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The University of San Francisco

TEACHING CRITICAL THINKING IN A COMMUNITY-COLLEGE ART-
HISTORY LEARNING ENVIRONMENT: A COMPARISON OF
IMPLICIT INSTRUCTION VERSUS A COMBINATION OF
IMPLICIT AND EXPLICIT INSTRUCTION

A Dissertation
Presented to
the Faculty of the School of Education
Learning and Instruction Department

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by
Michael Leonard

San Francisco, California
May 2007

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DEDICATION


This dissertation is dedicated to those educators who came before and whose example stirred their students' imaginations and encouraged them to pursue the truth wherever it might lead, to those educators who presently carry that torch, and to and those educators of like mind and spirit who will come in the future.

Michael Leonard

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This dissertation, written under the direction of the candidate's dissertation committee and approved by the member of the committee, has been presented to and accepted by the Faculty of the School of Education in partial fulfillment of the requirements for the degree of Doctor of Education. The content and research methodologies presented in this work represent the work of the candidate alone.



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5/10/07

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Chapter I

INTRODUCTION

This study is concerned with a comparison of the effects of implicit critical-thinking instruction versus a combination implicit and explicit critical-thinking instruction on students' ability to think critically about art history in a community-college History of Visual Arts course. Visual art history is the most common type of art history taught in colleges and universities in the United States of America.

A precedent for this approach to the problem of improving students' ability to think critically in a subject-specific course such as art history was set by Kromrey and Reed (2001), who compared explicit and implicit critical-thinking instruction in a community-college U.S. History 1870 to the Present course. The present study was designed to see if a combination of explicit and implicit critical-thinking instructions was superior to implicit critical-thinking instruction only in increasing students' ability to think critically about art history.

The control group for this study received implicit critical-thinking instruction only at a California community college during the spring 2005 semester and the experimental group received a combination of both explicit and implicit critical-thinking instruction during the fall 2005 semester. Explicit critical-thinking instruction involves the use of specific critical-thinking exercises within the context of a subject-specific pedagogy. Implicit critical-thinking instruction concerns critical-thinking exercises inherent to the general pedagogy employed in a subject-specific

course such as art history (Ennis, 1989; Kromrey & Reed, 2001). The instruments employed in this study were a pretest and posttest art-history slide-comparison essay exam designed to measure students' abilities to think critically about the images they see and the contextual information they learn and a self-report questionnaire designed to measure students' perceptions of their growth in their ability to think critically about art history.

Dewey (1958) wrote that art is human experience. The history of art is a chronological compendium of that experience – a visual expression of humankind's hopes and fears, understanding and prejudices, desires and needs, and successes and failures. Besides reminding people of their human identities and encouraging them to examine critically their goals and values, art history teaches people the value of aesthetic enjoyment for its own sake (Garoian, 1988). For these reasons, the study of art history has been an integral part of college liberal-arts education in the United States since the beginning of the 20th Century.

The study of art history, by its nature, requires the exercise of higher-order critical-thinking skills and is, therefore, of general practical importance in the United States educational system (Shipps, 1997; Sowell, 1991). Artistic images, the products of nonlinguistic thought, are comprised of complex systems of symbols (codes) that form a rich visual language whose expressive meanings must be learned in order to be understood (Arnheim, 1969; Gardner, 1990; Langer, 1942, 1951; Siegusmund, 2000; Vygotsky, 1929). According to many art educators, one way to achieve such understanding is by teaching students to think critically about the images they see and the contextual information they learn in art-history classes (Kemp & McBeath, 1994).

A primary purpose of this study is to measure the effect of teaching critical-thinking skills on student comprehension in a community-college introductory art-history course. Two-year community colleges traditionally serve novice learners engaged in general academic courses of study or vocational training. It is, therefore, less likely that community-college students will have received the same degree of specialized training in the use critical-thinking skills as students attending four-year colleges or universities (Arburn & Bethel, 1999; Comerford, 1999; Tsui, 2002). For this reason, the effect of critical-thinking instruction on student achievement is likely to be more apparent in a community-college learning environment than in more advanced higher-learning situations.

Critical thinking is not to be confused with its relative, problem solving. Problem solving involves the cognitive process of examining existing facts (problem state) and transforming them into a desired state or goal state (Mayer, 1983, 1992). A simple problem solving activity would to count the number of apples in a basket in order to determine what the sum total of all the apples in the basket is.

Critical thinking, on the other hand, is an evaluative cognitive process. Mayer defined critical-thinking as "...how to evaluate and test ideas or hypotheses regarding a problem" (p. 363). Here, the thinker might want to know: What is the significance of having that many apples (the sum total mentioned above) in the basket?

Ennis (1989) defined critical thinking in general terms as "reasonable thinking focused on deciding what to believe or do" (p. 4). Although no specific definition of critical thinking exists that is acceptable to all educators and psychologists, there appears to be general agreement among these scholars that critical thinking is

concerned with purposeful, self-directed evaluation of factual information involving the exercise of key cognitive abilities including analysis, interpretation, inference, explanation, evaluation, and self-regulation (Angelo, 1995; Astleitner, 2002; Dick, 1991; Ennis, 1962; Facione, Facione, & Giancarlo, 1992, 1994, 1996, 1998, 2000; Olson, 1997). Barrett (1994) said that the essence of art criticism, a form of critical thinking applied to visual art, is the processes of description, interpretation, and evaluation. Barrett's three categories embrace the general cognitive skills associated with critical thinking listed above. For instance, description of artworks involves explanation. Interpretation of works of art involves analysis and the ability to draw inferences (inference), whereas artistic evaluation involves reflective thinking (self-regulation). The critical-thinking instruction employed in this study focused on these three kinds of critical-thinking abilities.

Teaching critical-thinking skills has become a general-educational concern in the United States. Studies show a strong correlation between critical thinking and academic achievement (Astleitner, 2002). The National Commission on Excellence in Education published a report in 1983 titled *A Nation at Risk* (cited in Halonen, 1995) that noted with dismay the faltering educational achievement of students living in the United States. Addressing this problem, President George W. Bush instituted the *Goals 2000 Program* that emphasized the need to teach critical-thinking skills in U.S. schools (Halonen, 1989). U.S. educators have come to recognize this need in order to meet the increasing challenges of the complex technological and information-oriented world of the 21st Century (Astleitner, 2002; de Sanchez, 1995; Gadzella, Hartsoe, & Harper, 1989). Many of these same educators, however, are concerned that the

nation's schools are failing to teach students to think critically about what they learn in the classroom (Halpern, 1998; Sternberg, 1984; Tsui, 2002).

Art educators likewise are concerned that most college undergraduate art-history instructors are not teaching their students to think critically (Olson, 1997; Shipps, 1997). Many students are taught to memorize and repeat factual information related to specific works of art presented in slide-lecture formats by their teachers (Kemp & McBeath, 1994). These students are neither encouraged to employ learned cognitive skills necessary for comprehending the expressive and intellectual meanings of visual images and acquired contextual information nor are they required to connect classroom knowledge to their general life experiences. Without such critical thought, the study of art history becomes a dull, lifeless, intellectual exercise (Curtis, 2001; Freedman, 1991; Gardner, 1990; Shipps, 1997).

Background and Need of this Study

Despite the implementation of critical-thinking programs in community colleges in California, there appears to be little empirical evidence, except in isolated studies, for their effectiveness in teaching students to think critically. Furthermore, there is much debate as to whether it is possible to teach effectively critical-thinking skills in a content-specific discipline such as art history (Ennis, 1989; Sternberg, 1984). Few empirical studies have been conducted in this regard. Three such studies discussed in this research project are Kromrey and Reed's (2001) examination of the effect of implicit and explicit critical-thinking instruction in a community-college U.S. History course, Tsui's (2002) study of the effects of pedagogy on college students' self-perceptions of growth in their abilities to think critically, and Gadzella,

Hartsoe, and Harper's (1989) examination of the effects of critical-thinking pedagogies on university students classified as high, average, and low in mental ability. No related research, however, has been located with regard to the subject of art history. Hence, there is a need for empirical research regarding the effects of teaching critical thinking in community-college art-history course such as that presented in the current study.

Purpose of the Study

The purpose of this study was to assess whether a combination of explicit and implicit instruction in critical thinking is preferable to implicit critical-thinking instruction only in teaching community-college students enrolled in art-history classes to think critically about the images they see and the contextual information they learn.

Significance of the Study

This study was important for several reasons. First, it appears to be the first study of its kind to compare a combination of implicit and explicit critical-thinking instruction with implicit critical-thinking instruction only in a subject specific-course such as art history. The only previous study concerned with explicit and implicit critical-thinking instruction in a subject-specific college-level course located by the researcher was a research study conducted by Kromrey and Reed's (2001). Kromrey and Reed's study, however, unlike the present study, was neither concerned with art history nor was it concerned with subject-specific critical-thinking ability only (it focused on students' general critical-thinking ability as well). Moreover, Kromrey and Reed did not compare a combination of implicit and explicit critical-thinking

instruction with implicit critical-thinking instruction as was the case in the present study.

Second, this study appears to be the first of its kind concerned specifically with a college-level art history course. Third, the study shed light on the question of whether it is possible to teach effectively critical-thinking skills such as description, interpretation, and evaluation in community-college undergraduate art-history classes. Fourth, it identified some effective strategies for teaching critical-thinking skills in a community-college art-history learning environment. Lastly, this study helped assess whether a combination of implicit and explicit instruction in critical thinking is preferable to implicit critical thinking only in increasing community-college undergraduate students' ability to think critically about art history.

Theoretical Rationale

Critical thinking is a form of intelligent behavior. To better understand the nature of critical thinking, it is necessary to examine what is human intelligence in general and how human learning takes place. Several theories of intelligent behavior and human learning are pertinent to this study. These theories include Sternberg's (1984) componential theory of intelligence, Anderson and Krathwohl's (2001) revised taxonomy of Bloom's (1956) educational objectives, Dick's (1991) Taxonomy of Critical Thinking, Piaget and Inhelder's (1969) developmental learning theory, and Vygotsky's (1978) educational theory.

General Intelligence

Sternberg (1984) attempted to define intelligence as a learned process rather than a fixed, immutable characteristic such as IQ. He believed that intelligent

behavior is comprised of three basic components: (1) metacomponents that involve conscious planning, monitoring, and evaluating strategies of learning; (2) performance components that involve problem solving; and (3) knowledge acquisition components concerned with learning of new materials (organization, storage, and retrieval, etc.).

Sternberg's (1984) componential theory of intelligence is relevant to this study for several reasons. First, it affirms the belief that intelligence is comprised of learned behaviors that can be taught. Second, it supports the belief that individual intelligence can be improved given proper training. Third, Sternberg's three theoretical intelligence components involve the exercise of critical-thinking skills such as analysis, inference, evaluation, and self-regulation that are essential to the study of art history. Finally, Sternberg's intelligence categories are congruent with the research of other scholars concerned with critical thinking such as Halpern (1998) and Halonen (1995) discussed below.

Bloom's (1956) Taxonomy of Educational Objectives was an original attempt by Bloom and associates to identify and categorize specific learning domains (cognitive, affective, and psychomotor) and behaviors (analysis, synthesis, open-mindedness, meta-cognition, etc.). Anderson and Krathwohl (2001) revised Bloom's taxonomy to create a taxonomy that made it easier for educators to align learning standards, instruction and assessment. Anderson and Krathwohl identified four knowledge categories (factual, conceptual, procedural, and meta-cognitive) and the cognitive processes (remember, understand, apply, analyze, evaluate, and create) by which these types of knowledge could be accessed and applied in educational situations.

How Learning Takes Place

Piaget's (Piaget & Inhelder 1969) developmental learning theory was an attempt to explain how human learning takes place in two basic knowledge domains – cognitive and affective (with emphasis placed on the former) – and, as such, serves as an important guide for educators engaged in teaching specific skills such as critical thinking in subject-specific courses such as art history. Piaget's theory is pertinent to this study for several reasons. First, Piaget believed that the learner is an active constructor of reality based on his or her own direct experience of nature rather than a passive receptor of outer-imposed knowledge. According to Piaget, learners organize, analyze, and evaluate their experiences in order to make sense of them in the form of mental schemas. Thus, one implication of Piaget's theory is that these skills, including critical thinking, are essential to human intellectual growth.

Second, Piaget (Piaget & Inhelder, 1969, 2000) stated that individual learners are incapable of higher-order thinking until they master less complex types of thought. Thus, his theory implies that critical thinking, a form of higher-order intelligence, is difficult and takes time to learn. Gardner (1990), in an attempt to apply the principles of Piaget's developmental theory to his own theories of art education, recognized the time and effort it takes to master the cognitive skills necessary for making and appreciating art and how these factors must be taken into account when devising art curricula. Finally, Piaget's concept of conservation (the storage of information through the use of abstract symbols) is relative to art

appreciation, because works of art are symbolic representations whose complex meanings must be learned in order to be understood.

Closely aligned with Piaget's constructivist approach to learning is Vygotsky's (1978) educational theory. Vygotsky, however, emphasized the effects of social interactions rather than the individual's innate abilities as essential to learning. Like Sternberg and Piaget, Vygotsky thought that higher-order intelligences are learned rather than inherited. Vygotsky's belief that learners actively construct their own perceptions with the help of experts and their more advanced peers implies that critical-thinking skills, as forms of intelligent behavior, can be taught and perfected in classroom environments. Accordingly, critical thinking has the potential of allowing students of art history to analyze and evaluate material presented in teachers' lectures and questions and class discussions in order to form reasonable emotions, attitudes, opinions, and beliefs about the nature of the art and art history. It is not surprising that Vygotsky (1929) wrote a long treatise on artistic perception as an intelligent activity.

Critical Thinking Theory

Dick (1992) offered a comprehensive taxonomy of critical-thinking skills that he composed by examining forty years of published literature on critical thinking by well-known experts in the field (psychologists and educators including Black, Browne & Keeley, Ennis, Raths, Shurter & Pierce, and Sternberg) and, as such, can serve as a practical guide for identifying and teaching critical-thinking skills in the classroom. The taxonomy is a distillation of the literature concerning critical thinking in order to define it by arranging its most common and salient characteristics in behavioral categories that may be altered as new knowledge gains acceptance or old

knowledge is rejected. Dick identified five generic categories of critical thinking and three specific types of critical-thinking behaviors listed under each of the five generic categories. Table 1 below identifies those five generic categories and the specific critical-thinking behaviors related to each category.

Table 1

Dick's Taxonomy of Critical Thinking

General Categories	Specific Categories
Identifying Arguments	Issues and Conclusions, Reasons, Organization
Analyzing Arguments	Assumptions, Ambiguities, Omissions
Examining External Sources	Values, Authority, Emotional Language
Scientific Analytic Reasoning	Causality, Statistical Reasoning
Reasoning and Logic	Analogy, Deduction, Applications

An important issue of interest to Ennis (1989) was the relationship between critical thinking and subject specificity. Ennis explored the questions of whether critical-thinking skills were subject specific (for instance, with regard to art history) and whether they were transferable to other knowledge domains. He attempted to clarify important issues related to these questions while pointing the way for future research in the field. Ennis' thoughts are important to this study in that they illuminate the problem of how best to teach critical thinking in a content-specific course such as art history.

The following are some important implications of Ennis' (1989) observations for teaching critical thinking in the classroom: (1) critical thinking is generally specific to the subject matter taught (as in an art-history class), (2) transfer of critical-thinking abilities from one subject to another is unlikely unless students are taught

specifically transfer skills and encouraged to practice them, and (3) general instruction in critical thinking, when conducted separately from a specific course of study, is not likely to enhance students' abilities to think critically in a specific knowledge domain.

Halpern (1998), Halonen (1995), and Paul (1995) each created models for critical thinking meant to guide instructional and curriculum development in college classrooms. These models are discussed in detail in Chapter II.

Critical Thinking and Visual Perception

Visual perception is essential to making and understanding art and, therefore, is relevant to the study of art history in which comprehension of the meaning of images is of primary importance. Until the middle of the 20th Century, visual perception was viewed by psychologists and educators as merely sensory responses to what is seen and relegated by them to a position of secondary importance in the realm of intelligent behavior compared with what is known through cognition (rational or scientific thought).

Psychologists and educators such as Arnheim (1969), Siegmund (2000), and Vygotsky (1929) opposed this traditional view of visual perception. Instead, they understood visual perception as a highly intelligent form of behavior that is not only first and foremost cognitive in nature but also involves the expression of emotion (affect) as an essential ingredient. Arnheim referred to the act of visual perception as "visual thinking"- a kind of visual thought that he believed comes to one before written or spoken language. Using concrete visual examples and exercises, Arnheim described how humans organize, analyze, abstract, and evaluate visual data in order

to make rational sense of what they see and how they derive pleasure from the order they create.

Like Arnheim (1969), Vygotsky (1929) believed that it is the intelligent (cognitive) structuring of visual experience that accounts for the expressive power of works of art. Vygotsky, however, emphasized his belief that visual perception (hence art) is very much a socially constructed intelligence as well as an innate ability.

Siegusmund (2000), an art educator, extended Arnheim's (1969) and Vygotsky's (1929) ideas of visual perception into the realm of art education through his own concept of "reasoned perception" by including language (written and oral exercises) as essential means for teaching visual perception. According to Siegusmund, written and oral exercises help students organize and clarify their visual thoughts and observations, analyze them, reflect upon them, and evaluate them, and in this regard, they promote that form of intelligent behavior termed critical thinking that is pertinent to this study.

Critical Thinking and Active Learning

Since 1980, many educators, in discussing teaching methodologies with regard to the study of art history, expressed the need to encourage "active learning" in college classrooms (Freedman, 1991; Kemp & McBeath, 1994; Saucy & Webb, 1984; Sowell, 1991; Stinespring & Steele, 1993). Like general learning theorists, Piaget (1969), Vygotsky (1978), and Sternberg (1984) and visual learning theorists Vygotsky (1929) and Arnheim (1969), educators such as Freedman (1991), Kemp and McBeath (1994), Sowell and Stinespring (1993) advocated the active participation of art-history students in knowledge acquisition and construction of

personal belief systems based on careful reflection, analysis, and evaluation of data with the expert help of their teachers. Among the most important strategies recommended by these experts to encourage active learning, and thus, critical thinking, are research, writing, open questioning, and classroom discussions supplemented by teacher lectures (Chaffee, 1995; Freedman, 1991; King, 1995; Litecky, 1992; Sowell, 1991; Stout, 1992; Tsui, 2002).

Background: Community Colleges

This study was conducted in a United States community college located in California. Community colleges are two-year institutions of learning with open-enrollment policies that are designed to serve the low-cost educational needs of local communities and are meant to bridge the education gap between high school and four-year colleges and universities. Eighty-five percent of these community colleges are public institutions offering students a choice of general and liberal studies culminating in an Associate of Arts Degree (AA), adult and continuing education, and career and vocational training programs (American Association of Community Colleges, 2004). Approximately 70% of the nation's community-college-student population is Caucasian, 58% female, 63% enrolled full-time (more than 12 units), 53% between the ages of 17 and 24, and 40% intending to transfer to four-year colleges or universities (American Association of Community Colleges, 2004). Only 34% of community-college faculty members are employed on a full-time basis (Community College Web, 2004). Community colleges throughout the United States have become interested increasingly in teaching their students critical-thinking skills

as the number of academically-low achieving students enrolling in community college continues to grow (Cohen & Brawer, 1996).

Research Questions

This study posited two basic questions:

1. To what extent is a combination of explicit and implicit instruction in critical thinking more effective than implicit instruction only in enhancing community-college students' abilities to think critically about art history as measured by an art-history slide comparison essay examination?

2. To what extent is a combination of explicit and implicit instruction in critical thinking more effective than implicit instruction only in increasing community-college students' self-perceived growth in their ability to think critically about art history as measured by a self-report questionnaire?

Definitions

For the purposes of this research, the following definitions apply:

Critical thinking is the purposeful, self-directed evaluation of factual information involving analysis, interpretation, inference, evaluation, and self-regulation (metacognitive or other reflective behaviors) in order to form opinions and beliefs about something (Angelo, 1995; Astleitner, 2002; Dick, 1991; Ennis, 1962; Facione, Facione, & Giancarlo, 1992, 1994, 1996, 1998, 2000; Olson, 1997). This study emphasized the three cognitive aspects of art-critical thinking proposed by Barrett (1994), which are description, interpretation, and evaluation.

Self-regulation is a critical-thinking tool that encourages thoughtful analysis of one's qualitative responses to examined data (Facione, 1998).

Metacognition is the careful examination and awareness of the cognitive processes that individual's employ to solve problems (Livingston, 1997).

A community college is a two-year institution of higher learning with an open- enrollment policy meant to serve the educational needs of local communities at low cost while providing students with a educational bridge to enrollment in four-year colleges or universities. Community colleges normally offer an Associate of Arts Degree as well as specialized vocational and professional training for diverse populations (Wordig, 2004).

Art history usually refers to the history of the visual arts from ancient times to the present. The study of art history traces changes that have occurred in art making overtime and attempts to understand the values and creative impulses that inspired artists to make such changes (Adams, 1996).

