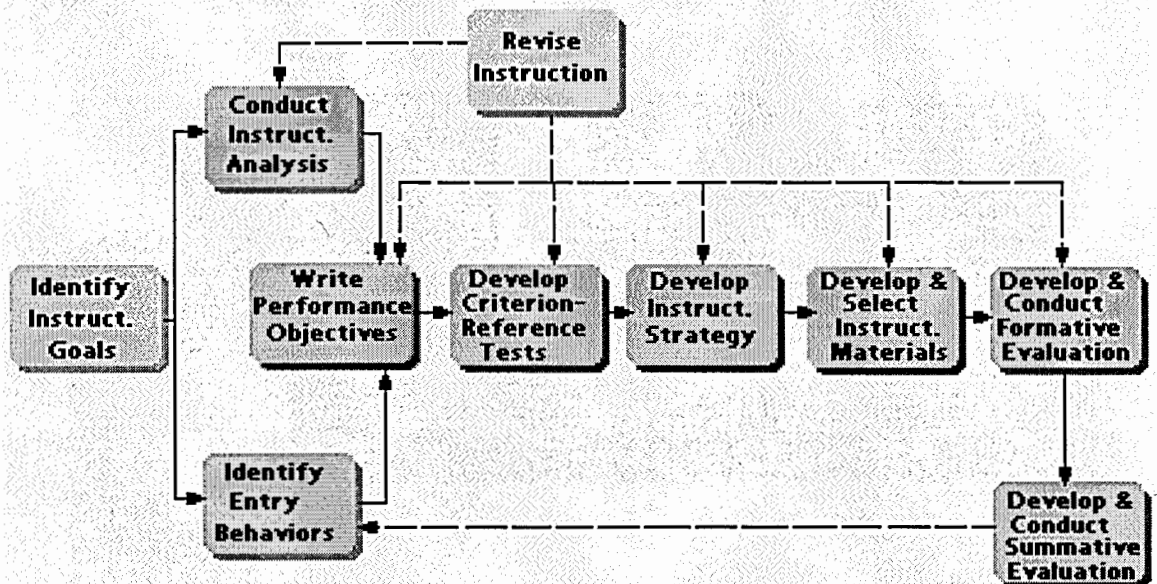


Kolb's Instructional Design Model (Foreman, K., 1997)