Visual art history is that aspect of art history concerned with art that is experienced primarily through the sense of vision (Wordig, 2004).

Art appreciation refers to the introduction of the basic principles of visual literacy ---especially with regard to the analysis of form without reference to subject matter, symbolism, or historical context --- to general audiences in order to enhance their enjoyment of works of art (artlex.com, 2004).

Implicit learning is defined by Seger as the learning of complex information without complete verbal knowledge of what is learned (Psychology Press, 2005). In this study, implicit-critical-thinking learning was inherent in the examination of art works through the use of slide-comparison discussions and tests, class discussions, and class lectures.

Explicit instruction is a systematic instructional approach that includes a set of delivery and design procedures derived from effective-schools research merged with behavior analysis. There are two essential components to well-designed explicit instruction: (1) visible delivery features and group instruction with a high level of teacher and student interactions and (2) the less observable, instructional-design principles and assumptions that make up the content and strategies to be taught (Hall, 2002). In this class, explicit instruction in critical thinking with regard to art history was carried out using specific critical-thinking-reading assignments, class discussions of critical-thinking reading materials, and specific critical-thinking exercises pertaining to artworks and related contextual information.

Summary

Chapter I presents evidence that American educators in general and art historians in particular are concerned about college students' inability to think critically (Olsen, 1977; Shipps, 1977) and proposes a study comparing the effects of two different approaches to teaching critical-thinking in a community-college art-history course on students' ability to think critically about art history: (1) a combination of explicit and implicit critical-thinking instruction and (2) implicit critical-thinking instruction only. Both Ennis (1989) and Kromrey & Reed (2001) were concerned with implicit and explicit critical-thinking instruction.

Chapter II contains a review of relevant literature pertaining to a general understanding of the nature of human intelligence and learning including the psychological and educational theories of Anderson and Krathwohl (cited in Cruz, 2003), Piaget and Inhelder (1969), Sternberg (1964), and Vygotsky (1978); the nature

of critical-thinking in particular including works by Dick (1992), Ennis (1989), Halonen (1995), Halpern (1998), and Paul (1995); and various approaches to teaching critical thinking in college classroom environments including empirical studies by Kromrey and Reed (2001), Gadzeller, Harper, and Hartsoe (1989), and Tsui (2002). Chapter III is concerned with the methods employed in making a comparison of the effects of a combination of implicit and explicit critical-thinking instruction with implicit critical-thinking instruction only on students' understanding and appreciation of art history in a community-college art-history learning environment. Chapter IV presents the findings of this comparison with a discussion of the major themes found. To conclude this study, Chapter V contains the study's limitations, a discussion of the results, the study's implications, recommendations for future research, and a general summary of the results.

Chapter II

REVIEW OF THE LITERATURE

This review of literature is designed to help explain the nature of critical thinking, its relationship to human intelligence in general, and how it may be applied to college-educational instruction in general and the study of art history in particular. The review, accordingly, is divided into the following sections: (1) general intelligence and learning theory, (2) general critical-thinking theory, (3) three models for critical thinking, (4) critical thinking and subject specificity, (5) teaching critical thinking in community colleges, (6) specific strategies for teaching critical thinking, (7) assessing critical thinking in college classrooms, (8) art-critical thinking (9) teach about art and critical thinking, (10) teaching about art history, (11) three empirical studies, and (12) a summary of the review of literature.

General Intelligence Learning Theory

Critical thinking is part of intelligent behavior. It is, therefore, necessary to understand the nature of human intelligence and learning and how they take place in order to better understand critical thinking. This chapter includes the pertinent general intelligence and learning theories of Anderson and Krathwohl (cited in Cruz, 2003), Gardner (1983), Piaget and Inhelder (1969, 2000), Vygotsky (1978), and Sternberg (1984).

Anderson and Krathwohl (2001)) revised Bloom's (1956) original educational learning taxonomy making the new taxonomy easier to use in aligning educational standards, instruction, and assessment. Anderson and Krathwohl created two basic learning dimensions: (1) a knowledge dimension and (2) a cognitive processes

dimension by which teachers could easily plot their classroom learning objectives (see Figure 1). They divided Bloom's knowledge category into various subcategories such as factual knowledge, conceptual knowledge, procedural knowledge, and meta-cognitive knowledge, and listed the concurrent cognitive processes (remembering, understanding, applying, analyzing, evaluating, and creating) by which those types of knowledge are accessed and applied. This present study emphasized student's abilities to understand, apply, and evaluate factual and conceptual knowledge with regard to the study of art history.

The Knowledge Dimension	The Cognitive Process Dimension	The Cognitive Process Dimension	The Cognitive Process Dimension	The Cognitive Process Dimension	The Cognitive Process Dimension	The Cognitive Process Dimension
	<i>Remember</i>	<i>Understand</i>	<i>Apply</i>	<i>Analyze</i>	<i>Evaluate</i>	<i>Create</i>
<i>Factual Knowledge</i>						
<i>Conceptual Knowledge</i>						
<i>Procedural Knowledge</i>						
<i>Meta-Cognitive Knowledge</i>						

Figure 1. The Revised Taxonomy Table (Cruz, 2003, p. 1).

Sternberg (1984) defined human intelligence as a learning process rather than a single, fixed quantifiable factor such as IQ. His componential theory divided the process of intelligent learning into three distinct branches or components: (1) a metacomponent, (2) a performance component, and (3) a knowledge acquisition component. The metacomponent of intelligent behavior refers to a person's abilities to plan, monitor, and evaluate his or her learning strategies. It is the reflective aspect

of human learning. The knowledge-acquisition component is concerned with the storage and retrieval of new information. The performance component is the practical aspect of intelligent behavior in which stored knowledge is employed for logical thinking, critical thinking, and problem-solving purposes.

Sternberg's (1984) theory is relevant to this study not only for acknowledging critical thinking as a significant aspect of intelligent mental activity but also for reinforcing the belief that intelligent behavior can be taught effectively and improved. Aspects of Sternberg's componential theory of intelligent learning were applied to a number of children's experimental learning programs cited by Sternberg including Feurestein's (cited by Sternberg) Instrumental Enrichment Program (IE) that emphasizes the metacognitive and performance components, Lipman's (cited by Sternberg) Philosophy for Children's Program emphasizing the metacognitive and knowledge acquisition components, and the Chicago Mastery Learning Program (cited by Sternberg) that emphasizes the knowledge-acquisition and performance components. Although those learning programs were geared for children, the principles upon which they are based may be relevant to intelligence-learning programs involving young adults attending colleges or universities.

As a result of these experimental-learning programs, Sternberg (1984) concluded that human learning programs should be grounded on sound psychological and educational theory concerning knowledge of the processes of human learning and how learning is to be taught. According to Sternberg, such educational programs should be sociologically appropriate (i.e., they should meet the specific needs of particular social groups) and provide explicit training in Sternberg's three

components of intelligent behavior. Furthermore, Sternberg argued that the programs should be responsive to the motivational as well as intellectual needs of students, be sensitive to individual learner differences, and provide a link between educational training and practical application. Sternberg indicated that educators should model new programs on similar programs that have demonstrated empirical evidence of success and establish strong curricula and training programs for teachers and students based on componential intelligence theory.

Gardner's (1983) theory of multiple intelligences is based on his belief that humans possess not one "raw intelligence" but at least seven different kinds of semi-autonomous intelligences in varying degrees. His theory is significant to this study in that he associated some of these mental abilities or "intelligences" (that include critical thinking) with artistic thought and creativity. The seven basic intelligences (there may be more) identified by Gardner are linguistic, musical, logical and mathematical, visual-spatial conceptualization, bodily-kinesthetic, knowledge of other persons, and knowledge of ourselves. According to Gardner, individuals form preferences or proclivities for at least one of these types of intelligences in order to respond to and act upon natural phenomena. Such preferences (such as artistic preference), rather than existing as fixed entities, may be modified and enhanced through educational practice. To better understand human artistic behavior and its development, Gardner, under the auspices of his experimental laboratory, Project Zero, located at Harvard University, studied children's art education in an attempt to connect his theory of multiple intelligences with their artistic growth. Some of his

findings are presented below under the headings “Artistic Intelligences” and “Art Teaching Methodologies.”

Piaget's (Piaget & Inhelder, 1969, 2000) developmental learning theory is an attempt to understand how human intelligence evolves in the individual. His developmental learning theory asserts that human learning takes place in distinct stages within two basic domains – cognitive and affective (with emphasis placed on the former). According to Piaget, human cognition occurs in four successive hierarchical stages as learners mature and gain intellectual and emotional mastery over their surroundings. Piaget named these phases of cognitive development sensory-motor, preoperational, concrete operational, and formal operational. Table 2 below lists these four developmental stages of cognitive growth, the periods of human life in which this growth occurs, and the kind of learning that takes place during each developmental stage. In the first two phases (sensory-motor and preoperational) that occurs in early childhood, young learners form basic concepts of naturally occurring phenomena such as permanence of objects, causality, location in time and space, and form and size constancy or perception as they interact with their environment. This knowledge is extended during the concrete operational phase, a stage that usually begins in early or pre-adolescence, when learners comprehend more complex concepts such as reversibility, conservation, classification, serialization, correspondence, and advanced causality. The final and most advanced learning phase is the formal operational stage, which extends from adolescence into adulthood, where learners begin to understand such concepts as abstraction, hypothetical-

deductive reasoning, symmetry, reciprocity, proportion, frames of reference, advanced probability, and control of variables.

Table 2

Piaget's Developmental Learning Theory		
Phases of Cognitive Development	Developmental Period	Knowledge
1. SENSORY-MOTOR	Early Childhood	1. Awareness of the permanence of objects
2. PREOPERATIONAL	Early Childhood	2. Causality 3. Location in time and space 4. Form and size constancy of perception
3. CONCRETE OPERATIONAL	Early Adolescence	1. Reversibility 2. Conservation 3. Concrete operations (classification, serialization and correspondence)
4. FORMAL OPERATIONAL	Adolescence to Adulthood	1. Abstraction 2. Hypothetico-deductive reasoning 3. Symmetry 4. Reciprocity (negation) 5. Proportion 6. Frames of reference 7. Advance probability 8. Control of variables

Basic to Piaget's (Piaget & Inhelder, 1969) developmental learning theory are the concepts of assimilation and accommodation. During the sensory-motor stage and later thought stages, people absorb and organize information derived from their direct experience of nature (reality) in the form of mental schemata that constantly undergo change through the processes of assimilation and accommodation. The learner perceives new information, which he or she internally integrates into existing schemata (assimilation), while trying to harmonize these continually changing

concepts with the reality of the outside world (accommodation). Piaget defined human intelligence as the ability to maintain a balance or equilibrium between these two ongoing processes of assimilation and accommodation.

An essential bridge between the sensory-motor phase and the thought phase in human learning is the process of representation or what Piaget (Piaget & Inhelder, 1969) refers to as the semiotic or symbolic function. Learning to use signs, symbols, language, drawings, play, memory, and mental imagery as representations of reality enable humans to extend the life of their internal and external experiences (conservation) beyond the immediate moment, store them, and recall them at will thereby heightening their own experiences of reality. Piaget pointed out that learning to use these various tools entails imitation of reality (forming habits, etc.) as well as the internalization of meaning (assimilation) that transforms old realities to new ones.

According to Piaget (Piaget & Inhelder, 1969), affective behaviors (attitude, motivation, and interest) and socialization follow the same patterns of growth and development as with cognitive skills through the processes of accommodation and assimilation. Essential to behavioral growth is the process of decentralization, where the learner begins to abandon his or her self-centeredness and becomes more and more aware of the outside world and his or her relationship to it. As with the assimilation and accommodation processes related to cognitive development, the learner must find a way to balance the emotional need to maintain his or her own individuality with the desire for recognition and acceptance from the outside world.

Piaget's developmental learning theory is pertinent to this study in several ways. First, Piaget believed that the individual learner is an active constructor of

reality based on his or her own direct experience of nature rather than a passive receptor of outer-imposed knowledge. As such, individuals must analyze and synthesize information and evaluate their experiences in order to make sense of them in the form of mental schemas. This type of intelligent behavior related to both the cognitive and affective domains is characteristic not only of Piaget's concrete operational learning stage but also of that aspect of intelligent thought referred to as critical thinking.

Second, Piaget's theory states that individual learners are incapable of higher-order thinking until they master less complex types of thought. The implication here is that intelligent behaviors such as critical thinking must be learned and that such learning takes time and effort, especially with regard to replacing old mental schemas with new ones. Finally, Piaget's concept of conservation is relative to art appreciation, since works of art are symbolic representations whose meanings must be learned in order to be understood.

Closely aligned with Piaget's constructivist approach to learning is Vygotsky's (1978) educational theory. Vygotsky, however, emphasized the effects of social interactions upon learning in relation to the individual's innate abilities rather than the learner's direct interactions with his or her environment only. According to Vygotsky, low-order intelligences, which are largely the result of heredity influences, are acquired during the earliest phase of a child's life (Piaget's sensory-motor stage) but high-order learning skills (including the use of language) are acquired through socialization as the child moves toward adolescence. For Vygotsky, significant

intellectual growth is only possible through learner's interactions with parents, teachers, mentors, and more advanced peers.

In their social interactions, learners build upon prior knowledge to form new, externalized (intermental) and internalized (intramental) constructs of knowledge in accordance with their own innate abilities. Vygotsky (1978) named this process "scaffolding." The difference between what children learn without assistance and what they accomplish intellectually with expert assistance is called their "zone of proximal development."

Like Sternberg (1984) and Piaget (1969), Vygotsky (1978) stated that high-end intelligences are learned rather than inherited. Moreover Vygotsky's belief that learners, with the help of experts and their more advanced peers, actively construct their own perceptions of reality rather than act as mere receptors of outer imposed truth implies that critical-thinking skills, as forms of intelligent behavior, can be taught and perfected in classroom environments. Accordingly, critical thinking has the potential of allowing students of art history to properly analyze and evaluate empirical facts related to course material presented in teachers' lectures and questions and class discussions in order to form reasonable emotions, attitudes, opinions, and beliefs about the nature of the art and art history.

General Critical Thinking Theory

Critical thinking is an important aspect of intelligent behavior. It is, therefore, imperative to understand the nature of critical thinking and the behaviors associated with critical thinking in order to understand how its principles may be applied in

educational settings. This section of the review of literature contains pertinent critical-thinking theory.

What is critical thinking and how may it be applied in educational situations?

As stated earlier in this review, critical thinking is a form of intelligent behavior involving the use of higher-order critical-thinking skills such as analysis, synthesis, inference, evaluation, and self-regulation. Facione (1998) worked on a two-year research project with a panel of forty-six experts (scholars from a variety of disciplines in the arts, sciences, and education) under the auspices of the American Philosophical Association in an attempt to define critical thinking and its properties. The panel defined critical thinking as “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (Facione, 1998, p. 14). In the affective domain, the panel referred to that critical spirit characteristic of thoughtful people that moves them to question and probe the nature of reality. The group saw education in critical thinking as essential to the well being of the individual and the maintenance of a democratic society whose existence depends on self-regulation.

As mentioned in the introduction to this study, definitions of critical thinking vary among scholars. Dick (1992) developed an empirical taxonomy of critical-thinking behaviors. In writing his taxonomy, Dick was influenced by Ennis’s (1989) general definition (“the correct assessing of statements”) and the theories of Feurestein and Sternberg (1984) who stressed critical thinking as a process rather than as a quantifiable measure of intelligence. Dick composed his critical-thinking

taxonomy by examining over forty years of published literature on critical thinking written by prominent psychologists and educators such as Black, Browne and Keeley, Ennis, Raths, Shurter and Pierce, and Sternberg. The taxonomy is a distillation of the literature in order to define critical thinking by arranging its most salient characteristics in behavioral categories that may be altered as new knowledge about critical thinking gains acceptance or old knowledge is rejected. As such, Dick's taxonomy of critical thinking can serve as a practical guide for identifying and teaching critical-thinking skills in the classroom.

Dick (1992) identified five generic categories of critical thinking:

(1) identifying arguments, (2) analyzing arguments, (3) examining external sources, (4) scientific analytic reasoning, and (5) reasoning and logic. He listed three specific critical-thinking behaviors under each of these general categories. These categories are listed in Table 1.

Three models for critical thinking

A number of scholars have created specific models for critical thinking meant to guide instructional and curriculum development in college classrooms. Three such models are discussed in this review: Paul's (1995) model for critical thinking, Halonen's (1995) critical-thinking model, and Halpern's (1998) critical-thinking model.

Paul's general model for critical thinking consists of four basic components of reasoning and a series of relative subcomponents or cognitive skills and behaviors that served as the basis of sound critical-thinking instruction (Kromrey & Reed, 2001). Figure 2 below lists these general and specific components and sub-

components which are elements (such as purpose, concepts, assumptions, implications, etc.), traits (such as independent thinking, intellectual empathy, intellectual courage, etc), standards (such as clear, consistent, logical, etc.), and

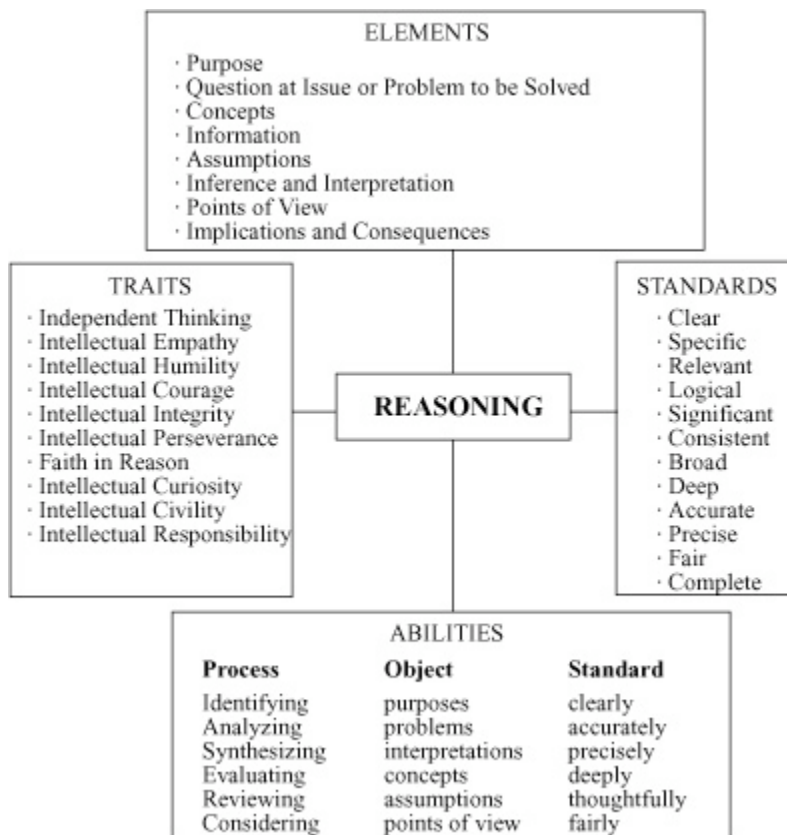
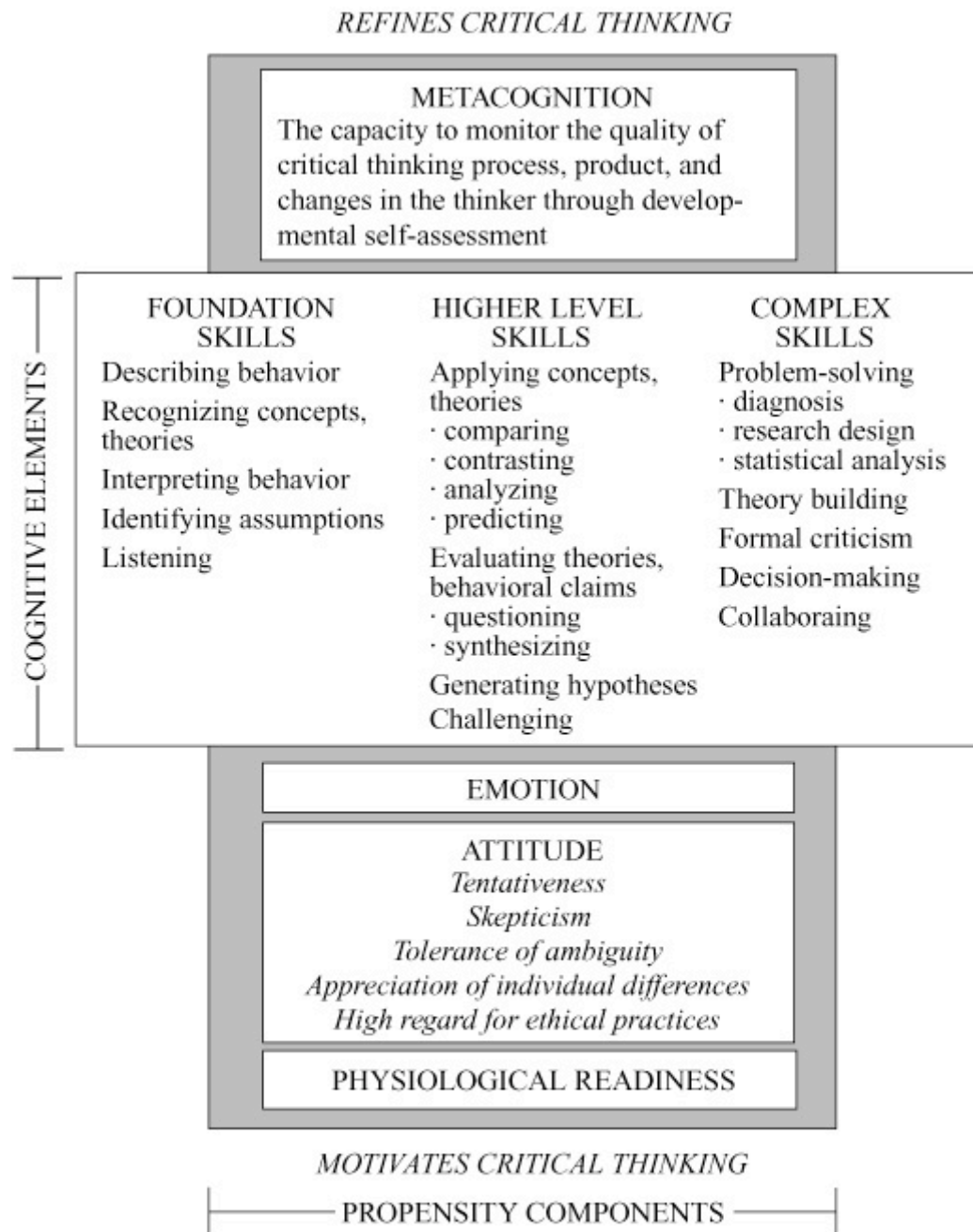


Figure 2. Paul's Model for Critical Thinking (Kromrey & Reed, 2001)

abilities (such as identifying purposes clearly, analyzing problems accurately, evaluating concepts deeply, etc.). Paul's Model is relevant to this current study in that it was used by Kromrey and Reed (2001) in a similar comparative study and clearly identifies and organizes specific critical-thinking behaviors in the cognitive and affective domains that will be encouraged by means of explicit critical-thinking instruction in the experimental group.

Both Halonen (1995) and Halpern (1998) designed models for teaching critical- thinking skills specifically in college classrooms that are useful to this study



A generic model of cognitive and propensity elements to assist in the development of critical thinking objectives in the undergraduate psychology curriculum.

Figure 3. Halonen's Model for Critical Thinking (Halonen, 1995)

in that they can serve as guidelines for teaching critical-thinking skills in a community-college art-history course. Figure 3 describes Halonens's model which is a general guide for teaching critical thinking at the college level. Figure 4 below describes Halpern's model which is subject-specific (introductory college psychology course). Both models are essentially the same with one important exception.

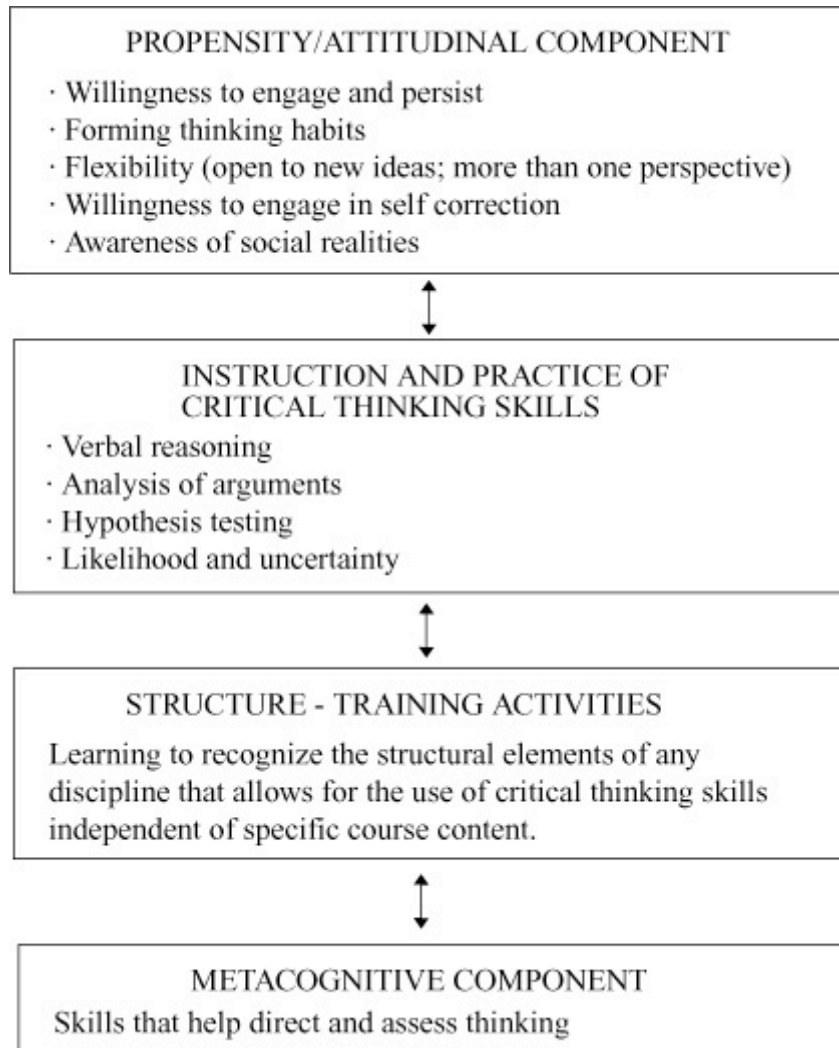


Figure 4 Halpern's Model for Critical Thinking (Halpern, 1998).

The three main components of Halpern (1998) and Halonen's (1995) critical-thinking models are as follows: (1) a propensity /attitudinal component aimed at fostering better attitudes and emotions related to learning to think critically, (2) a

cognitive elements component designed for the teaching and practice of specific critical-thinking skills such as analysis, synthesis, and so on and (3) a meta-cognitive component whose goal is to direct and assess meaningful thinking. Halpern's (1998) model, however, is comprised of an additional component that is meant to reflect her strong belief that the purpose of teaching critical-thinking skills in college classrooms is for transfer to real-world, out-of-classroom situations. This additional or fourth component, which Halpern refers to as "structure-training activities," is aimed at teaching students to identify the similar and different critical-thinking skills used to comprehend diverse fields of knowledge, thereby allowing students to transfer those learned skills more easily from one field, domain, or subject to another.

Critical thinking and subject specificity

An important issue of interest to Ennis (1989) and other scholars is the relationship between critical thinking and subject specificity. Ennis explored the questions of whether critical thinking is subject specific (for instance, with regard to art history) or whether it exists as an independent knowledge domain that could and should be taught as a separate discipline. Although Ennis offered no definitive answers to these questions, he did attempt to clarify important issues related to them while pointing the way for future research in the field. His thoughts about critical thinking and subject specificity are important to this study in that they illuminate the problem of how best to teach critical thinking in a content-specific course such as art history.

Ennis (1989) identified four possible approaches to teaching critical thinking relative to specific subject matter and names a number of scholars who are interested

in one or more of them. The four approaches are the “general approach” favored by Sternberg (cited in Ennis, 1989) in which the principals of critical thinking are taught separate from but in conjunction with specific course content, “infusion” favored by Glaser and Resnick (cited in Ennis, 1989) in which challenging subject matter requiring the exercise of critical-thinking skills is taught along with explicit instruction in critical-thinking principles and dispositions, “immersion” favored by McPeck (cited in Ennis, 1989) where students are steeped in challenging course materials requiring the use of critical-thinking skills and dispositions whose general principles are implicit in the instruction rather than made explicit, and the “mixed” approach favored by Ennis and Sternberg that combines the general approach with either the infusion or immersion approaches.

For Ennis (1989), the concept of subject specificity relative to critical thinking is not a simple matter but a complex issue requiring continued scrutiny in order to define it and identify its salient characteristics. Accordingly, Ennis identified three types of subject-specificity (domain or empirical, field or epistemological, and conceptual) and some of their salient characteristics. Ennis observed that background knowledge appears to be essential to thinking critically in domain (specific knowledge) or field (general knowledge) subjects. The transfer of critical-thinking abilities from one subject domain to another, however, was not likely, according to Ennis, unless transfer skills were specifically taught and regularly practiced within domains. Furthermore, Ennis said that empirical evidence suggested that general instruction in critical-thinking skills was not likely to enhance domain-specific learning.

With regard to epistemological subject specificity, Ennis (1989) pointed out that required critical-thinking skills, far from being homogeneous among all fields of knowledge, often vary between or partially overlap other fields (art and mathematics, for instance). Finally, Ennis, in addressing a conceptual view of the problem of subject specificity, stated that critical thinking cannot exist separate from subject matter (one has to have something to think about) and, therefore, must be subject specific.

The important implications of Ennis' (1989) observations for teaching critical thinking in the classroom are that (1) critical thinking is generally specific to the subject matter taught (as in an art-history class), (2) that transfer of critical-thinking abilities from one subject to another is unlikely unless students specifically are taught transfer skills and encouraged to practice them, and (3) and that general instruction in critical thinking, when conducted separately from a specific course of study, is not likely to enhance students' abilities to think critically. These facts would seem to indicate that the infusion or mixed approaches to teaching critical thinking are likely to be most effective in the classroom. One purpose of the present study was to see if the last of these three contentions by Ennis – that a mixture of explicit and implicit instruction in critical thinking is superior to implicit critical-thinking instruction alone – applied to the study of art history in a community-college learning environment.

Teaching critical thinking in community colleges

This study was conducted in a United States community college located in the State of California. As mentioned earlier in the introduction to the study, the inability of the nation's students to think critically, as evident by declining levels of their

academic achievement, has become a growing national political as well as educational concern at the beginning of the 21st Century. Many educators who oversee the nation's more than 1,100 community colleges and the approximately six million students who attend these schools (Barnes, 1992; Hirschberg, 1992) have become aware, consequently, of the need to teach critical thinking in the classroom and have instituted programs meant to meet that need. Their concern for teaching critical thinking may have been exacerbated by the fact that increasing numbers of low-achieving students, many of whom are economically deprived, are enrolling in community colleges (Saxon & Boylan, 2004).

Evidence of the move to encourage critical-thinking instruction in the nation's community colleges may be found in the state of California, where all 108 community colleges are required by law to teach critical thinking as a general-education requirement (Halpern, 1993). In 1988, the California legislature, in an effort to make the Associate of Arts Degree (AA) offered by the state's community colleges more credible and viable, passed Assembly Bill 1725. This bill implemented the Course Standard Regulations of the Administrative Code (known as Title V), which established seven academic standards for all community-college courses leading to an AA Degree. Section 55002 (a) (2) (F) of the code pertained to teaching critical-thinking skills in AA-designated courses across curricula. In 1987, the Educational Standards and Evaluation Unit of The State Colleges' Chancellor's Office published a Course Standards Handbook (Glock, 1987) as a guide for community colleges in implementing critical-thinking skills programs and instruction. The state handbook defines critical-thinking skills (not critical thinking itself) as

“those diverse cognitive processes and associated attitudes, b) critical to intelligent actions, c) in diverse situations fields, d) that can be improved by instruction or conscious effort (sec. 8, p. 9)” (Feare, 1992, p. 96). Individual California community colleges were given considerable leeway in deciding how to implement their critical-thinking programs across curricula and which critical-thinking skills to emphasize (Barnes, 1992).

Many community colleges outside of California have attempted to address the problem of establishing critical-thinking programs with only mixed results pointing out the difficulty of teaching critical-thinking skills (Eisner, 1999; Gardner, 1990; and Halpern, 1993). To promote critical thinking for transfer across curricula, La Guardia Community College in New York instituted thirty-five sections a course of explicit instruction in critical thinking titled “Critical Thought Skills” whose goals were to develop students’ reading, writing, and speaking skills; increase students’ abilities to think, reason, and problem solve; and encourage students to explore their own attitudes and values about life and education (Chaffee, 1998). The course was grounded in active-learning strategies such as writing, discussion, collaboration, questioning, and feedback (from students and teachers).

Wayne County Community College in Detroit, Michigan, Oakton Community College in Skokie, Illinois, and the Miami-Dade Community College District in Florida also implemented studies and learning programs aimed at developing students’ critical- thinking skills (Hirshberg, 1992). Wayne County Community College conducted a study indicating that many community-college students were not capable of exercising higher-order cognitive skills associated with abstract thinking

and that it, therefore, was incumbent upon community colleges to implement critical-thinking programs to assist those students. Oakton Community College established a Critical Literacy Project (CLP) for teachers comprised of two components: one aimed at educating teachers about critical thinking and encouraging them to infuse critical-thinking instruction in their curricula and the other aimed at identifying and addressing problems that might inhibit the effectiveness of such instruction like students' lack of awareness of their academic deficiencies, lack of student motivation, and lack of opportunities for student collaboration.

The Miami-Dade Community College District designed a course available to all district schools titled "Effective Teaching-Learning in Higher Education." This course was meant to help educators associated with the district's various community colleges identify desirable critical-thinking skills and behaviors and encourage implementation of critical-thinking programs across college disciplines. Individual teaching modules within the course, such as a motivation module, were also made available to each college in the district, and recommendations were made to college to administrators and faculty as to how to progress in creating such programs (Hirshberg, 1996).

Lastly, Valencia Community College in Orlando, Florida instituted its own critical-thinking program titled the "Valencia Community College Competency I" that emphasized instruction in specific critical-thinking competencies such as the analysis, synthesis, acquisition, and evaluation of knowledge across curricula (Robinson, 1996). Despite the creation of these above-mentioned programs, there is

little concrete evidence to show their effectiveness in teaching community-college students to think critically.

Specific strategies for teaching critical thinking

This study involved the practice of active-learning strategies in an attempt to understand the effects of teaching critical thinking in a subject-specific community-college course (art history). Many scholars interested in the problem of how to teach critical-thinking skills effectively in college classrooms are in agreement that critical-thinking instruction involves active-learning strategies such as reading, writing, class discussions, and other forms of collaborative-learning experiences (Chaffee, 1998; King, 1995; Litecky, 1992; Potts, 1994). Such active-learning strategies allow students as individuals and in groups to formulate problems; practice cognitive skills associated with critical thinking such as analysis, synthesis, inference, evaluation, metacognition, and self-regulation; and form opinions and make value judgments regarding materials studied in the classroom. Many of these same scholars agreed that a goal of critical-thinking instruction within specific domains should be the transference of learned critical-thinking skills to other contexts or disciplines (Chaffee, 1998; Potts, 1994).

In encouraging critical thinking in the classroom, Potts (1994) suggested that teachers carefully plan their pedagogical strategies and define problems to be solved within the curriculum in advance and enhance the processes of critical thinking by maintaining a proper physical environment conducive to such learning (including

access to visual aids). Potts advocated pedagogical strategies for teaching critical thinking such as encouraging interaction among students and open-ended questioning, allowing adequate class time for reflection, and teaching for transfer to other knowledge domains.

King (1995) emphasized questioning as an important instructional strategy that encourages students to think critically. King specifically advocated the use of question stems as models for teaching students how to ask and generate critical questions pertaining to course material. The following are several examples of such stems: (1) What is the meaning of ...?, (2) Why is the...important?, (3) Explain how...., and (4) Compare ...with...in regard to...(p.14).

Litecky (1992) was particularly interested in the use active-learning strategies in community colleges that he found particularly effective in promoting critical-thinking. He proposed the following instructional methods: (1) the five-minute write-a-response to formal questions posed by the instructor, (2) panel presentations, (3) video excerpts, (4) discipline worksheets, (5) written assignments that require critical thought, (6) assignment interviews, and (7) seminar presentations.

Assessing critical thinking in college classrooms

Several types of assessment tools were employed in this study in order to comprehend the results of teaching critical thinking in a community-college art-history learning environment including an essay test to measure students' abilities to think critically about art history and a student self-assessment inventory aimed at measuring student self-perceptions of their growth in their ability to think critically about art history. These assessment tools are similar to those instruments advocated

by scholars discussed below and are applied with the same implicit understanding of the difficulty of measuring growth in critical thinking on a short-term basis (Halpern, 1993).

Halpern (1993), like other scholars such as Gardner (1990) and Eisner (1999), pointed out that assessing critical thinking is a difficult enterprise because cognitive growth is a relatively slow, cumulative process without relief from easy instructional shortcuts. According to Halpern, educators can expect to witness only modest improvements in students' critical-thinking abilities in college courses that are only of several months duration. She warned that proper assessment of critical thinking in college classrooms is a time consuming, complex procedure involving multiple comparison groups that take into account diverse factors such as students' maturation and inherent critical-thinking abilities as well as outcomes from critical-thinking instruction. Proper assessment should be aimed at determining what classroom teaching strategies are most effective for teaching critical thinking, whether gains made in critical thinking are long or short term, and whether critical-thinking skills learned in particular disciplines are transferable to other fields of knowledge. Besides using multiple-choice and essay examinations to measure the effects of critical-thinking instruction on student growth in critical-thinking-abilities, Halpern also suggested using standardized tests such as Facione's *California Critical Thinking Skills Test* and IQ tests to measure such growth. Like Sternberg (1984), Halpern also believed that instruction in critical thinking can improve students' IQs.

Both Cromwell (1992) and Angelo (1995) believed, like Halpern (1993), that assessing critical-thinking instruction is an on-going, cumulative process and

emphasized the importance of self-assessment tools for measuring gains in students' critical-thinking abilities. Angelo focused on one such self-assessment tool titled the "classroom assessment technique" (CAT) that is a short, student-generated written response to teachers' questions about students' learning experiences. According to Angelo, CATs require that students exercise important critical-thinking skills, such as analysis, synthesis, reflection, when evaluating their instructional experiences.

Art and Critical Thinking

Making and looking at art, activities so common throughout human history, generally are perceived by the United States public to be pleasant diversions appealing to human emotions rather than intelligent thought so highly valued by society. Evidence of such devaluation of art is the neglect it has suffered within the United States educational system (Arnheim, 1969; Eisner, 1992; Gardner, 1983). Well-known 20th Century and contemporary psychologists and educators such as Vygotsky (1929), Arnheim (1969), Eisner (1998), Gardner (1983), and Siegusmund (2000), however, have challenged this simplistic and negative view about the nature of art, art production, and aesthetic enjoyment. For these experts, making and looking at art are intelligent activities requiring the use of high-order cognitive skills and are worthy, therefore, of a prominent place in the American educational system. All of these scholars agree that the critical-thinking skills necessary for understanding and appreciating art can be taught. Hence, the nature of artistic visual perception and its pedagogies are issues relevant to this current study.

Like Sternberg (1983) who saw general intelligence as a cognitive process, Arnheim (1969) viewed artistic intelligence (visual perception) as an ongoing process

in which humans employ a variety of cognitive abilities to structure and make sense of the natural world that is in continuous flux. Arnheim referred to this ongoing process of visual perception, artistic or otherwise, as “visual thinking” – a type of nonlinguistic thought that precedes oral and written language – that is an essential aspect of human growth and survival.

According to Arnheim (1969), the artistic structuring of visual experience involves the exercise of intelligent behaviors such as active exploration, abstraction, analysis and synthesis, completion, correction, comparison, and problem solving as well as combining, separating, and putting into context. For Arnheim, visual thinking entailed the psychological balancing or gestalt of the various aspects of nonlinguistic perceptual experience that gave rise to powerful emotions and feelings. Arnheim presented a variety of artistic images created by adults and children as symbols of human experience and exemplifying visual intelligence in order to advance his theories.

Madeja (1997) created a model for the artistic process in which visual perception was a key component. Figure 4 below describes Madeja’s model in which visual perception leads to the development of visual ideas which in turn lead to the exploration of visual ideas and so on culminating eventually in the creation of a work of art. Madeja based his perceptual model on Arnheim’s (1969) description of cognitive faculties involved in visual thinking and employed the model as a pedagogical guide for his own classes in art, art criticism, and art history. As such, this model is relevant to the present study in that it further clarifies the intimate

connection that exists between the exercise of specific critical-thinking skills and the understanding of visual images.