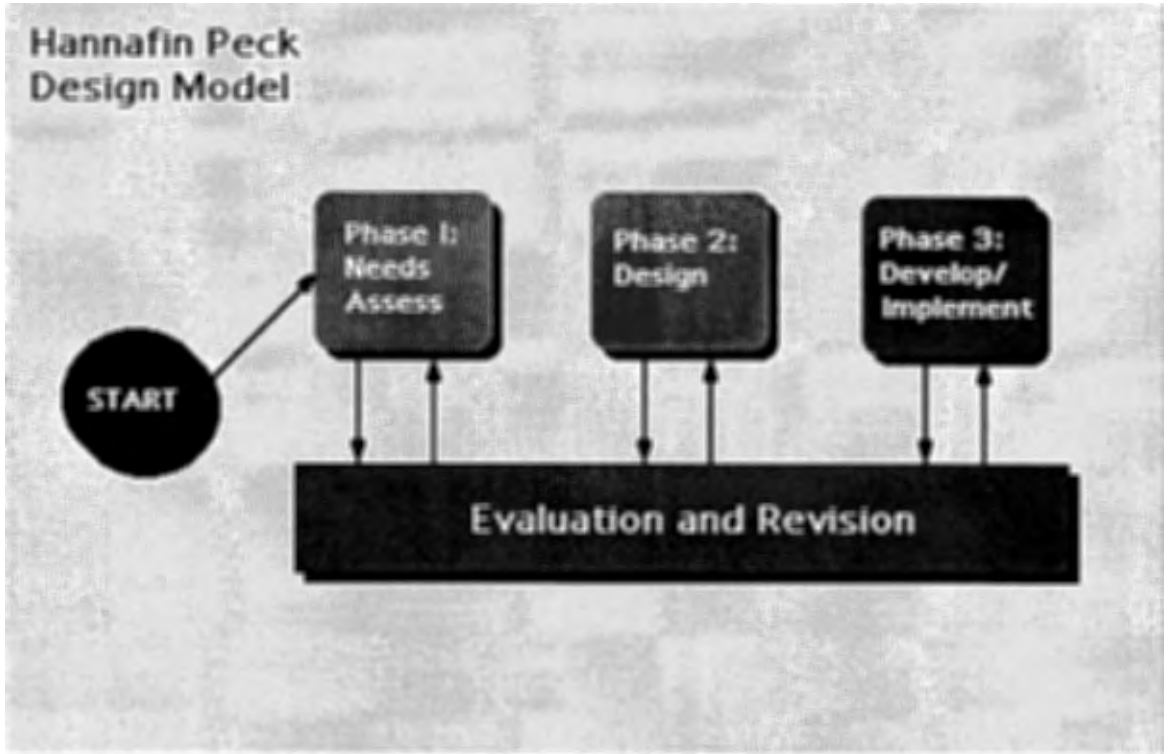


Gerlach and Ely's Instructional Design Model (Foreman, K., 1997)

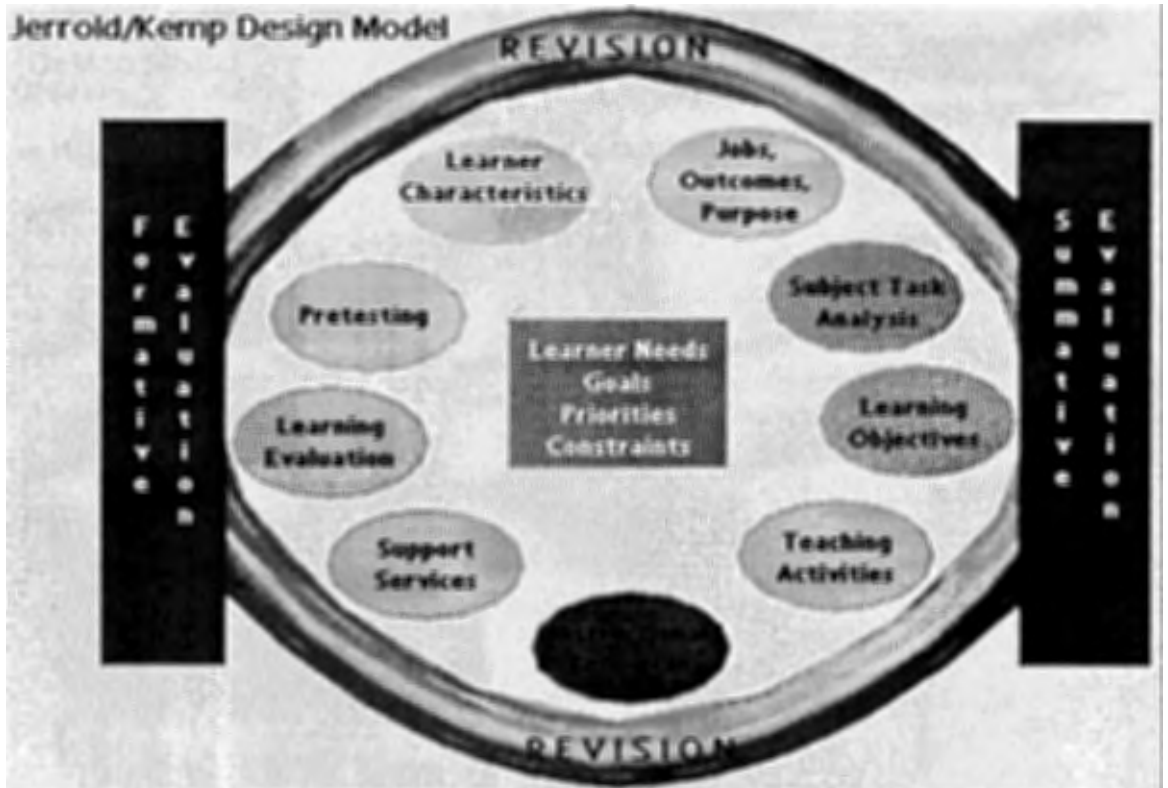
Dick and Carey Design Model



Dick and Carey's Instructional Design Model (Foreman, K., 1997)