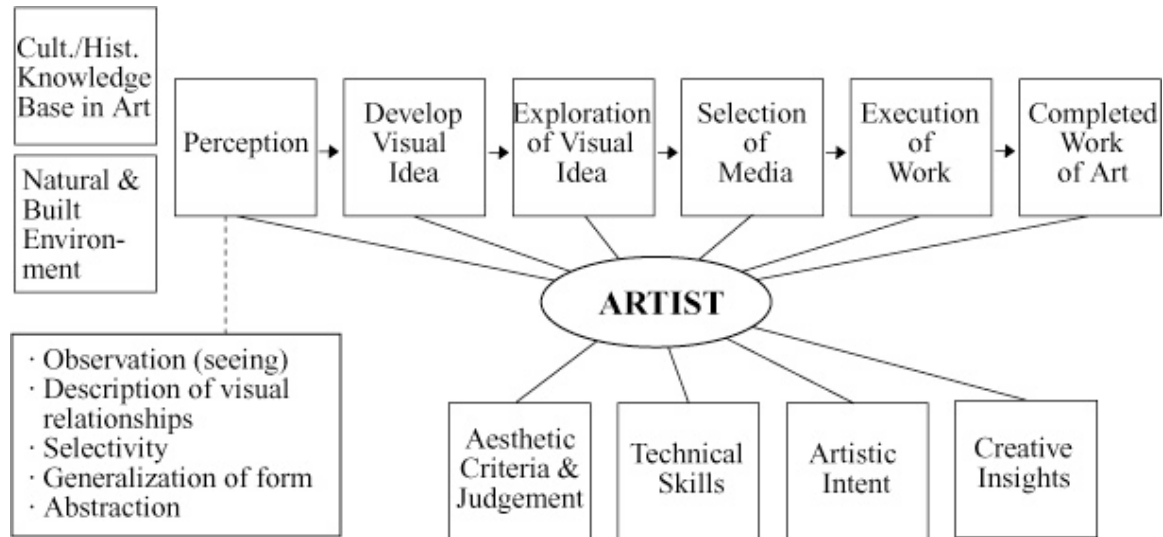


Figure 5. Model for the Artistic Process (Madeja, 1997)

Siegismund (2000), an art educator, applied and built upon Arnheim's theory in developing an educational theory of artistic perception. Siegismund referred to visual-artistic perception as "reasoned perception" rather than visual thinking. He defined reasoned perception as mentally orchestrated sense impressions and emphasized the dual and complementary role of linguistic and nonlinguistic thought in understanding and appreciating art. Although not rejecting Arnheim's psychological approach to comprehending what we see, Siegismund emphasized the role of language in refining and defining nonlinguistic visual thought. Hence, Siegismund asserted the importance of written exercises, reading exercises, discussions, and instructors' critical feedback in classrooms where art is made and examined. All of these linguistic tools require the exercise of students' and teachers' critical-thinking abilities.

Gardner (1983) attempted to explain artistic intelligence, that is, why certain members of society appear to have greater artistic abilities than others. Based on his theory of multiple intelligences described earlier in this study, Gardner believed that there was such a thing as artistic intelligence distinguishable from other kinds of intelligences. According to Gardner, artistic intelligence was the proclivity of certain individuals toward particular intelligences (musical, logical and mathematical, visual-spatial conceptualization, etc.) that enabled them to comprehend and produce artistic (in this case, visual) symbols more readily than those individuals not so inclined. Gardner felt, however, that the artistic abilities of both artistically and nonartistically-oriented people could be advanced through education.

Olson (1983), recognizing the importance of art as a symbol-making activity, defined artistic intelligence as the ability of individuals to comprehend the polysemic nature of artistic symbols, that is, how artistic form (line, color, technique, materials, scale, composition, etc.), rather than existing as an independent variable of symbolic meaning or content, enhances the contextual meanings of those symbols as well. Vygotsky (1929) pointed out earlier that even the slightest tampering with the formal structure of a work of art could destroy its essential meaning(s): contextual or otherwise. The educational implication of Olson's holistic approach to understanding art is that instruction in the arts must take into account the unique relationship between form and content. It takes critical-thinking skills to comprehend the various signifying and qualifying aspects of this relationship (Eisner, 1993; Perkins, 1983). Olson's commentary was particularly relevant to this present study that employed slide analyses and comparisons as pedagogical tools for encouraging and measuring

growth in students' critical-thinking abilities. Students' awareness of the unique relationship between artistic form and content is essential to their ability to intelligently analyze and comprehend visual images.

Art-critical Thinking

Art criticism comprises a specific system of critical-thinking behaviors for understanding and appreciating works of art and is often taught as an independent discipline within college-art-studies curricula along with studio art, aesthetics, and art history. Students in the experimental group for this study were explicitly taught art critical-thinking skills by means of a written gallery-review assignment.

The essential ingredients of art-critical thought are description (including ordering), interpretation (analysis, synthesis, and inference), and evaluation (judgment) of visual data (Andersen, 1991; Barrett, 1994). The final goal of art criticism is the evaluation of art (Andersen, 1991). Andersen stated that contemporary instruction in art-critical thinking focused on students' intelligent forming of subjective judgments about works of art in a social-historical context rather than on the making of judgments based upon pre-established ideological, historical, or cultural imperatives. In this sense, contemporary art criticism involves active-learning behaviors similar to those described by Piaget's (Piaget & Inhelder, 1969) in his developmental learning theory in which individuals construct meaning based on their own intellectual and emotional experiences. It is the attempt to measure students' growth in their art critical-thinking faculties of description, interpretation, and evaluation that was a prime focus of this quasi-experiment.

Teaching about art and critical thinking

The present study entailed the use of active-learning strategies to teach students critical-thinking skills with the hope of enhancing their understanding and appreciation of the visual arts. Both Shipps (1997) and Stout (1992) argued for greater teacher awareness of students' diverse needs and abilities in contemporary college art-appreciation classes where active learning was encouraged. Shipps believed that new approaches to teaching were needed to engage today's students – the so-called “Generation X” – who he saw as alienated and disengaged from traditional cultural values and educational processes even though he perceived them to be intelligent, sensitive, and open to change. Noting that students were not trained to think well, Shipps criticized teachers' over-reliance on formal or traditional approaches to teaching art-appreciation classes based on slide-lecture and rote-memorization formats. He suggested that instructors adopt an aesthetic-based approach to teaching about art as well. By an aesthetic-based or “structuralist” approach, Shipps meant a pedagogy that allowed students to structure their subjective responses to the visual imagery and contextual information presented in the classroom in relation to their every-day life experiences. This aesthetic structuring implied the employment of active-learning strategies such as collaborative-learning exercises, individual student research projects, class discussions, and written exercises that encourage students' to think critically.

Stout (1992) stated that college teachers of art appreciation must learn from their students and be open to innovative modes of student expression given the multi-dimensionality of student abilities and responses in the classroom where active-learning strategies are practiced. Stout referred to students' subjective responses to

course materials and activities as “expressive outcomes” and viewed the teacher’s primary role to be that of a guide in the disciplined formation of those outcomes.

The primary methods for teaching critical thinking in art classes – whether art history, art criticism, aesthetics, or a combination of these disciplines – are essentially the same as those used in teaching critical thinking in general across curricula as mentioned earlier in this study. These instruments are reading, writing, and class-discussion exercises that, when properly organized and regularly practiced in art-appreciation classes, engage students in critical-thinking behaviors such as observation, description, analysis, synthesis, and evaluation of visual data. Reading, writing, and class discussion are essential ingredients of the pedagogy relative to the present study.

Wilson and Clark (2000) focused their attention on classroom discussions in art-appreciation classes. Wilson wrote an account of a small, qualitative study both she and Clark conducted based on an innovative teaching strategy developed by Clark, an expert instructor and writer about art, for teaching middle-school students art appreciation. Clark named his special teaching methodology Looking and Talking About Art (LATA). Wilson observed Clark’s teaching strategies and monitored student and teacher interactions in two middle-school art-appreciation classes (seventh and eighth grades) by using video and audio-tapes recordings, taking classroom notes, keeping journal entries, and conducting teacher interviews.

Clark employed a four-pronged instructional strategy using reproductions of visual images created by famous artists that he taped to the classroom blackboard (Wilson & Clark, 2000). The essence of Clark’s strategy was to promote classroom

discussion by asking open-ended questions about the artwork, intervening in the discussions in key instances to maintain the discussion flow, and clarifying and explaining key concepts related to the visual images where called for. Wilson noted that Clark conducted this ritual with sensitivity and respect for his students and their views, qualities that were, according to Wilson, essential to the effectiveness of Clark's pedagogy in general.

Although Clark's LATA methodology was directed at teaching middle school rather than college students, the essential components of this pedagogical technique-- questioning and classroom discussions -- have been used commonly in college classrooms where critical thinking is encouraged as mentioned earlier in this study and were employed extensively in the study.

Recognizing the complexity of nonlinguistic thought as it applies to visual perception, Stout (1992) advocated the use of microwriting exercises to encourage students enrolled in introductory college art-appreciation classes to think critically about their visual experiences. Microwritings are short writing exercises ranging from analogies, to narrative paragraphs, to three-page themes meant to foster students' awareness of their own thought processes and creative impulses in confronting works of art. Although not denying the importance of open discussions to the learning process in college art-appreciation classrooms, Stout believed that microwriting exercises gave students greater opportunities for reflection and the practice of metacognitive skills in grappling with the complexities of their visual experiences.

Stout (1992) gave four specific examples of microwriting exercises used in her art-appreciation classes and listed the critical-thinking processes, fundamental

issues, and specific artworks involved in each type of exercise. The four examples were (1) classification in which students sorted works of art into thematic or stylistic categories, (2) clustering in which students organized their qualitative responses to a variety of works of art, (3) examining multiple perspectives in works of art, and (4) analogies. Although microwriting exercises such as these were not employed specifically in the present study, writing is an important activity, particularly with regard to slide comparison that require the exercise of such cognitive skills as organization, analysis, synthesis, evaluation, self-reflection, and metacognition.

Teaching art history

Freedman (1991), Sowell (1991), and Stinespring and Steele (1993) specifically addressed active-learning strategies with regard to teaching art history. As in other courses that stressed active-learning strategies discussed earlier in this review of the literature, the motivation for employing such teaching strategies was to encourage students to think more critically about art-historical subject matter that was the central focus of this study in general.

Freedman (1991) stressed the importance of employing writing and talking exercises to promote students' understanding of (1) what art historians do and how they do it, (2) the relationship of art history with other disciplines, (3) the concept of time as an art-historical construct, (4) the interpretation of art and the relativity of meaning, and (5) how to use one's life experiences to interpret art. Sowell (1991) employed a unique methodology for teaching art history to beginning college students who are new to the subject, which he named Accent in Developing Advanced Process of Thought (ADAPT). Based in part on Piaget's developmental learning theory and in

part on Karpus's (cited in Sowell, 1991) small-group discussion and learning-cycle format (exploration, invention, and application), Sowell hoped to encourage his students to learn to think critically while forming new mental constructs about their art-history studies.

Stinespring and Steele (1993) advocated teaching a critical approach to the study of art history by addressing three important aspects of that discipline: chronology, art criticism, and style. Rather than recommending the rote memorization of a general chronology of art-historical events covered during an entire course of studies, Stinespring and Steele emphasized the learning of chronologies relative to understanding specific artistic developments within a particular culture during a particular historical period (for instance, the Nineteenth Century impact of photography on the painter Manet's pictorial compositions). According to the researchers, the practice of art criticism in art-history classes helped students distinguish between evaluations of works of art based on opinion and those founded on objective facts. Finally, Stinespring and Steele emphasized the role of critical thinking in teaching students how to identify and comprehend important stylistic differences in works of art.

Three Empirical Studies

As mentioned earlier, few empirical studies of the effects of critical-thinking instruction on student achievement at the college level have been conducted. Three prior empirical studies, however, do exist that provide evidence that critical-thinking skills can be taught effectively in classrooms at the college and university levels. Although none of these three research experiments specifically involved the study of

art history, all of these studies indicated that teaching critical thinking in a college-level course such as art history was indeed possible. Kromrey and Reed's (2001) research project studied the effects of explicit versus implicit instruction in critical thinking in a subject-specific community-college course. Tsui's (2002) study was concerned with identifying what pedagogical strategies encouraged the development of critical-thinking skills among students attending institutions of higher learning. Finally, Gadzella, Hartsoe, and Harper (1989) examined the effects of various pedagogical strategies on the development of critical-thinking abilities among various mental-ability groups (high, average, and low) in an introductory, university-level course.

Kromrey and Reed's (2001) study focused on the questions of if and how critical-thinking skills could be taught in a subject-specific classroom and whether such instruction could improve students' general (everyday life) and subject-specific abilities and dispositions to think critically. Reed was the primary researcher for this study. She wanted to know specifically if explicit instruction in critical thinking using Paul's model in a community-college U.S. History 1877 to the Present Course (infusion) was a more effective means for developing students' critical-thinking abilities than implicit critical-thinking instruction (immersion) based on Paul's model. Paul's model for critical thinking as described in Figure 1 contains four general components of reasoning: (1) elements of reasoning (problems to be solved, purposes, concepts, etc.), (2) traits of reasoning (independent thinking, intellectual integrity, intellectual curiosity, etc.), (3) abilities of reasoning (identifying purposes clearly,

analyzing problems, accurately, evaluating concepts deeply, etc.), and (4) standards of reasoning (being logical, clear, complete, etc.).

Kromrey and Reed (2001) hypothesized that those students receiving explicit instruction in the use of Paul's model in a community-college U. S. History course would score higher on critical-thinking tests than those who received only implicit critical-thinking instruction inspired by Paul's model. They also predicted that student scores on knowledge-acquisition tests would be about the same for both the experimental and comparison groups, because both groups were given the same opportunities to learn factual historical material.

This descriptive study involving pretest and posttest comparisons employed four instruments designed to measure students' achievement in critical thinking and knowledge acquisition. Two of the instruments were well-known standardized tests measuring students' general critical-thinking abilities (*Ennis-Weir Critical Thinking Essay Test*) and their dispositions to think critically (*California Critical Thinking Disposition Inventory*), and two sections derived from standardized tests designed to assess students' acquired factual knowledge of U. S. History 1877 to the present (multiple-choice test) and their abilities to analyze and draw inferences about that specific knowledge (document based question essay test or DBQ). The researchers claimed high reliability for the tests and validity based on their already proven track records as standardized tests or because their designs were based on certain aspects of well-known standardized examinations. The latter assertion of validity, however, is rather tenuous in that claims of validity by association and without sound statistical back-up is hardly a convincing argument for making such a claim.

Three of these examinations were used for pretests and posttests purposes. The fourth test, the DBQ, was used for posttest purposes only, as researchers felt it required sophisticated responses about factual information that students just beginning their course work were not prepared to make. In analyzing test results using analyses of covariance (ANCOVA), the researchers used the pretest results on the U.S. History multiple-choice test as covariant for the DBQ, because both involved factual knowledge of U. S. History.

This study involved four sections of a U.S. History 1877 to the Present course taught by Reed (2001) at a moderate-size Florida community college. Two sections each were selected randomly to be either the experimental or comparison groups ($n = 29$, $n = 23$, respectively). The small sample size, the limited scope of the study (only one college campus site), and the potential for researcher bias due to the fact that Reed served as instructor for all classes involved in her quasi-experiment raised doubts about the validity and reliability of the reported statistical outcomes for this study.

Classes were three hours long and met once a week for fifteen weeks. Both the experimental and comparison groups used the same primary source documents. The experimental groups, however, received approximately 90 semester minutes of explicit training in the use of Paul's model for critical thinking, a specialized document pertaining to reasoning about U.S. history, written instructions about the practical application of Paul's model, and in-class and out-of-class practice in the use of Paul's model. By contrast, the comparison groups received only implicit critical-

thinking instruction based on Paul's model imbedded in the teacher's general pedagogy and in questions from the textbook that student's were required to answer.

Table 3 below compares the means, F-ratios, p-values, and effect sizes for the control and experimental groups for all four instruments. The results of the study

Table 3

Means, Standard Deviations, F tests, and Effect Sizes for Outcome Variables								
Pretest	Posttest							
Instruments	M	SD	M	SD	Adj M	F(1,49)	p	Effect Size
Experimental (n = 29)								
DBQ			5.28	8.61	5.58			
Ennis-Weir	11.91	8.61	15.19	8.84	14.85			
CCTDI	296.03	27.42	297.66	32.09	302.53			
Hist. Cont.	14.66	1.26	25.28	4.85	25.43			
Control (n = 23)								
DBQ			3.93	7.94	4.20	9.08	.004	.48
Ennis-Weir	11.09	7.94	8.46	8.25	8.88	23.02	.0001	.83
CCTDI	296.96	26.72	302.04	31.51	393.51	0.37	.55	.12
Hist. Cont.	13.39	5.01	23.87	5.29	24.32	0.23	.63	.14

Code.- M = mean, SD = standard deviation, Adj M – adjusted mean, DBQ = Document Based Essay Test, Ennis-Weir = Ennis-Weir Critical Thinking Essay Test, CCTDI = California Critical Thinking Disposition Inventory. (Kromrey & Reed, 2001, p. 209)

confirmed Kromrey and Reed's (2001) predictions with one exception. The experimental group had scores, on the average, statistically significantly higher than the comparison groups on the two essay exams involving the exercise of critical-thinking skills applied to general and historical subject matter. The effect sizes were .83 and .49, respectively. No statistically-significant differences were found between groups on the U. S. history factual knowledge (multiple choice) test, because both groups had the same opportunities to acquire such information. The researcher was surprised to find, however, that there were no statistically-significant differences

between the experimental and comparison groups on the critical-thinking disposition test (*California Critical Thinking Disposition Inventory*) despite the fact that the experimental groups had received training and practice using Paul's model for critical thinking and the comparison groups had not. This outcome indicates that other factors besides critical-thinking instruction such as students' age, socioeconomic background, gender, race, and so on may effect students' dispositions to think critically.

Although they cited research limitations such as the small sample size culled from a single community college only, failure to take demographic data into account and the broad nature of Paul's model, Kromrey and Reed (2001) concluded, nevertheless, that Paul's model was an effective instrument for teaching critical thinking and that explicit instruction using Paul's model was preferable to implicit instruction using Paul's model. These conclusions were based on the experimental groups' higher means on both the Ennis-Weir general critical-thinking essay test and the subject-specific critical-thinking essay test in U.S. History and their large effect sizes (.83 and .48, respectively) that compared favorably with the results of previous studies. Kromrey and Reed reasoned that the experimental groups' higher scores, on the average, on the *Ennis-Weir Critical Thinking Essay Test* indicated that critical-thinking skills learned explicitly using Paul's model in conjunction with the study of U. S. History were transferred effectively by students to more general problem-solving areas monitored by the *Ennis-Weir Critical Thinking Essay Test*.

As mentioned above, Kromrey and Reed (2001) were surprised to find that the comparison groups' scores on the *California Critical Thinking Disposition Inventory*

were approximately the same, on the average, as those for the experimental groups. Reed speculated that this result was attributable to the fact that changing students' dispositions to think critically may take more time than their learning and applying specific critical- thinking skills in the classroom.

The limitations of this study as stated by Kromrey and Reed (2001) are well-taken. Certainly, the sample size was small and limited to one college. Certain demographic data such as race, gender, socioeconomic status as well as high-school grade-point average (GPA) that were not accounted for in this study might have played a role in students' abilities to respond to critical-thinking instruction. Furthermore, teacher bias also might have impacted the study's statistical outcomes, because Reed served as instructor for all four classes (experimental and comparison), and there is no telling whether her pedagogical approach, quantitatively and qualitatively, was consistent throughout the experiment.

The researchers' argument for validity was weak and lacked proper statistical back-up. The fact that the designs for the DBQ and the U. S. history multiple-choice tests were derived from segments of two well-known and accepted standardized examinations was rather tenuous proof of the validity. Likewise, Kromrey and Reed's (2001) assertions that the history content test questions were well-matched to course content and that the variety of item-difficulty levels were consistent with Educational Testing Service examinations also were insufficient arguments for validity and reliability without comparative statistical support.

Other problems with this study were Kromrey and Reed's (2001) failure to provide more descriptive details of how Paul's critical-thinking model was applied

specifically to the pedagogy and their failure to provide more specific statistical data reinforcing their contention that the use of Paul's model enhanced students' abilities to think critically in the classroom. How can one be sure that it was Paul's model rather than the instruments themselves or other instructional methodologies that accounted for the reported increase in students' abilities to think critically?

Tsui (2002) studied the effects of pedagogy on students' self-perceptions of growth in their abilities to think critically. The concept of students' self-perception of their growth in critical-thinking skills since entering college or university labeled Institutional Growth in Critical Thinking (IGCT) was based on a previous study involving 300 colleges and universities conducted under the auspices of the Cooperative Institutional Research Group (CIRP) that found a strong correlation to exist ($r = .56$) between students' self-reported growth in critical thinking (IGCT) and institutional selectivity. IGCT refers to the level of students' self-perceptions of their growth in critical thinking in different institutional (colleges or universities) environments.

The fact that Tsui based her study in part on student self-reports of growth in critical thinking may, however, limited the validity of the study's reported outcomes as self-reports are not necessarily the most accurate means for assessing actual growth in critical thinking. Objective assessment using standardized tests also may be required in order to attain an accurate picture of the benefits of critical-thinking instruction.

The purpose of Tsui's (2002) study was to understand what teaching methodologies were conducive to encouraging students attending institutions of

higher learning with high- or low-selectivity policies to think critically. To accomplish her goal, Tsui conducted research at four of the three hundred colleges or universities that participated in the CIRP study differentiated by a combination of high or low selectivity and high or low IGCT levels. Table 4 below presents the institutional characteristics of the four colleges in Tsui's study which, according Tsui, served as key factors effecting students self-perceptions of their growth in critical-thinking ability.

This was a qualitative study conducted between October 1996 and May 1997. By means of taped interviews with administrators, professors, and students; informal interviews; and classroom observations, Tsui (2002) was able to isolate and identify certain pedagogical strategies commonly employed by those institutions that reported high IGCT levels. A total of 55 individuals were formally interviewed and 28 classrooms observed one time each for 55 minutes. The classes were divided almost equally between the physical sciences, social studies, and humanities. The institutions participating in this study enrolled less than 5,000 primarily full-time students.

For the purposes of this study, Tsui (2002) limited her operational definition of critical thinking to abilities normally associated with literacy activities (reading and writing) such as identifying issues and assumptions, recognizing important relationships, making correct inferences, evaluating evidence or authority, and deducting conclusions. She excluded numeric problem solving commonly associated with science and mathematics from her definition. Each interviewee was informed of

this working definition. Tsui’s definition, however, placed an important limitation on the study in general as institution C that emphasized numeric critical-thinking skills was classified as having a low level of IGCT despite its rigorous curricula in

Table 4

Institutional Characteristics for 4 Colleges in Tsui’s Study					
College	Selectivity	IGCT	Location	Type	Curriculum
A	High	High	Commuter	Public	Innovative
B	High	Low	Commuter	Private	Traditional
C	Low	Low	Residential	Private	Math/Science
D	Low	High	Residential	Private	Liberal Arts

Mathematics, science, and engineering.

Tsui (2002) analyzed her data using the tool of explanation building, “wherein the researcher strives to identify causal links and/or explore plausible or rival explanations in the attempt to construct an explanation about the case” (p. 746). To verify her data, Tsui triangulated information gathered from a variety of sources rather than one source only to assure the accuracy of her findings and avoid the possibility of charges of bias.

Two key pedagogical strategies emerged from this study that appeared to encourage critical thinking among students: writing and rewriting exercises and open class discussions. Tsui (2002) found that institutions reporting high IGCT (A and D) encouraged the development of students’ writing skills and participation in classroom discussions, whereas institutions reporting low IGCT (B and C) did not, relying heavily on traditional teacher lecture formats and the use of multiple-choice tests to

assess learning. Tsui noted that the active-learning strategies (writing exercises and class discussions) routinely employed at high IGCT institutions A and D encouraged students to try out and verify diverse ideas, analyze and exchange ideas, and disagree with the arguments of others: behaviors essential to critical thinking. Students responded positively to these strategies. At low IGCT institutions B and C, which placed heavy emphasis on knowledge acquisition skills and numeric problem solving, teachers and students alike appeared to resist writing and discussion strategies as nonessential to meeting their academic goals and intrusive of their academic time. Tsui expressed her belief that with determination and effort on the part of administrators and professors, it was possible to integrate active-learning strategies with traditional pedagogies in college and university curricula

In discussing the results of this study, Tsui (2002) suggested that, although its purpose was not an attempt to establish a statistically casual link between the two pedagogical methods of writing and discussion and scores on critical-thinking tests, it did provide ample evidence that infusion of certain of these strategies in institutional curricula may enhance students' abilities to think critically. Tsui stated, however, that further research was needed to substantiate a casual relationship between the two methodologies and critical-thinking development.

Operating under the assumptions that critical thinking can be developed and improved with proper guidance and practice and that critical-thinking abilities can be properly assessed, Gadzella, Hartsoe, and Harper (1989) studied the effects of critical- thinking pedagogies on university students classified as high, average, and low in mental ability after taking the standardized *Otis-Lennon School Ability Test*.

For the purposes of this study, the researchers chose to examine four university-level Introduction to Psychology classes taught by three different instructors. Students volunteered to take part in this project in exchange for credit toward their final grade. One hundred and sixteen students completed the experiment of whom 48% were male and 52% female. The majority of these students were freshmen (60%) and sophomores (27%). The Researchers did not explain how student assignments to the experimental and comparison groups were made. Two other limitations of this study are its relatively small sample size and the fact that the study was conducted at only one university site.

Two standardized instruments were used for this study: (1) *The Watson-Glaser Critical Thinking Appraisal* given as pre- and posttests to assess students' critical-thinking abilities and (2) the above-mentioned *Otis-Lennon School Ability Test*, an 80-item test whose purpose was to assess students' mental abilities and identify mental-ability groups by converting group scores into percentiles. The Watson-Glaser is comprised of five subtests (inference, recognition of assumptions, deductions, interpretations, and evaluation of arguments) related to problems similar to those encountered in everyday life. No further information was provided by the researchers regarding the validity or reliability of these tests.

At the beginning of the courses, all students were administered both standardized tests and appraised of their scores in writing. Instructors interpreted the meaning of those scores in class. Of the four Introduction to Psychology classes, three were designated as experimental groups and one as the comparison group. Of the three experimental classes, two employed curricula emphasizing individualized study

followed by group discussions and one emphasizing small-group learning (two to three students per group) followed by group discussions. All three experimental classes were given information, exercises, and problems on critical thinking. By contrast, the control class neither received any of the above-mentioned critical-thinking materials nor did they partake in discussions emphasizing critical thinking.

Table 5 below shows the results of an analysis of covariance (ANCOVA) computed for all three groups (individual, small-group, and comparison) using pre-

Table 5

Means and Standard Deviations From Analysis of Covariance For Three Groups (Small-Group, Individualized, and Control) on Critical Thinking Appraisal

Group	n	Cov M	Cov SD	Dep M	Dep SD	Adj M
Small-Group	43	44.58	9.96	46.77	11.07	46.73
Individualized	43	44.02	9.64	48.37	10.14	48.47
Control	26	44.85	11.21	44.77	8.66	44.67

Note. *Code*, - CTA = Critical Thinking Appraisal, Cov M = covariate mean, Cov SD = Covariate standard deviation, Dep M = dependent mean, Dep SD = dependent standard deviation, Adj M = adjusted mean. (Gadzella, Harper, & Hartsoe, 1989).

and posttest scores on the *Watson-Glaser Critical Thinking Test* (the pretest served as the covariate). No statistically significant differences in critical-thinking abilities were detected. The researchers did not, however, attempt to explain the lack of statistical difference between the experimental and comparison groups. The data were then analyzed for each of the three groups according to mental ability levels. Tables 6, 7, and 8 below represent the results of ANCOVAs computed for each group (small, individual, and control respectively with regard to mental ability levels) to examine pretest and posttest scores on the total test and five subtests of the Watson-Glaser.

With regard to the total critical-thinking scores for the three different mental-ability groups (high, average, and low) within each class group (small group,

individualized study groups, and comparison group), the high- and average-mental-ability students had scores, on the average, significantly higher than the low-mental-ability group in most instances. High scores on subtests between mental-ability groups within the three different types of classes were similarly statistically significantly higher for the high- and average-mental-ability groups.

Table 6

Means and Standard Deviations from Analysis of Covariance for Small Group Study for Students High (n = 16), Average (n= 13), and Low (n=14) Ability: Total CTA and Subtest Scores

Ability Group	Cov M	Cov SD	Dep M	Dep SD	Adj M
Total Critical Thinking Score					
High	45.43	10.79	53.81	10.67	53.64
Average	43.62	10.69	43.54	9.55	43.70
Low	44.29	8.87	41.71	9.02	41.76
Subtest Scores					
Inference					
High	5.88	3.24	8.69	3.24	8.68
Average	5.46	2.22	6.31	3.17	6.22
Low	6.43	2.85	5.93	2.59	6.02
Deductions					
High	10.88	2.22	11.25	2.93	11.12
Average	10.62	2.29	9.77	1.64	9.67
Low	8.21	2.01	8.57	1.91	8.81
Interpretation					
High	9.25	3.21	11.81	2.83	11.81
Average	8.77	3.06	9.77	4.02	9.78
Low	9.36	2.76	8.57	2.68	8.56

Note. Code, - CTA – Critical Thinking Appraisal, Cov M = covariate mean, Cov SD = covariate standard deviation, Dep M = dependent mean, Dep SD = dependent standard deviation, adj M = adjusted mean (Gadzella, Harper, & Hartsoe, 1989).

In discussing the results of their study and its limitations, the researchers suggested that the higher scores on the *Watson-Glaser Critical Thinking Appraisal Test* of students classified as high and average in mental ability compared with those classified as having low mental abilities indicated that the high- and average-mental-

Table 7

Means and Standard Deviations from Analysis of Covariance for Individualized Study for Students High (n=18), Average (n = 12), and Low (n=13) Ability: Total CTA and Subtest Scores

Ability Group	Cov M	Cov SD	Dep M	Dep SD	Adj M
Total Critical Thinking Score					
High	47.11	10.25	50.44	10.74	50.02
Average	44.50	9.43	52.83	8.11	52.77
Low	39.31	7.48	41.38	7.54	42.03
Subtest Scores					
Inference					
High	6.00	3.01	7.33	3.41	7.34
Average	6.08	3.55	7.83	2.98	7.84
Low	7.31	4.03	4.69	1.93	4.68
Interpretation					
High	9.50	3.13	10.89	3.38	10.84
Average	9.42	3.12	10.92	3.15	10.89
Low	8.92	2.06	8.38	1.80	8.48

Code. - CTA = Critical Thinking Appraisal, Cov M = covariate mean, Cov SD = covariate standard deviation, Dep M = dependent mean, Dep SD = dependent standard deviation, adj M = adjusted mean (Gadzella, Harper, & Hartsoe, 1989).

Table 8

Means and Standard Deviations from Analysis of Covariance for Control Group of Students High (n = 5), Average (n = 11), and Low (n = 10) In Ability: Total CTA And Inference Score

Ability Group	Cov M	Cov SD	Dep M	Dep SD	Adj M
Total Critical Thinking Score					
High	47.40	7.70	50.00	9.77	49.55
Average	49.27	10.32	46.00	9.26	45.23
Low	33.70	11.62	40.80	6.01	41.88
Student Scores					
Inferences					
High	8.40	3.13	8.00	2.92	8.03
Average	8.00	3.35	6.27	2.69	6.23
Low	7.60	3.17	4.70	2.11	4.68

Code: CTA = Critical Thinking Appraisal, Cov M = covariate mean, Cov SD = covariate standard deviation, Dep M = dependent mean, Dep SD = dependent standard deviation (Gadzella, Harper, & Hartsoe, 1989).

ability students benefited most from classroom instruction in critical thinking. The researchers, however, acknowledged that the level of students' reading abilities, a factor not accounted for in their study, could have played a significant role in this statistical outcome and stated that students should have been tested for their reading skills before taking the critical-thinking test.

Furthermore, the researchers pointed to the fact that although the higher mental-ability students in the small group class outperformed both the average- and low-mental-ability students on the critical-thinking test, the high-mental-ability students scores were the same as those of the average students on the same test in the individualized study classes indicating that high-mental-ability students' may benefit more from social interactions (small groups and class discussions) than other students.

Finally, the researchers speculated that the low-ability students may need a different kind of critical-thinking instruction than the type provided in this study and that they may need more time to learn to think critically. The authors stated that more research was needed in these latter two areas.

The results of Gadzella, Hartsoe, and Harper's (1989) study are valuable to the present study in its focus on the effectiveness of higher-education critical-thinking instruction. Though the present study is not concerned specifically with mental-ability groupings, it is focused on community-college students who generally fall into the average- or low-mental-ability categories.

Summary

This comparative study of critical-thinking instruction in a community college

appeared to be the first of its kind to be conducted with regard to the subject of art history. It also appears to be the first study of its kind to focus on growth in students' critical-thinking abilities specific to the subject matter only as compared to focusing on students' growth in their general critical-thinking abilities or combination of both subject-specific and general critical-thinking abilities. The primary purpose of this study was to understand whether a combination of explicit and implicit critical-thinking instruction in a community-college art-history course can improve students' abilities to think critically about art history. This review of literatures supports the proposal that critical-thinking is a form of intelligent behavior as defined by Bloom (1969) and Dick (1992). Like human intelligence in general, critical thinking exists, not as a fixed entity, but a set of cognitive behaviors that must be learned over time (Ennis, 1989; Piaget, 1969; Vygotsky, 1978). In a community-college setting such as the learning environment explored in the present study, where students tend to be generally low academic achievers and come from the lower half of their high-school classes both academically and socioeconomically, the process of teaching and learning critical thinking is likely to take more time and effort than is usual in four-year colleges or universities.

Unlike general intelligence, critical-thinking involves specifically the use of higher-order cognitive skills such as analysis, synthesis, and evaluation. These skills are essential to comprehending the complex systems of symbols and codes (structures) that give meaning to works of art (Arnheim, 1969; Siegusmund, 2000; Vygotsky, 1929).

Educators have advocated the use of active-learning strategies (reading,

writing, and class discussions) such as those employed in the present study to teach effectively critical-thinking skills in subject-specific courses such as art history (Chaffee, 1998; Freedman, 1991; King, 1995; Litecky, 1992; Potts, 1994; Shipp, 1997; Siegusmund, 2000; Sowell, 1991; Stinespring & Steele, 1993; Stout, 1992; Wilson & Clark, 2000). In classrooms where active learning is practiced, students are encouraged to construct their own meanings through the exercise of their critical-thinking faculties with regard to the course materials presented by instructors who act as expert guides in the educational process rather than mere imparters of factual knowledge.

The three empirical studies discussed in this literature review, although not directly related to the study of art history, provided evidence of a positive link between critical-thinking instruction and academic achievement at the college level. Kromrey and Reed's (2001) research project studied the effects of teaching critical thinking in a community-college U.S. History course. Using Paul's critical-thinking model as an instructional guide, Kromrey and Reed found that students exposed to a combination of explicit and implicit instruction in critical thinking scored statistically significantly higher on historical and general critical-thinking tests than those students who received implicit critical-thinking instruction only.

Tsui's (2002) sought to identify pedagogical strategies that encouraged the development of critical-thinking skills among students attending institutions of higher learning. Tsui found evidence of a possible link between students' high levels of self-reported growth in critical thinking and their exposure to active-learning strategies such as writing and class discussions.

Finally, Gadzella, Hartsoe, and Harper (1989) examined the effects of a variety of pedagogical strategies for teaching critical thinking on various mental-ability groups (high, average, and low) in an Introduction-to-Psychology course at the university level. Gadzella, Hartsoe, and Harper found that the high- and average-mental ability groups benefited most from critical-thinking instruction, indicating that the low-mental-ability groups may require more concentrated and sustained instruction in critical thinking. These findings particularly are significant for community colleges, a focus of this study, which tend to enroll students with prior histories of low academic achievement. As mentioned previously in this study, researchers such as Halpern (1993), concerned with teaching critical thinking in subject specific courses, suggested that educators can generally expect only modest gains at best in students' critical-thinking abilities over the short term (Halpern, 1993). Such gains may be even less noticeable in community colleges, a factor deserving of attention with regard to interpreting the statistical outcomes of the present study.

Chapter III

METHODOLOGY

The purpose of this study was to compare the effects of implicit critical-thinking instruction versus a combination of explicit and implicit critical-thinking instruction in a community-college art-history class on students' abilities to think critically about the images they see and the contextual information they learn. This chapter presents the study's methodology. Sections included in this chapter are Research Design, Description of Treatment for Control and Experimental Groups, Instrumentation, Sample, Qualification of the Researcher, Protection of Human Subjects, Procedures and Timeline, and Data Analysis.

Research Design

This was a two-group quasi-experimental study using a pretest and posttest slide-comparison essay test with three dependent levels: (1) students' abilities to describe, (2) interpret, and (3) evaluate works of art; and a self-report questionnaire with one dependent variable - students' self-perceived growth in their ability to think critically about art history. The independent variable was critical-thinking instruction with two levels: (1) explicit and implicit critical-thinking instruction and 2) implicit critical-thinking instruction only. The experimental group (treatment group) received the combination of implicit and explicit critical-thinking instruction and the control group received the implicit critical-thinking instruction. This study was conducted over a period of one year or two consecutive college semesters. The control group was tested during the spring 2005 semester and the experimental group was tested during the fall 2005 semester.

Description of Treatment

Tables 9 below provides a detailed list of the implicit critical-thinking activities engaged in by both the control and experimental groups and the percentage of the approximate number of hours (48) devoted to these activities over the course of

Table 9

A Description of Implicit Critical-Thinking Instruction Provided to the Control and Experimental Groups and the Estimated Percentage of Semester Hours* Devoted to Implicit and Explicit Critical-Thinking Instruction

Activities Hours	Percentage of Class Room	
	Control	Experimental
Slide Lectures/with some discussion	67%	59%
Four multiple choice/true or false question quizzes (15 Minutes Each), 1 mid term exam and 1 final exam in similar formats (1-1/2 hours each), video screenings, Question and Answer Class discussions, discussion of Art Gallery Review Project.	33%	33%
Explicit Critical-Thinking Instruction**	0%	8%

*Total of 48 Hours Class Time Per Semester

** See Table 10 (below) for Description of Explicit Instruction Activities

a semester. The experimental group received 59% of regular class time for slide-lectures and discussion compared with 67% for the control group. The difference, 8% (or 3.5 hours), was devoted to explicit critical-thinking instruction given the experimental group during the fall 2005 semester. The instructor (who was also the researcher), eliminated some non-critical images from his experimental-group slide lectures in order to minimize the impact of the loss of the 3.5 hours from slide-lecture time.

Table 10 below gives a detailed breakdown in percentages of the 3.5 hours of explicit critical-thinking instruction provided the experimental group. Explicit critical-thinking instruction included an in-class reading and discussion of a published art-critical gallery review; written explanations and definitions of critical thinking;

Table 10

A Description of Explicit Critical-Thinking Instruction Provided to the Experimental Group over the course of One Semester and the Estimated Minutes and Percentage of Instruction Hours Devoted to Each Learning Activity*

Activities	Minutes	Percentage Of instruction
A discussion of a teacher-originated photocopy off a diagram describing the 3 domains of art-critical thinking. See Appendix L.	15	7%
A class discussion of a photocopy of Barrett's (1994) discussion of the 3 domains of art-critical thinking (students read this material as a homework assignment). See Appendix M.	30	14%
An in-class analysis of a short, published art-critical review (students read the article individually before analyzing together as a group). See Appendix N.	45	22%
A class discussion of the Art-Critical Gallery-Review Project in the Light of the 3 domains of art-critical thinking as defined by Barrett (1994).	30	14%
In-class reviews: looking at and discussing 3 separate art-making projects related to different art movements studied in class and completed as homework assignments.	90	43%

*Total of 3-1/2 hours' class time devoted to explicit instruction over the course of a semester.

written and oral instructions on how to describe, interpret, and evaluate works of art including a photocopy of an excerpt from Barrett's (1994) text Criticizing Art; three art-making assignments related to particular art styles studied in class that, upon completion, were examined in-class for approximately a half hour each; and written and oral practice comparing images from slides and texts utilizing specific critical-thinking skills.

Table 11 provides a comparison of homework assigned both groups over the course of a semester and the estimated time it took students to complete the assignments. Both the control and experimental group students were assigned the same written term-paper project to be submitted for evaluation towards the end of the semester. The term paper was an art-critical gallery review of one work of art chosen by students after visiting a number of different art galleries on their own. Students

received written and oral instructions on how to write this review at the beginning of the semester (see Appendix K). Regular weekly outside-reading assignments from the

Table 11

A Description of Homework Assignments Given the Control and Experimental Group Students During One Semester and the Estimated Number of Hours Spent by Students Completing Each Assignment

Assignment	Estimated Hours Spent	
	Control	Experimental
Regular Reading Assignments from Text Book	2.00	2.00
Term Paper (Art-Critical Gallery Review)	8.00	8.00
Reading Photocopy of Barrett's (1994) Discussion of Art-Critical Thinking	.00	.75
Three Art-Making Activities	.00	2.25

course text book were the same for both groups. The experimental group students, however, were given additional homework assignments of reading a photocopy excerpt from Barrett's (1994) text Criticizing Art about how to describe, interpret, and evaluate a work of art; and making three small works of art related to several different art movements studied in class.

Two instruments were used in this study. The first instrument was a slide-comparison essay examination administered as a pretest and posttest. The pretest slide-comparison essay exam (See Appendix A) was administered during the fifth week of studies by which time students in both groups had received enough instruction to enable them to write reasonably about and compare art-historical images, and the posttest slide-comparison essay examination was administered at the end of the same semester as part of the students' final examination (see Appendix J). The slide-comparison essay tests were intended to measure students' ability to describe, interpret, and evaluate a pair of slides of well-known contemporary works

of art studied in class during the course of a semester. The tests consisted of three questions pertaining to the description, interpretation, and evaluation of the two artworks to be answered in essay form.

Student test responses were evaluated in each of the three critical-thinking domains (description, interpretation, and evaluation) using a four-level scoring rubric (see Appendix C) with level 1 indicating no ability and level 4 indicating a strong ability to describe, interpret, or evaluate the pair of artworks based on factual knowledge and direct observation. The highest possible score for each student for each domain (description, interpretation, or evaluation) was set at 4 and the lowest possible score was set at 1. Three dependent variables (description, interpretation, and evaluation) were created from this instrument.

The second instrument employed in this study was an end-of-the-semester student self-report questionnaire (see Appendix B) created by the researcher and based on a similar instrument developed by the California Academic Press (2004). This instrument was used to measure students' self-perceived growth in their ability to think critically about art history and to gather student demographic information such as age, gender, and ethnicity and information regarding the degree of students' prior instruction in art history and critical thinking (see Appendix B). Both instruments were pilot-tested one semester prior to the actual test period for this study with students not participating in this study.