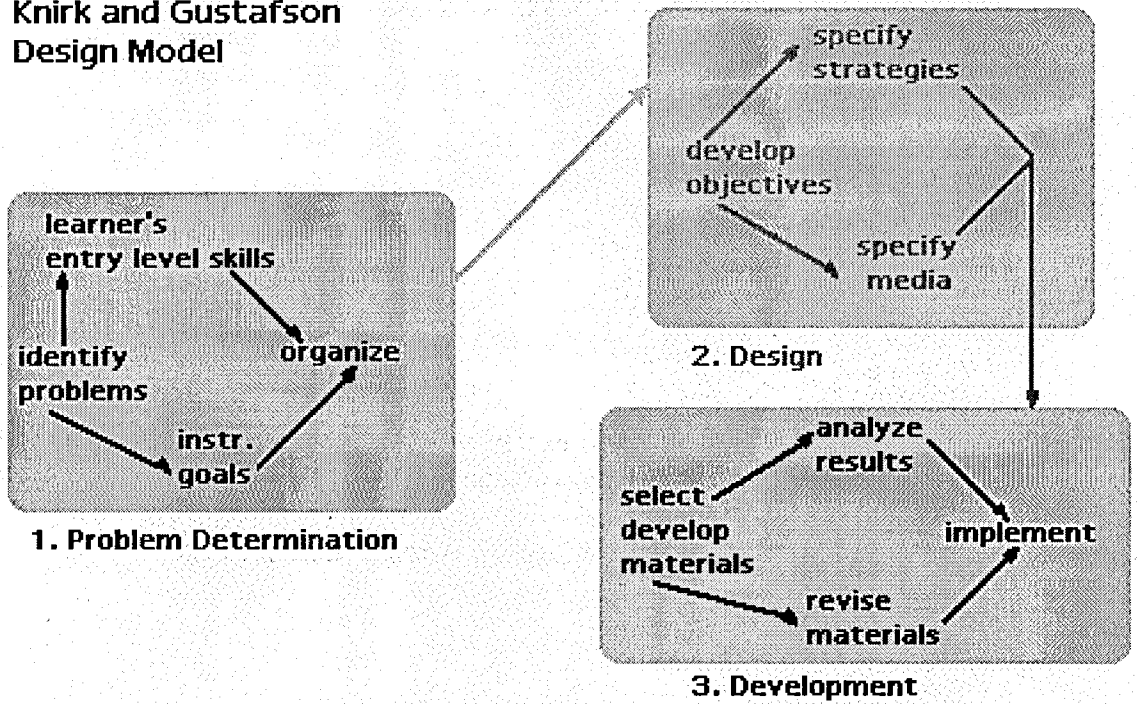


Hannafin and Peck's Instructional Design Model (Foreman, K., 1997)