The student self-report questionnaire consisted of 19 questions. That portion of the questionnaire designed to measure students' perceptions of their growth in their ability to think critically about art history was comprised of 12 questions with 6

possible responses ranging from strongly agree to strongly disagree. Two of these twelve questions (questions 1 and 2) were excluded from the statistical analysis conducted at the end of the actual test period in order to achieve a higher reliability coefficient. Each of the six possible responses per question was assigned a numerical value from 1 to 6, with 6 representing the highest value and 1 the lowest response value. Of the twelve self-report questions, questions 4, 5, 6, 8, and 10 were negatively worded and, therefore, reverse-coded. Student responses for each group were summed and mean scores calculated for comparison purposes. This instrument produced the study's fourth dependent variable: students' self-perceived growth in their ability to think critically about art history.

The demographic portion of the self-report questionnaire consisted of seven questions pertaining to students' gender, grade level (first year, second year, etc.), academic goal (Associate Degree, Vocational Training, etc.), ethnic background, age, amount of prior art-history instruction, and amount of prior critical-thinking instruction. Numerical values were assigned to the responses and response frequencies recorded. This information was gathered in order to provide the researcher with an accurate profile of the sample population in comparison to the school population and to see if there were any large between-group differences that might impact the study's statistical outcomes.

Pilot Tests and Instrument Reliability

Pilot testing of both instruments was conducted one semester (Fall 2004) prior to the start of the actual test period (Spring 2005 semester). The researcher administered the pilot tests to students in his Contemporary Art History class on the

final day of class of the fall 2004 semester at the community college where the study took place.

A moderate reliability coefficient (Cronbach's coefficient alpha) of .76 was obtained for the self-report questionnaire. Negative correlations between items appeared to occur most frequently with regard to negatively-worded questions, especially question number 6. Based on examination of students' responses to the questionnaire, it seemed possible that these discrepancies might have been caused by students misreading the negatively-worded questions as positive and responding accordingly. To avoid this possible source of error during the actual test period, words contained in questions denoting a negative response were underlined. When the actual tests for the study were concluded in December 2005, another test of reliability was performed for the self-report questionnaire and Cronbach's coefficient alpha of .86 was obtained.

Three raters (including the researcher) evaluated the pilot-test slide-comparison essay exams ($n = 16$) to determine the level of interrater reliability on all three critical-thinking domains at the end of the fall 2004 semester. One rater taught art history at the same college as the researcher and the other taught art history at a private university located in California that focused on the study of art. Exact agreement among evaluators was very low for all three domains. The highest percentage of exact agreement was for the description domain (25%). The highest percentage of agreement within 1 point of exact agreement was also for the description domain (69%), while the highest percentage of two-point differences in agreement was for the evaluation domain (the least concrete and most abstract of the

three assessment domains). These pilot-test results indicated that changes in the rubric, especially with regard to the evaluation domain, were needed.

Interviews conducted with raters after the pilot tests were scored confirmed the need for further honing of the scoring rubric as well as the evaluator training procedures. During the time of the interviews, the researcher presented the evaluators with a newly designed rubric for them to examine, and one of the evaluators stated that a new rubric was more concrete and easier to understand than the original. Another evaluator suggested that providing raters with specific information about each image prior to testing (a step not originally taken by the researcher) would be helpful in refreshing their knowledge of the images and aid them in making more accurate assessments. The researcher acted upon this suggestion by providing oral and written information about the artworks for the raters prior to the commencement of the actual slide-comparison test- evaluation procedures.

After testing for the study was completed and during the early part of August, 2006, the researcher enlisted one of the raters who had participated in pilot testing to help evaluate the slide-comparison essays. The researcher and the second rater met for approximately three hours to go over general written and oral evaluation instructions, to train in the use of a newly-revised rubric, and to jointly evaluate a practice test in preparation for establishing interrater-reliability and evaluating all the essay-test examinations. Once the training was completed, twelve essay exams were randomly selected by the researcher and scored by both evaluators in order to determine the level of interrater reliability. The obtained results were a low 58 % exact agreement for the Description and Interpretation domains and a very low 17%

exact agreement for the Evaluation Domain. Agreement within one point was 100% for the Description and Interpretation Domains and 75% for the Evaluation Domain (see Table 12 below).

The researcher met once again with the second evaluator at the end of August, 2006 for approximately 1.5 hours to discuss the low percentages of interrater reliability, particularly in the Evaluation Domain. The ensuing discussion revealed that the second rater had based his scores in the Evaluation Domain largely on generalized statements rather than on specific art-historical and visual facts as required by the rubric. The researcher, therefore, with the consent of the second evaluator, decided to re-test for interrater reliability. The results of the second testing (analyzed September 23, 2006), though still lower than the desired 70% exact-agreement, were nevertheless higher than the initial test results - 67% exact agreement in the Description and Interpretation Domains, 58% in the Evaluation Domain, and 100% agreement within 1 point for all three domains. Table 12 shows the results in percentages of the three attempts to achieve exact interrater reliability over the course of this study.

Table 12

A Comparison of the Percentages of Exact Interrater Agreement obtained for the Slide-Comparison Essay Test Over the Course of the Study

Trial	Description	Interpretation	Evaluation
Pilot Test (Dec. 2004)	25%	13%	13%
Trial 1 (Aug. 2006)	58%	58%	17%
Trial 2 (Sept. 2006)	67%	67%	58%

In conclusion, the reliability coefficient for the self-report questionnaire was raised from a moderate .76 obtained during the pilot test phase (Fall 2004) to a high .86 during the actual test period (Fall 2005) as a result of underlining key words denoting a negative response for negatively-worded questions and eliminating from statistical analysis two of the twelve questions pertaining to self-perceived growth in critical-thinking from statistical analysis. Concurrently, interrater reliability on all three domains for the slide-comparison essay exams increased from the pilot test period (25% exact agreement in the description domain, 13% exact agreement in the interpretation and evaluation domains) to the actual test period (67% exact agreement in the description and interpretation domains and 58% agreement in the evaluation domains) as a result of changes made to the rubric, improvements made to the training materials (word-processed student exams and photocopy information about the art-historical images used for the slide-comparison essay test), and additional time (4.5 hours total) spent for pertinent discussion among evaluators.

Sample

The sample for this study came from a large, suburban Northern California community college serving an affluent Bay Area community-college district whose populace is predominately European American (79%) and professional (41%). The college enrolls approximately 23,000 students, 78% of whom attend college on a full-time basis. Fifty-four percent of the student population is European American, 18% is Asian American, 11% Hispanic American, 8% unknown, 5% African American, and 3.7% other non-European American. The college enrolls 52% female students, 45%

males, and 3% unknown. The student age distribution is 29% 19 years old or less, 29% 20 to 24 years, 9% 25 to 29 years, 12% 30 to 39 years, 21% 41 plus years.

The study sample consisted of students enrolled in Contemporary Art History classes taught by the researcher over a period of two consecutive semesters beginning spring 2005 (the college offers only one Contemporary Art History course per semester and is one of the few community colleges in Northern California to offer such a course). Each class met once a week for three hours for sixteen weeks. The control group was comprised of 14 students who enrolled in the Contemporary Art History course at the beginning of the spring 2005 semester and 10 at the end of semester due to normal student attrition. The experimental group consisted of 28 students who enrolled in the Contemporary Art History course at the beginning of the fall 2005 semester and 21 at the end of the semester due to normal student attrition. The scores of three the students who completed the experimental-group class, however, were not included in the study, as they either did not properly complete the questionnaire or did not participate in the pretest; hence the final sample totaled 18 experimental students. Because of the abstract and conceptual nature of contemporary art, the Contemporary Art History class tends to attract fewer student enrollments than other art history courses and to account for a higher than usual attrition rate during the course of the semester.

Table 13 shows the demographic breakdown for both the control and the experimental groups and is important for this study in that it points to between-group differences that could affect certain statistical outcomes. For instance, Table 13 showed an unusually large percentage of female students for the control group (80%)

compared with 50% for the experimental group. The majority of students in both groups were enrolled in at least their second year of school and planned to transfer to

Table 13

Demographic Data (in percentages) for Comparison and Experimental Groups		
Data	Control Group (n = 10)	Experimental Group (n = 18)
Gender		
Male	20%	50%
Female	80%	50%
School Year		
First Year	30%	22%
Second Year	40%	50%
Other	30%	28%
Enrollment		
Transfer	60%	61%
BA	30%	0%
Vocational	0%	5%
Enrichment	0%	28%
Other	10%	6%
Ethnicity		
European-American	60%	61%
Hispanic-American	10%	11%
African-American	10%	0%
Asian-American	10%	6%
Other	10%	22%
Age		
18-25	100%	72%
26-35	0%	0%
55 Plus	0%	28%
Prior Art History		
None	50%	72%
1	0%	5%
2	10%	6%
3	20%	6%
More than 3	20%	11%
Prior Critical Thinking		
Yes	50%	50%
No	50%	50%

a four-year college of university upon completion of their studies. In line with the general school population, a majority (60%) of the students was of European-American decent, while most of the students in both groups fell into the 18-25-year

age bracket. The control- group students, however, took more prior art history than the experimental-group students (50% for the control group and 23% for the experimental group). Moreover, 40% of the control-group students took three or more art history courses compared with only 17% for the experimental group. Lastly, the demographic survey showed that 50% of the students in both the control and experimental groups had taken a prior course in critical thinking.

Table 14 provides both the number of students and the percentage of students from both groups who took prior art history. The larger amount of prior art history taken by control-group students is of statistical interest because this characteristic could potentially impact the study's statistical outcomes (between-group differences).

Table 14

Number and Percentage of Students in the Control and Experimental Groups Who Took Prior Art History

Group	Control Group (n=10)		Experimental Group (n =18)	
	Number	Percent	Number	Percent
Prior Art History				
0	5	50%	13	72%
1	0	0%	1	5%
2	1	10%	1	6%
3	2	20%	1	6%
3+	2	20%	2	11%

Qualifications of the Researcher

The researcher is an adjunct faculty member of the community college where the experiment was conducted and has taught art history at the undergraduate and graduate levels in Northern California colleges and universities for approximately 20 years. The researcher is also a published author in the fields of art history and art criticism.

Protection of Human Subjects

All participants in this study were protected according to the rules and regulations set forth by the Institutional Review Board for the Protection of Human Subjects (IRBPHS) and the American Psychological Association (1992). Students' and test evaluators' participation in this study was strictly voluntary and their individual identities protected from outside scrutiny. The researcher made every effort to maintain the anonymity of his students when grading the slide-comparison essay test by assigning an identification number to all papers and hiding students' names with masking tape before beginning the grading process and shuffling the exams. Test evaluators (art-history instructors) had no prior knowledge of the students or their academic abilities when they grade the slide-comparison essay tests, as tests were coded and student names were hidden. One of the two evaluators is the researcher and the second is an instructor at a private California university specializing in art education.

All research participants received oral and written explanations of the study (see Appendices D and G). The researcher solicited signed voluntary written-consent forms from all participants in this study (see Appendices E and F). Each participant in this study received a copy of the signed and dated written-consent form and a written copy of the IRBPHS's Research Subject's Bill of Rights. Data were kept in a secure location that only the researcher had access to, and no one at the community college saw individual papers or surveys. Written permission to test was obtained from the University of San Francisco February 8, 2005 (see Appendix I) and the Art

Department Chair at the community college where this study was conducted during the fall 2004 semester (see Appendix H).

Procedures and Time Line

The control-group students who enrolled in a Contemporary Art history class taught by the researcher and who received implicit critical-thinking instruction only (see Research Design above), took the slide-comparison essay test of 30 minutes duration as a pretest during the fifth week of the spring 2005 semester (approximately the second week in February). The pretest slide-comparison essay tests were administered during the fifth^{week} of a semester for both groups because the researcher believed that five weeks was enough instructional time to properly prepare students, particularly novice learners, to write about and compare a pair of art historical images. At the end of the spring 2005 semester (16th week), students were administered the posttest slide-comparison essay (also of 30-minutes duration) as part of their final examination. Students were also asked to fill out the 19-item self-report questionnaire designed to measure their self-perceived growth in their ability to think critically about art history (12 of the questions) and to gather demographic information and information about the degree of students' prior instruction in art history and critical thinking (7 of the questions). The self-report questionnaire was administered at the conclusion of the final examination and before students left the classroom. Students had a maximum of 20 minutes to complete the questionnaire.

All students were asked to return the informed-consent form in an envelope that was placed at the front of the classroom, regardless of their decision to participate or not participate in the study. The envelope was sealed, and students were informed

that the envelope would not be opened until after the grades for the course were submitted. The pre- and posttests and self-report questionnaires of those students who volunteered to be in the study were used for the research. To assure research subjects anonymity, student names attached to the slide-comparison pretests and posttests for both the experimental group and the control group were hidden with masking tape and all exams were coded for identification and evaluation purposes

These above-mentioned procedures were repeated during the Fall 2005 semester (which began in late August 2005 and ended in the middle of December 2005) for the Contemporary Art-history experimental group with the exception that the experimental group received both implicit and explicit instruction in critical thinking with regard to the study of art history (described in detail in the Research Design segment of this study).

Data Analysis

To address research question 1: To what extent is a combination of explicit and implicit instruction in critical thinking more effective than implicit instruction only in enhancing students' abilities to think critically about art history as measured by an art-history slide-comparison essay test? the dependent variable was critical-thinking ability and one-way analysis of variance (ANOVA) was used. Means, standard deviations, effect size (η^2), p-values, and F-observed values for both groups' pretest and posttest scores on all three critical-thinking domains (description, interpretation, and evaluation) were examined. The level of significance was set at the .05 level.

To address research question 2: To what extent is a combination of explicit and implicit instruction in critical thinking more effective than implicit instruction only in increasing community-college students' self-perceived growth in their ability to think critically about art history as measured by a student self-report questionnaire? the dependent variable for this research question was self-perceived growth in ability to think critically about art history and one-way ANOVA was used. Means, standard deviations, effect sizes (η^2), and the results of F-observed values for the control and experimental groups were examined. The level of significance was set at the .05 level.

Chapter IV

RESULTS

This quasi-experimental study was conducted to see if a combination of implicit and explicit critical-thinking instruction in a community-college art-history course is preferable to implicit critical-thinking instruction only. Two instruments developed by the researcher were employed to measure outcomes posed by the research questions: a slide-comparison essay test administered as a pretest and posttest and a student self-report questionnaire administered after the posttest slide-comparison essay exam at the end of the test period. This chapter presents the statistical results of the experiment.

Research Question 1

Research question 1 reads as follows: To what extent is a combination of implicit and explicit instruction in critical thinking more effective than implicit instruction only in enhancing community-college students' abilities to think critically about art history as measured by an art-history slide-comparison essay examination? The dependent variables were ability to think critically about art history in three critical-thinking domains: description, interpretation, and evaluation. Scores were based on a scale of 1 to 4 with 4 representing the highest possible score and 1 the lowest possible score in ability to think critically in each domain. Mean comparisons and one-way analyses of variance (ANOVA's) were conducted to compare the means of the control and experimental groups for the pretests and posttests in order to detect between-group differences.

Pretest Results

Tables 15 and 16 showed no between-group statistically-significant differences at the .05 level for the slide-comparison essay pretests. The mean differences were negligible on all three critical-thinking domains – a favorable outcome indicating that students in both groups were equal in their ability to think critically about art history before the experimental group received the treatment of explicit critical-thinking instruction. These outcomes would be expected from a group of novice learners before they received a full semester of critical-thinking instruction and ranged between a low group mean of 1.40 (control-group evaluation domain) and a high group mean of 2.50 (control-group description domain). Mean values decreased from the most concrete critical-thinking domain (description) to the most abstract critical-thinking domain (evaluation) as was also expected, since abstract thought is believed to be the most difficult to master (Bloom, 1956, 1964; Piaget & Inhelder, 1969, 2000). The control-group mean for the description domain (2.50) was slightly higher than that of the experimental group (2.17), and the experimental-group mean for the evaluation domain (1.50) was slightly higher than that of the control group (1.40). The means of both groups were virtually identical for the interpretation domain.

Table 16 presents the results of a one-way analysis of variance (ANOVA) for the control and experimental group pretests showed no statistically-significant between-group differences at the .05 level of significance set for this study.

Posttest Results

Contrary to expectations, the results of a comparison of the posttest means of the control and experimental groups revealed that the group means were equal in all

Table 15

The Results of a Comparison of the Pretest Means for the Control and Experimental Groups on 3 Critical Thinking Domains of Description, Interpretation, and Evaluation for the Slide-Comparison Essay Examination

Group	Control Pretest	Experimental Pretest
Description		
M	2.50	2.17
SD	.53	.71
Interpretation		
M	1.70	1.72
SD	.48	.58
Evaluation		
M	1.40	1.50
SD	.70	.71

M = Mean, SD = Standard Deviation, Control Group Pretest n = 14, Experimental Group Pretest n = 28.

Table 16

The Results of a One-way Analysis of Variance Between the Control and Experimental Groups for the Pretest Scores on the Three Critical-Thinking Domains (Description, Interpretation, and Evaluation) of the Slide-Comparison Essay Test

Domain	F Observed	p	Eta ²
Description	1.69	.21	.06
Interpretation	.01	.92	.00
Evaluation	.13	.72	.01

F = Observed Ratio, p = Level of Probability, Eta² = Effect Size.

three critical-thinking domains. Table 17 presents the results of a posttest mean comparison for both groups. The largest mean differences were .49 for the description

domain and .46 for the evaluation domain. As with the pretests, the control group means decreased in size from the description domain (the most concrete critical-thinking domain) to the evaluation domain (the most abstract critical-thinking domain).

Table 18 presents a one-way analysis of variance (ANOVA) measuring the between-group differences for the posttest for the control and experimental groups on all three critical-thinking domains. The results indicated no statistically-significant difference at .05 level of significance set for this study. The lowest p-values were almost the same for the description (.12) and evaluation (.14) domains.

Table 17

The Results of a Comparison of the Posttest Means for the Control and Experimental Groups on the 3 Critical Thinking Domains of Description, Interpretation, and Evaluation for the Slide-Comparison Essay Examination

Group	Control Posttest	Experimental Posttest
Description		
M	3.10	2.61
SD	.32	.92
Interpretation		
M	2.50	2.17
SD	.85	.71
Evaluation		
M	2.40	1.94
SD	.70	.80

M = Mean, SD = Standard Deviation, Control Group Posttest n = 10, Experimental Group Posttest n = 18.

Table 18

The Results of a One-way Analysis of Variance Between the Control and Experimental Groups for the Posttest Scores on the Three Critical-Thinking Domains (Description, Interpretation, and Evaluation) of the Slide Comparison Essay Test

Domain	F	p	Eta ²
Description	2.63	.12	.09
Interpretation	1.24	.28	.04
Evaluation	2.26	.14	.08

F = Observed Ratio, p = Probability, Eta² = Effect Size.

Although there were no statistically-significant differences, the control group appears to have been the primary benefactor of the critical-thinking instruction. At least three factors may have contributed to these posttest results (1) the small sample sizes of the control group ($n = 10$) and the experimental group ($n = 18$), (2) the greater amount of prior art history taken by the control-group students, and (3) higher academic ability of the control-group students (see Table 13 and the Ancillary Analysis below for further information).

Research Question 2

Research question 2 states: To what extent is a combination of explicit and implicit instruction in critical thinking more effective than implicit instruction only in increasing community-college students' self-perceived growth in their ability to think critically about art history as measured by a student self-report questionnaire? The dependent variable is students' self-perceived growth in their ability to think-critically about art history. Students responded to each of the 10 questions comprising the self-report questionnaire rated on a scale of 1 to 6 with 1 being the lowest and 6 the highest possible self-reported rating for each question. Table 19 below presents a comparison of group means showing virtually no mean difference (5.01 for the control group and 5.09 for the experimental group) The F-ratio and p-value indicate no statistically-significant differences at the .05 level.

Ancillary Analysis

One possible explanation of why the control group posttest means were higher than the experimental group posttest means on all three critical-thinking domains, and why the results of the self-report questionnaire were essentially the same for both

groups, is that control-group students took more prior art history than the experimental-group students. To help determine the credibility of this supposition, a mean comparison and one-way analysis of variance was conducted for the control and experimental groups with regard to the amount of prior art history taken. A correlational analysis was also conducted to see how strong was the correlation between the amount of prior art history taken and the scores for both groups on the slide-comparison essay test and the self-report questionnaire. A second correlational analysis of pretest and posttest scores in all three critical-thinking domains for the slide-comparison essay test was also conducted to see if there were any important associations between the variables.

Table 19

A Comparison of Means for the Control and Experimental Groups and the Results of a One-Way Analysis of Variance With Regard to Students' Self-Perceived Ability to Think Critically About Art History as Measured by a Self-Report Questionnaire

Group	Control	Experimental	ANOVA
M	5.01	5.09	
SD	.69	.65	
F Observed			.10
P			.75
Eta ²			.00

M = Mean, SD = Standard Deviation, ANOVA = Analysis of Variance, Eta² = Effect Size, F = Observed Ratio, p = Level of Probability.