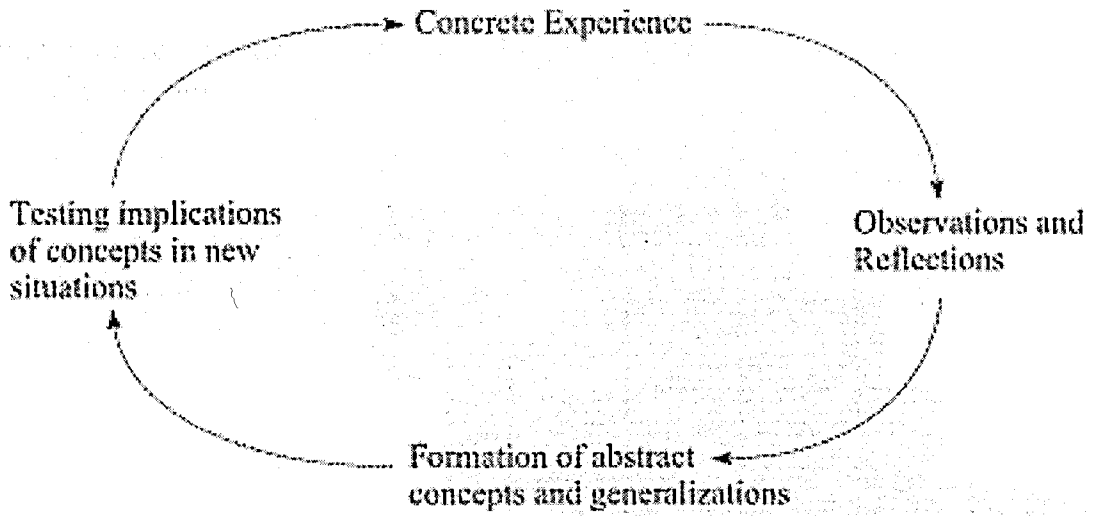


Jerrold and Kemp's Instructional Design Model (Foreman, K., 1997)

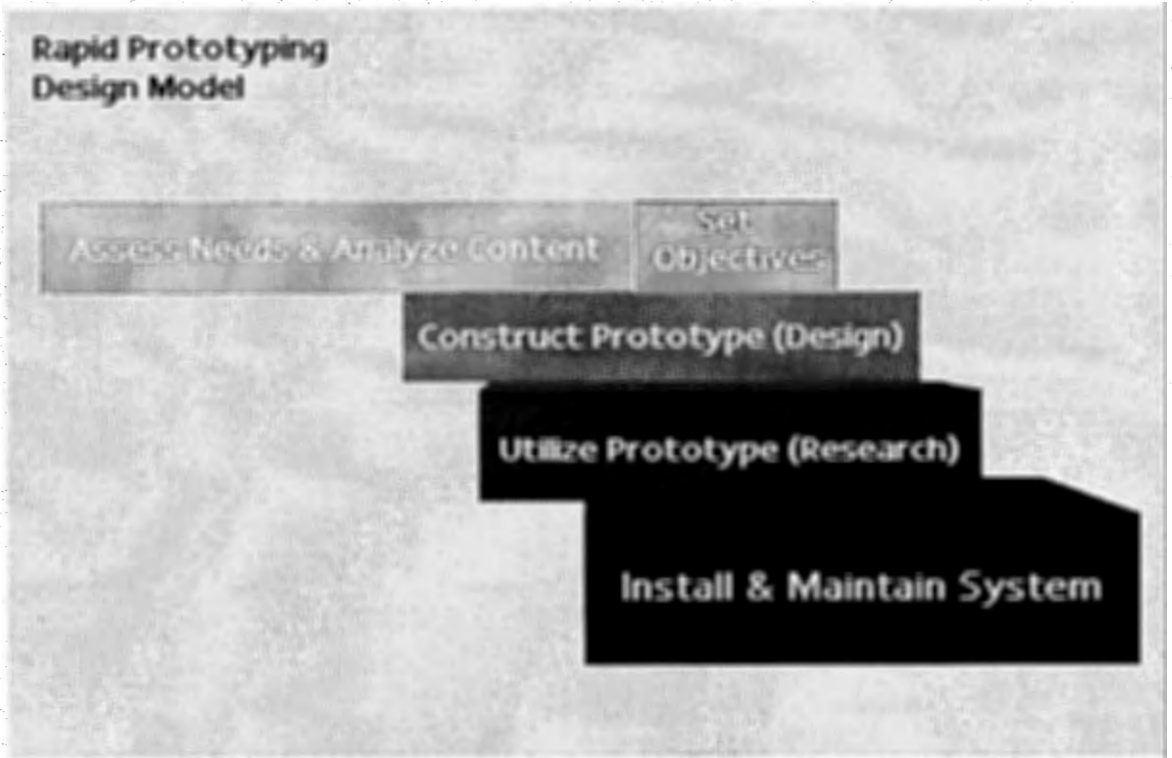
Knirk and Gustafson Design Model



Knirk and Gustafson's Instructional Design Model (Foreman, K., 1997)



Lewin's Instructional Design Model (Foreman, K., 1997)



Rapid Prototyping Instructional Design Model (Foreman, K., 1997)