Table 20 shows the results of a comparison of means and a one-way analysis of variance (ANOVA) of between-group differences with regard to the amount of prior art history taken. Although the control-group mean (2.60) was higher than the

experimental-group mean (1.78) with regard to the amount of prior art history taken by students, this difference was not statistically significant ($p = .19$) at the .05 level of set for this study. The effect size (.06) was moderate, indicating some between-group differences. Nevertheless, the greater amount of prior art history taken by the control group does not appear to be statistically large enough to explain why the control group's test scores were the same or higher than those of the experimental group.

Table 20

A Mean Comparison and Analysis of Variance (ANOVA) for the Experimental Group and the Control Group with Regard to the Amount of Prior Art History Taken

Statistics	M	SD	F	p	Eta ²
Control (n = 10)	2.60	1.77	1.78	.19	.06
Experimental (n = 18)	1.78	1.44			

M = Mean, SD = Standard Deviation, F = Observed Ratio, p = Level of Probability, Eta² = Effect Size.

Table 21 summarizes the results of a correlation analysis of the amount of prior art history taken and the pretest and posttest scores on all three critical-thinking domains (description, interpretation, and evaluation) for both groups for the slide-comparison essay exam. Pretest and posttest correlations for each domain were generally low and decreased from pretests to posttest with regard to the description and evaluation domains. The correlation increased for the interpretation domain, however, from .20 to .29. No statistically-significant correlations were found at the .05 level of significance set for the study. The highest correlation (.33) was recorded for the pretest description domain and the lowest correlation (.01) for the posttest description domain. With the exception of the interpretation domain, the decreases in

correlations from pretest to posttest may indicate the possibility that critical-thinking instruction negated the significance of the amount of students' prior art history as the semester progressed.

Table 21

Correlations Between the Amount of Student's Prior Art-History Instruction and Students' Pretest and Posttest Scores on All 3 Critical-Thinking Domains of the Slide-Comparison Essay Examination

Test	Pretest			Posttest		
	D	I	E	D	I	E
Prior AH	.33	.20	.10	.01	.29	-.04

Prior AH = Prior Art History, D = Description, I = Interpretation, E = Evaluation

A second correlation analysis was conducted to see if there was an association between the amount of prior art history taken and students' self-perceived growth in their ability to think critically about art history as measured the self-report questionnaire. The Pearson product-moment correlation coefficient of .01 was very small indicating no association between the two variables.

A pretest-posttest correlation analysis of students' performance on all three critical-thinking domains for the slide-comparison essay exam was also conducted to see if those results could shed some light on why the control groups scored somewhat higher than the experimental group with regard to the slide-comparison essay test. The results are presented in Table 22 which shows a statistically-significant correlation between the pretest-description and posttest-description domains (.48), the pretest- description and posttest-interpretation domains (.42), and pretest evaluation and interpretation domains (.44).

In an effort to further understand the reason why the control group had somewhat higher means on the slide-comparison essay exam than the experimental

group, a between-group mean comparison and one-way analysis of variance was conducted for student scores on the mid term and final examinations to see if there

Table 22

Correlation Analysis of Pretest and Posttest Scores for the 3 Critical-Thinking
Domains (Description, Interpretation, and Evaluation for the Slide
Comparison Essay Examination)

Domain	Pre D	Pre I	Pre E	Post D	Post I	Post E
Pre D	---	.35	.27	.48*	.42*	.22
Pre I		---	.27	-.06	.30	.25
Pre E			---	.19	.44*	.22
Post D				---	.48*	.58*
Post I					---	.56*
Post E						---

Pre = Pretest, Post = Posttest, D = Description, I = Interpretation, E = Evaluation,
* = significant at the .05 level.

were significant between-group differences. Table 23 presents the results of these statistical analyses. Although the control-group's mean on the mid-term examination (3.0) was higher than the experimental-group mean (2.46), the difference was not statistically significant at the .05 level. The between-group effect sizes, however, were high, especially for the mid-term examination (.39), indicating between-group variance. The control-group mean remained the same (3.00) for the final exam, while the experimental-group mean rose to an equal value (2.97) as that of the control group. The differences for the scores on the final exam were not statistically significant at the .05 level. The large effect size (.20), however, suggests significant between-group differences may be found if larger sample sizes were used. Based on these results, it would seem that the experimental group benefited most from the instruction over the course of the semester compared to the control group, and that variables such as natural ability (not accounted for in this study) or higher amount of

prior art history could have contributed to the control group's higher mid term-examination mean.

Table 23

A Comparison of Means and One-Way Analysis of Variance for Student Scores on the Mid Term and Final Examinations for the Control and Experimental Groups

Group	Mean	SD	ANOVA		
			F	P	Eta ²
Control					
Mid Term	3.00	.81			
Final Exam	3.00	.60			
Experimental					
Mid Term	2.46	1.58			
Final Exam	2.97	1.07			
Mid Term			1.53	.21	.39
Final			.60	.77	.20

SD = Standard Deviation, F = Observed Ratio, Eta² = Effect Size, p = Level of Probability, ANOVA = Analysis of Variance.

Summary

With regard to research question 1 (To what extent is a combination of implicit and explicit instruction in critical thinking more effective than implicit instruction only in enhancing community college students' abilities to think critically about art history as measured by an art-history slide-comparison essay examination?), there was no significant between-group differences despite the treatment (explicit and implicit critical-thinking instruction) administered to the experimental group. The control group (which received implicit instruction only) actually scored higher (though not statistically-significantly higher) on the slide-comparison posttest on all three critically-thinking domains than did the experimental group.

Similar results were obtained with regard to research question 2 (To what extent is a combination of explicit and implicit instruction in critical thinking more effective than implicit instruction only in increasing community-college students' self-perceived growth in their ability to think critically about art history as measured by a student self-report questionnaire?). A one-way ANOVA revealed no significant between-group differences.

No strong correlation was obtained between the amount of prior art history taken by students and their self-perceived growth in their ability to think critically about art history as measured by the self-report questionnaire; nor was there a strong correlation between the amount of prior art history taken and students' pretest and posttest scores for all three critical-thinking domains for the slide-comparison essay exam.

A correlation analysis of pretest and posttest scores in all three critical-thinking domains for the slide-comparison essay exam showed that there were statistically-significant associations between scores for the pretest and posttest description domains, the pretest-description and posttest-interpretation domains, and the pretest evaluation and posttest interpretation domains.

Finally, a one-way analysis of variance for the mid term and final exam scores for the control and experimental group showed that the control group's mid-term mean was higher than the experimental-group mean while both group's shared the same mean for the final exams. These statistical results were not significant, however, at the .05 level. The between-group effect sizes, particularly with regard to the mid-term examination were higher. This result would seem to indicate that the control

group was better prepared academically at the start of the semester than was the experimental group. By the end of the semester, however, both groups performed equally as well on the final exams, indicating that the experimental group had caught up to the control group in academic ability and benefited most from instruction over the course of the semester.

Chapter V

LIMITATIONS, DISCUSSION, AND SUMMARY OF THE STUDY

Introduction

The purpose of this study was to see if implicit critical-thinking instruction is preferable to a combination of explicit and implicit critical-thinking instruction in a community-college art-history course. The results of the study showed that there were no statistically-significant differences between the control group which received Disserimplicit critical-thinking instruction only and the experimental group which received a combination of explicit and implicit instruction in critical thinking. This chapter outlines the limitations and results of the study. It also discusses the implications of the study and makes recommendations for future research in the field.

Limitations

The limitations of the study discussed below include lack of prior research in the field, the quasi-experimental nature of the study, small sample size, the application of a limited definition of critical thinking, constraints of time, and constraints related to assessment. Few relevant, prior studies could be located to serve as building blocks for the present study. Of those few related studies that were found, Kromrey and Reed's (2001) research project involving explicit and implicit critical-thinking instruction in a community-college U.S. History 1877 to the Present course (see Chapter II for details) came closest to the current experiment in its design and intent. However, Kromrey and Reed's study differed in a number of ways from the present experiment (see discussion of results below).

This research project was quasi experimental in nature. Rather than randomly assigning individual students to the control or experimental groups, the researcher assigned in-tact classes to either the control or experimental groups. The researcher's ability to claim internal validity for the study due to random assignment of subjects was therefore compromised.

One of the most obvious and perhaps most significant limitations of the present study was its small sample size. The control and experimental group samples (n = 14 pretest, n = 10 posttest; and n = 25 pretest, n = 18 posttest respectively) were each drawn from a single Contemporary Art History class thus increasing the possibility that significant between-group differences would be difficult to detect and reliability of the measuring instruments hard to establish. The results of conducting one-way analyses of variance (ANOVA's) for both instruments used in this study indicated that there were no significant between-group differences (see Tables 12-16). Although reliability was good for the self-report questionnaire (.86), it was moderate-to-low for the slide-comparison essay pretests and posttests on all three art-critical-thinking domains (67% exact agreement for the description and interpretation domains and 58% for the evaluation domain).

The small sample size, though anticipated by the researcher because of the nature of the research design itself, was smaller than expected for two reasons: (1) the community college where the research study was conducted scheduled only one section of Contemporary Art History (taught by the researcher) per semester because of budgetary constraints, and (2) the college administration decided to schedule the Contemporary Art History class on Fridays, a day when class enrollment was usually

lower than on other weekdays (when Contemporary Art History was usually taught) starting with the spring 2005 semester – the same time that testing for the study commenced. Consequently, beginning-class enrollment for the control group dropped to 14 (normally about 40) with an end-of-semester enrollment of 10. The following semester (Fall 2005), when the experimental group was tested, beginning-class enrollment climbed to 30 with an end-of-semester enrollment of 21.

Because the test population came from a single community college rather than from two or more community colleges, the external validity of this study may also have been compromised in terms of the ability to make valid generalizations based on statistical outcomes. The community college used for this study was atypical of most community colleges not only in terms of size (23,000) which is very large, but location (an affluent school district) and socio-economic status (the general population is largely professional [43%] and European American [79%]). The majority of nation's approximately 1,100 community colleges, however, serve smaller, less affluent student populations from middle-to-low-income families that are more ethnically-diverse (Community College Web, 2004).

The narrow working definition of critical thinking employed also limited the scope of the study for two reasons. The working definition did not take into account critical-thinking skills associated with the affective domain of human intelligence (Bloom, 1956, 1964; Halonen, 1995; 1964; Halpern, 1998; Piaget & Inhelder, 1969) but emphasized the cognitive domain only. The study of art and art history is intimately involved in the exercise of affective behaviors such as tolerance, skepticism, and appreciation of differences as well as with cognition. Furthermore,

the study's definition of critical thinking was concerned only with those cognitive behaviors of describing, interpreting, and evaluating associated with art-critical thinking as defined by Barrett (1994) but did not take into account general cognitive behaviors such as reasoning and logic and identifying arguments (Dick, 1992).

This study measured only the short-term effects of critical-thinking instruction (a period of one semester or approximately four months). Education experts, such as Eisner (1999), Gardner (1990), Halpern (1993), and Piaget and Inhelder (1969), suggest that learning to think critically takes considerable time before measurable effects become noticeable. Halpern was explicit in her belief that a single college semester is not an adequate period of time for measuring students' growth in their critical-thinking abilities and that one could expect only modest gains at best during that time period.

According to Gardner (1990) and Halpern (1993), assessing critical-thinking behavior is a complex and difficult enterprise. The instruments used in this study to measure students' ability to think critically about art history and their perceived growth in their ability to think critically about art history may have been limited in part by their vulnerability to human error, particularly the slide-comparison essay test. The moderate-to-low between-group interrater reliability outcomes on all three critical-thinking domains of the slide-comparison essay test (67% exact agreement for the description and interpretation domains and 58% for the evaluation domain) may, to some degree, bear this weakness out. Both Halpern (1993) and Stemler (2004) discussed the difficulty of achieving high degrees of exact agreement among raters with regard to the assessment of essay-type examinations because of the possibility of

rater bias (despite pre-test training) and the complex nature of the qualitative responses they were assigned to measure. As for the student self-report questionnaire, despite a reliability coefficient of .86 (Cronbach's alpha), the instrument may not have been sensitive enough to detect between-group differences due to the treatments over the relatively short period of time of a single semester.

Discussion of Results

Ennis (1989) reported that instruction in critical thinking is most effective when taught in conjunction with a subject-specific course of study. Both Ennis and Halpern (1993), however, said that the assessment of critical-thinking skills in subject-specific courses such as art history was complex and time consuming. Mean comparisons and one-way analyses of variance with regard to both the slide-comparison essay examination and the self-report questionnaire showed very little between group differences and hence, the null hypothesis could not be rejected. Despite the researcher's expectations to the contrary, it appears that implicit critical-thinking instruction may be just as effective as a combination of implicit and explicit critical-thinking instruction in encouraging students to think critically about art history. The reasons for this outcome are unclear and may be of interest to future researchers in the field. Three possible explanations for this result, two general and one specific to the study, are (1) explicit critical-thinking instruction, when infused with implicit critical-thinking instruction, may actually distract students from concentrating on course subject matter; (2) explicit instruction in combination with implicit instruction, because of its relative complexity, may require a longer gestation period than implicit critical-thinking instruction only before positive results become

noticeable; and (3) the explicit instruction given the experimental group in this present study may not have been as powerful as the implicit instruction provided.

With regard to the latter explanation, the art-making projects, for instance, which comprised 43% of the 3.5 hours devoted to explicit critical-thinking instruction, may have been less effective as an explicit critical thinking tool than originally thought since critical-thinking is implicit in the art-making process itself. Hence the explicit instruction may have been weakened unintentionally and the implicit instruction unintentionally reinforced. The study outcome, therefore, may have been different had less time been devoted to the art-making activities and more time devoted to reading and discussing art-critical literature.

Deciding how much time to devote to explicit critical-thinking instruction in general over the course of a single semester presented a dilemma for the researcher who had to decide arbitrarily how much explicit critical thinking would benefit the students' ability to think critically about art history or detract from their ability to concentrate on the subject matter at hand. Kromrey and Reed's (2001) study involved only 1.5 hours of explicit critical-thinking instruction (less than half the number of hours spent on explicit critical-thinking instruction as spent in the present study) with a different outcome. The problem of deciding how much time is enough time to devote to explicit critical-thinking instruction in a subject-specific course in which critical- thinking instruction is implicit is a conundrum for teachers and future researchers to grapple with.

The statistical results of this study contradict the findings of a similar study by Kromrey and Reed (2001) that showed explicit instruction in a U.S. History 1877 to

Present community-college course to be more effective than implicit critical-thinking instruction. There were some noticeable differences between Kromrey and Reed's experiment and this current research project that are worth examining, however, which shed new light on the problem of teaching critical thinking in a subject-specific community-college course such as art history.

Whereas this present study compared a combination of implicit and explicit critical-thinking instruction in a subject-specific community-college course with implicit critical-thinking instruction only, Kromrey and Reed's (2001) experiment compared explicit instruction only with implicit instruction only using Paul's model for critical thinking to guide the pedagogy. Kromrey and Reed's study was focused on improvements in students' general (everyday) as well as specific (historical) critical-thinking abilities over the course of a college semester; whereas the present study was concerned only with improvements in students' critically-thinking abilities specific to the subject matter (Contemporary Art History).

Kromrey and Reed employed four tests for their study: two standardized tests to measure general critical-thinking ability (one for the cognitive domain and one for the affective domain) and one section of a standardized U.S. history knowledge test (multiple choice) and one section of a standardized U. S. History essay test to measure students' growth in their abilities to think critically about U. S. History. Statistical significance was achieved for the two standardized essay exams (the *Ennis-Weir Critical Thinking Essay Test* and the *U. S. History Document Based Question* or DBQ) only. *The Ennis-Weir Critical Thinking Essay Test* was administered as a pretest and posttest and the DBQ was administered as a posttest only.

In comparison to Kromrey and Reed (2001), the researcher for the current study employed two teacher-originated instruments (a Contemporary Art History slide-comparison essay test given as a pretest and posttest and a student self-report questionnaire administered as a posttest only) designed to measure students' growth in their ability to think critically about art history. The researcher believed that his relatively simple, economic design would yield direct and easy-to-understand results pertaining to the problem of teaching critical-thinking skills specific to the course subject matter.

Kromrey and Reed (2001) assigned 90 minutes instructional time to explicit critical-thinking instruction using Paul's model for critical thinking over the course of a semester compared to 210 minutes of explicit critical-thinking instruction using various active-learning tools over the same period of time in the current study. While Kromrey and Reed provided a list of specific tools used for critical-thinking instruction (especially for explicit instruction), they failed to give a detailed description of how Paul's model for critical thinking was specifically infused into the pedagogies employed for both groups over the course of a semester as well as a description of the general pedagogies used for both groups over the course of a semester and the time allotted to the various instructional activities related to those pedagogies. Consequently, anyone reading their study was left to wonder whether factors other than Paul's model for critical thinking could have contributed to the study's statistical outcomes. Furthermore, while reporting high interrater reliability for the essay exams, Kromrey and Reed did not state what criteria were employed by the raters to measure students' critical-thinking abilities. No scoring rubric was

provided. The doubt created by Kromrey and Reed with regard to these omissions were remedied by the present study, so that the connections between the treatments, assessment procedures, and statistical outcomes were more immediately clear and understandable.

Research Implications and Recommendations

The results of this study indicate that implicit critical-thinking instruction in a subject-specific course such as art history is just as effective as a combination of explicit and implicit critical-thinking instruction in fostering students' growth in their abilities to think critically about specific subject matter. As stated earlier, future researchers may be interested in exploring the reasons why there appears to be no statistically-significant differences between groups even though the experimental group received the addition of explicit critical-thinking instruction.

The study's results reaffirmed the findings of previous researchers that teaching critical-thinking in a subject-specific college course is difficult and may take more time than a single semester before significant improvements in students' critical-thinking abilities become noticeable (Eisner, 1999; Gardner, 1990; and Halpern, 1993). These results may even take longer to detect among novice learners attending a community college. The limitation of available time necessary to conduct research similar to this study presents a thorny problem for future researchers, since students typically remain in a particular college course for only one semester.

To measure the long-term effects of critical-thinking instruction in a study such as this, it may be necessary to alter the research design. One suggested alternative to the present design that allows for more than a single semester for data

gathering purposes is to compare the scores of students attending classes taught by art-history teachers who use traditional slide/lecture formats with the scores of those students attending classes taught by teachers who use active-learning (critical-thinking) strategies to see if the instruction emphasizing critical thinking makes a statistically-significant difference in how students perform in their coursework.

The outcomes of this study also supported previous research in affirming the difficulty of assessing critical thinking in subject-specific college course, especially in a course in which qualitative responses are commonly encouraged. This study pointed out the need for thorough rater training and rubric development in achieving a high degree of interrater reliability for instruments where qualitative responses are called for (essay-type examinations)

Methodological Recommendations

Small sample size may have masked statistically significant between-group differences not reported in this study. To confirm or reject similar findings in future studies of this kind, it is advisable that researchers use larger sample sizes for the control and experimental groups (at least two or more classes per test semester per group). Classes might be drawn from two community colleges rather than one in the same school district with similar demographic characteristics in order to further assure a large sample.

It is recommended that future studies of this kind include students' high school grade point averages (GPA's) in the demographic portion of the self-report questionnaire in order to help explain certain statistical outcomes. If it could be shown that this study's control group GPA's were significantly higher than those of

the experimental group, than that outcome would provide a strong rationale for explaining, at least in part, why the control group posttest means were equal to or higher than those of the experimental group on both instruments.

In the future, researchers may want to use the self-report questionnaire as a pretest as well as a posttest in order to investigate any changes in student's self-perceptions of their growth in critical thinking over the course of a semester.

Researchers may also want to consider employing a standardized test such as the California Critical Thinking Skills Test (1990) to measure changes in students' general abilities to think critically over the course of a semester.

Educational Implications and Recommendations

As mentioned earlier in this research project, United States community-college districts have expressed strong interests in encouraging their students to think critically. However, the critical-thinking programs implemented by many of the nation's community-college districts are largely general in nature, and little data has been provided by these districts to show the effectiveness of their critical-thinking programs (Barnes, 1992; Hirschberg, 1992). This study is important to educators for several reasons. For one, it appears to be the first research study of its kind to address the problem of teaching community-college students enrolled in an art history course to think critically about the images they see and the contextual information they learn. It also appears to be the first study of its kind to be concerned exclusively with subject-specific critical-thinking in a community-college learning environment.

The study results indicated that critical-thinking instruction that is implicit to community-college subject-specific course pedagogy may be just as effective as a

combination of explicit and implicit critical-thinking instruction. The implication of this outcome is that teachers using implicit critical-thinking strategies may want to think twice in terms of their time, energy, and pedagogical expectations before attempting to introduce explicit critical-thinking instruction into their curricula (see the discussion of the results of the study above for a detailed account of the specific problems related to infusing explicit critical thinking activities into the pedagogy).

Thirdly, this study serves as a practical guide for art educators interested in how best to integrate art-critical-thinking activities into their pedagogies and assess the outcomes of their instruction. Lastly, this study may also serve as a practical guide for implementing critical-thinking instruction in other community-college courses besides art history in which qualitative experience is of particular significance.

Summary

Both the experimental group and the control group showed increases in their means from pretests to posttests on the slide-comparison essay test indicating that both groups benefited from the instruction (see Tables 12 and 14). As mentioned earlier, however, the control group posttest means were higher on all three critical-thinking domains than those of the experimental group which received the treatment (explicit critical-thinking instruction). It seemed possible that this outcome may have, in part, resulted from the fact that 50% of control group students took one or more prior art-history classes compared with only 23 % for experimental group (see Table 11). Ennis (1989) said that more background knowledge in a subject-specific course was likely to increase students' ability to think critically about the subject matter.

To see if the amount of prior art history was a significant between-group factor contributing to the higher means for the control group in all three critical-thinking domains for the posttests, a one-way analysis of variance was conducted (see Tables 17 and 18, Chapter IV). Though the mean for the control group (2.64) was higher than the experimental group (1.78), the between-group difference ($p = .19$) was not significant at the .05 level set for the study.

Another ancillary one-way analysis of variance was conducted to see if there were statistically significant between-group differences with regard to student scores on the mid term and final examinations. Though the control group mean (3.00) was higher for the mid term examination than the experimental group mean (2.46), no significant differences at the .05 level were detected (p equaled .21).

The correlation between the amount of prior art history taken and students' performance on the three critical-thinking domains for the slide comparison essay test was weak (the highest correlation coefficient was .33 for the description domain). Some correlation coefficients pertaining to the correlation analysis of pretest and posttest scores for all the three critical-thinking domains were statistically significant at the .05 level (.48 between the pretest and posttest description domains, .42 between the pretest description and posttest evaluation domains, and .44 between pretest evaluation and posttest interpretation domains). None of these correlation results, however, offered clues as to why the control group scores were the same or higher than the experimental group scores on the two instruments used for the study.

Cromwell (1992) and Angelo (1995) had recommended the use of self-report tests for assessing critical thinking in the classroom. Tsui (2002) used a student self-

report questionnaire for her study which showed that students attending colleges where active- learning strategies were employed in the classroom rated themselves higher in their growth in critical-thinking ability than students who attended colleges where such strategies were discouraged. This result reinforced the contention set forth in the present study that active-learning strategies were conducive to critical thinking and helped explain the statistical outcomes for the student self-report questionnaire.

Though this study's control and experimental group students' ratings of their growth in critical-thinking ability were high, a mean comparison and one-way analysis of variance (see Table 16) for the student self-report questionnaire showed that there was no between-group differences (5.01 control-group mean, 5.09 experimental-group mean). This outcome may have been due, in part, to the design of the self-report instrument itself. The instrument may not have been sensitive enough to register between-group differences caused by implicit critical-thinking instruction versus a combination of implicit and explicit critical-thinking instruction, especially when measuring such differences over the short period of time of a single semester. Both the control and experimental group students appeared to benefit from instruction according to the results of a comparison of pretest and posttest means on the slide-comparison essay test (see Tables 12 and 14). Both groups of students were, therefore, likely to register improvement in their own critical-thinking ability on the self-report questionnaire.

Among the more important limitations of this study were its small sample size, the time constraints imposed by only one semester of instruction for each group, and the difficulty of achieving a high degree of exact interrater reliability for the

slide-comparison essay exam. This study appears to be the first of its kind in that it concerned not only the study of art history in a community-college course, but focused only on critical-thinking specific to the subject matter. Few similar studies were found to serve as research models. Though Kromrey and Reed (2001) obtained different results showing explicit critical-thinking instruction to be more effective than implicit critical-thinking instruction when Paul's model for critical thinking was employed to guide their pedagogy in a community-college U.S. history course, they failed to provide a clear picture of their pedagogical strategies for both groups, especially with regard to implicit critical-thinking instruction, and neglected to state what criteria were used to measure students' critical-thinking abilities making a reasonable comparison of the two studies very difficult.

One of the significant findings of this study is that implicit critical-thinking instruction specific to the subject matter (art history) may be just as powerful or more powerful in enhancing community-college student's abilities to think critically about art history than a combination of explicit and implicit critical-thinking instruction. The tools used to implicitly encourage critical thinking (the art-critical gallery review paper; the regular slide lectures and slide comparisons, often with class discussions; and even the art-making exercises given the experimental group) may have been extremely effective as contributors to this outcome. Future researchers may want to pursue the reasons why implicit critical-thinking instruction in a subject-specific course such as art history appears to be more effective than a combination implicit and explicit critical-thinking instruction in enhancing students' abilities to think critically about the subject matter.

The study also serves as a practical guide for educators as to how to approach the problem of teaching critical thinking in a subject-specific course such as art history. The experiment points out that educators who consider infusing explicit critical-thinking instruction into their courses in which critical-thinking instruction is implicit may want to do so with caution because of the extra time and effort it takes before tangible results may become noticeable.

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APPENDIX A

SLIDE COMPARISON ESSAY TEST

Directions: This is a test to see how well you can compare the following pair of slides in terms of their essential formal qualities (color, form, shape, technique, materials, etc.), their meaning or purpose, and their value as works of art as they pertain either to art history or your own subjective experiences. Use both your powers of observation and your knowledge of the art history (from readings and class lectures) to form your answers. Think about your answers before writing. Write clearly and simply in full sentences. Be specific! For example, in describing a particular object in a painting as “the round shape,” you might write more specifically “the purple, oval-shaped object in the upper left corner of the canvas.”

Comparison: Jackson Pollock’s *Guardians of the Secret* (1943) and Robert Rauschenberg’s *Estate* (1963). = 30 Minutes

Questions:

1. Describe and compare only the most obvious and important differences and similarities between both works of art in terms of their formal qualities (their shapes or forms, the techniques used, the materials used, the way they are composed, the colors used, the use of line if applicable, etc.) that give those works of art their visual power, energy, and meaning and their subject-matter..
2. Compare the important differences or similarities of these two works of art in terms of their artistic purpose or meaning (socio-political and/or aesthetic, etc.).
3. How do these two works relate to the historical events of the times in which they were created and your own life experiences including your visual experiences, values, needs, or interests? Use at least 2 but no more than 3 specific examples.

APPENDIX B

 Your Name
SELF-REPORT QUESTIONNAIRE**Appreciation and Understanding of Art History**

Directions: For each of the following statements, place a check mark in the answer box that best represents the level of your agreement or disagreement with the statement. Enter only one marked response per statement. Answer all statements.

1. As a result of taking this course, I have a greater appreciation of art history than I did before enrolling in this course.

strongly	agree	slightly	slightly	disagree	strongly
agree			agree	disagree	disagree

2. As a result of taking this course, I have a greater understanding of art history than I did before enrolling in this course.

strongly	agree	slightly	slightly	disagree	strongly
agree			agree	disagree	disagree

3. In this art history course, I learned useful strategies for approaching complex art historical questions in a variety of reasonable ways.

strongly	agree	slightly	slightly	disagree	strongly
agree			agree	disagree	disagree

4. In this course, I seldom found myself actively engaged in thinking about art historical problems.

strongly	agree	slightly	slightly	disagree	strongly
agree			agree	disagree	disagree

(continued)

APPENDIX B CONTINUED

Self-Report Questionnaire Page 2

5. In this course, I did not improve my ability to analyze and evaluate new works of art.

strongly agree agree slightly agree slightly disagree disagree strongly disagree

6. In this course, I did not improve my ability to give sound reasons for my beliefs and opinions about the art that we studied.

strongly agree agree slightly agree slightly disagree disagree strongly disagree

7. As a result of taking this course, I find that I am more fair-minded in interpreting, analyzing, and evaluating alternative points of view with regard to the artworks we studied.

strongly agree agree slightly agree slightly disagree disagree strongly disagree

8. As a result of taking this course, my interest and curiosity about the issues and questions involved in the study of art history has decreased.

strongly agree agree slightly agree slightly disagree disagree strongly disagree

9. As a result of taking this course, my thinking is more focused and systematic, at least in this subject area.

strongly agree agree slightly agree slightly disagree disagree strongly disagree

10. The instructor discouraged thoughtful exploration of the central art historical ideas, theories, and assumptions in the course content.

strongly agree agree slightly agree slightly disagree disagree strongly disagree

(continued)

APPENDIX B CONTINUED

Self-Report Questionnaire Page 3

11. The way the instructor presented this course illustrated how to think in reasonable, objective, and fair-minded ways about art history.

strongly agree agree slightly agree slightly disagree disagree strongly disagree

12. The assignments (texts, readings, projects, papers, classroom activities) in this course frequently engaged me in complex thinking about art history.

strongly agree agree slightly agree slightly disagree disagree strongly disagree

Demographic Questions

Directions: For each of the following questions, place a check mark in the answer box that best applies to you. Enter only one marked response per question. Answer all questions.

13. I am

male
female

14. I am a

first-year student
second-year student
other

15. The main reason I am enrolled in this college is

to pursue an Associate Degree for transfer to a 4-year college or university
to pursue a Bachelor of Arts Degree
for vocational training
for personal enrichment
other

(continued)

APPENDIX B CONTINUED

Self-Report Questionnaire Page 4

16. My ethnic or racial background is

European American
Hispanic American
African American
Asian American or Pacific Islander
other

17. My age range is

17 to 25 years old
26 to 35 years old
36 to 45 years old
46 to 55 years old
55 plus years old

18. I have taken the following number of art history classes prior to enrolling in this course:

none
one
two
three
more than three

19. I have had formal training in critical thinking before enrolling in this course.

yes
no

THANK YOU FOR PARTICIPATING IN THIS QUESTIONNAIRE

APPENDIX C

ESSAY EXAMINATION SCORING RUBRIC

A Note to Evaluators

This rubric serves as a general guide to grading students' written responses to questions posed with regard to a comparison of a pair of art-historical slide images. Scoring pertains to 3 specific learning domains: Description, Interpretation, and Evaluation. Please read the scoring criteria listed under each domain carefully. Because so many students enter community colleges with poor English composition skills, the quality of their test responses may be impaired by this limitation. Word-processed test responses have been recorded as closely as possible to the original hand-written responses including grammatical and spelling errors. Please note: responses specific to one domain may overlap and be included in the responses to another domain question.

DESCRIPTION

Criteria: Students should be able to describe the formal elements and visual representations of a work of art that are essential to its meaning and purpose.

Level 4: Subject clearly and accurately describes all visual elements (composition, line, color, materials, technique, shape, visual representations, scale, etc.) essential to the meaning or purpose of the images.

Level 3: Subject describes most relevant visual elements (composition, line, color, materials, technique, shape, visual representations, scale, etc.) essential to the meaning or purpose of the images. One or 2 key omissions or inaccuracies.

Level 2: Subject describes some relevant visual elements (composition, line, color, materials, technique, shape, visual representations, scale, etc.) essential to the meaning or purpose of the images. Subject's description involves 3 or more key visual omissions or inaccuracies.

Level 1: Subject's descriptions are irrelevant or inaccurate with regard to the meaning or purpose of the visual images presented.

INTERPRETATION

Criteria: Students should be able to analyze and synthesize visual and art-historical data to form rational interpretations about the meaning or purpose of a work of art.

(continued)

APPENDIX C CONTINUED

Level 4: Subject provides clear, accurate interpretations of the images based on art historical facts and visual observations.

Level 3: Subject provides interpretations of the images that, with a few exceptions, are reasonable and based on art historical facts and visual observations.

Level 2: Subject's interpretations of the images tend to be vague and/or inaccurate and based on few significant art historical facts and visual observations.

Level 1: Subject is unable to make reasonable interpretations of art work based on art historical facts and/or visual observations.

EVALUATION

Criteria: Students should be able to reflect upon relevant art-historical facts and personal experience in making rational judgments about a work of art.

Level 4

Subject is able to make clear, rational judgments about works of art based on relevant art-historical facts and his or her own visual observations.

Level 3

Subject is generally able to make rational evaluations of the art works based on art-historical facts and visual observations but fails to take into account a few key art historical and visual facts when discussing the significance of the art works.

Level 2

Subject's evaluations of the images tend to be vague and show little evidence of his or her ability to make rational judgments about the art works based on relevant art-historical facts and visual observations.

Level 1

No evidence of subject's ability to make rational judgments about works of art based on relevant art-historical facts and visual observations.

APPENDIX D**Script for Soliciting Participation in Survey from Students**

My name is Michael Leonard and I am a doctoral student at the University of San Francisco. As part of my doctoral work, I am completing a study on teaching art history in community colleges. You are being asked to participate in the study by allowing me to use your responses to an essay that you completed around the fourth week of the semester and your responses to an essay portion of your final examination. After the final examination, I am asking you to complete a self-report questionnaire about the course. Your input will help art-history instructors decide how to teach students in community colleges the history of art.

If you agree to participate in the study, you will need to read and sign the Informed Consent Form. You will have sufficient time to complete the essay and fill out the questionnaire. Before you begin your final examination and regardless of whether you decided to participate or not participate in the study, place your Informed Consent Form in the envelope that is in the front of the class. When everyone has returned his or her form, I will seal the envelope and will not open it until grades are submitted. In this way, I will not know who has or has not agreed to participate in the research. So you can be assured that your decision to participate or not participate in the study will not affect your grade in the course. All data will be kept in a secure location. No one at the college will see the individual results. Thank you for considering participating in my research

Michael Leonard

APPENDIX E

Informed Consent to Participate in a Research Study

Purpose and Background

Michael Leonard, M.A., a graduate student in the School of Education at the University of San Francisco, is doing a study on teaching methods in community-college art-history classes. The researcher is interested in understanding if certain kinds of instruction will benefit student's understanding and appreciation of art history

I am being asked to participate because I am a community-college student enrolled in one of Mr. Leonard's art-history classes.

Procedures

If I agree to be a participant in this study, the following will happen: I will allow Mr. Leonard to use for his research my responses to a Slide Comparison Essay question administered during the fourth week of the current semester and on the final day of the semester as part of the final examination. I will fill out a self-report questionnaire after completing the Slide Comparison Essay Question on the final day of class. I understand that whether I agree to participate or not in Mr. Leonard's study will in no way affect my grade in the course.

Risks and/or Discomforts

There are no extraordinary risks or discomforts associated with participating in this study.

Benefits

There are no known direct benefits to my participation in this study. Information gathered from these test evaluations, however, may contribute to future knowledge about effective methods for teaching art-history classes in a community college.

Payment/Reimbursement

I understand that there will be no cost or reimbursement to me to participate in this study.

APPENDIX E CONTINUED

Questions

I have talked to Mr. Leonard about his study and have had my questions answered. If I have further questions about the study, I may contact him at the following e-mail address: artprof@earthlink.net.

If I have any questions or comments about participation in this study, I should first talk with the researcher. If for some reason I do not wish to do this, I may contact the IRBPHS, which is concerned with protection of volunteers in research projects. I may reach the IRBPHS office by calling (415) 422-6091 and leaving a voicemail message, by e-mailing IRBPHS@usfca.edu, or by writing to the IRBPHS, Department of Counseling Psychology, University of San Francisco School of Education, 2130 Fulton Street, San Francisco CA 94117-1080.

Consent

I have been given a copy of the “Research Subject’s Bill of Rights,” and I have been given a copy of this consent form to keep.

PARTICIPATION IN RESEARCH IS VOLUNTARY. I am free to decline to be in this study or to withdraw from it at any point. My decision as to whether or not to participate in this study will have no influence on my present or future status as a student at Happy Valley College.

My signature below indicates that I agree to participate in this study.

Subject’s Signature

Date of Signature

Signature of Person Obtaining Consent

Date of Signature

APPENDIX F

Evaluators Informed Consent to Participate in a Research Study

Purpose and Background

Michael Leonard, M.A., a graduate student in the School of Education at the University of San Francisco, is doing a study on teaching methods in community-college art-history classes. The researcher is interested in understanding if certain kinds of instruction will benefit student's understanding and appreciation of art.

I am being asked to participate because I am a college-level instructor of art history.

Procedures

If I agree to be a participant in this study, the following will happen. I will examine and evaluate responses to Slide Comparison Essay tests that were administered by Mr. Leonard during his course for 2 consecutive semesters. My evaluations will be based on verbal and written instructions including a scoring rubric provided by Mr. Leonard.

Risks and Discomforts

There will be no risks or discomforts other than the voluntary expenditure of the time it takes to complete the evaluations of student Slide Comparison Essay tests and the effort involved in meeting the time deadlines set by Michael Leonard for completing the evaluations.

Benefits

There are no known direct benefits to my participation in this study. The information gathered from these test evaluations, however, may contribute to future knowledge about how to teach art history in community colleges.

Payments/Reimbursement

I understand that there will be no cost or reimbursement to me to participate in this study.

Questions

I have talked to Mr. Leonard about his study and have had my questions answered. If I have further questions about the study, I may contact him at the following e-mail address: artprof@earthlink.net.

APPENDIX F CONTINUED

If I have any questions or comments about participation in this study, I should first talk with the researcher. If for some reason I do not wish to do this, I may contact the IRBPHS, which is concerned with protection of volunteers in research projects. I may reach the IRBPHS office by calling (415) 422-6091 and leaving a voicemail message, by e-mailing IRBPHS@usfca.edu, or by writing to the IRBPHS, Department of Counseling Psychology, University of San Francisco School of Education, 2130 Fulton Street, San Francisco, CA 94117-1080.

Consent

I have been given a copy of the “Research Subject’s Bill of Rights,” and I have been given a copy of this consent form to keep.

PARTICIPATION IN RESEARCH IS VOLUNTARY. I am free to decline to be in this study, or to withdraw from it at any point. My decision as to whether or not to participate in this study will have no influence on my present or future status as an employee of the Academy of Art University.

My signature below indicates that I agree to participate in this study

 Signature of Expert Evaluator

Date of Signature

 Signature of Person Obtaining Consent

Date of Signature

APPENDIX G**Script for Soliciting Participation in Survey from Evaluators**

My name is Michael Leonard and I am a doctoral student at the University of San Francisco. As part of my doctoral work, I am completing a study on methods for teaching art history in community colleges. You are being asked to participate in the study by serving as an evaluator of student Slide Comparison Essay tests administered by me over the course of 2 consecutive semesters. Your input will help art-history instructors decide how to teach art history in community colleges.

If you agree to participate in the study, you will need to read and sign the Informed Consent Form. You will receive oral and written instructions on how to evaluate the Slide Comparison Essay tests as well as a scoring rubric to guide you. All data will be kept in a secure location. No one at the college will see the individual results. Thank you for considering participating in my research

APPENDIX H

Frances Brown, Chair
Art Department
Happy Valley College
456 Old Club Road
Happy Valley, California 00000

Dear Frances:

This letter confirms that you have been provided with a brief description of my dissertation research concerning teaching critical thinking in a community-college art- history learning environment. Your signature below indicates that you give your consent for me to ask my students to allow me to use 2 Slide Comparison Essay tests and a self-report questionnaire administered during the course of each of 2 consecutive semesters in order to see if a combination of implicit and explicit instruction in critical thinking is preferable to implicit critical-thinking instruction only as an affective means for increasing students' ability to think critically about art history and to foster a greater understanding and appreciation of art history.

I will make every effort to ensure that my data collection causes minimal distraction to the regularly-scheduled class activities. Student participation will be entirely voluntary, and the results will be kept confidential. I will request permission to use the test and questionnaire data from students on the last day of class. Informed consent forms will be placed in an envelope that will be sealed and not opened until after grades are submitted. In this way, students will know that whether or not they participate in the study will not affect their grade in the course.

After the study is complete, I will be glad to share with you a summary of my research findings and conclusions. Please feel free to contact me if you have any further questions about this project.

Sincerely,

Michael Leonard
C/O Art Department
Happy Valley College
456 Old Club Road
Happy Valley, Ca. 00000
e-mail: artprof@earthlink.net

Signature

Date

APPENDIX I

Michael Leonard

From: "IRBPHS" <irbphs@usfca.edu>
To: <artprof@earthlink.net>
Cc: <busk@usfca.edu>
Sent: Tuesday, February 08, 2005 2:40 PM
Subject: IRB Application #05-003 - Approved

February 8, 2005

Dear Mr. Leonard:

The Institutional Review Board for the Protection of Human Subjects (IRBPHS) at the University of San Francisco (USF) has reviewed your request for human subjects approval regarding your study.

Your application has been approved by the committee (IRBPHS #05-003). Please note the following:

1. Approval expires twelve (12) months from the dated noted above. At that time, if you are still in collecting data from human subjects, you must file a renewal application.
2. Any modifications to the research protocol or changes in instrumentation (including wording of items) must be communicated to the IRBPHS. Re-submission of an application may be required at that time.
3. Any adverse reactions or complications on the part of participants must be reported (in writing) to the IRBPHS within ten (10) working days.

If you have any questions, please contact the IRBPHS at (415) 422-6091.

On behalf of the IRBPHS committee, I wish you much success in your research.

Sincerely,

Terence Patterson, EdD, ABPP
Chair, Institutional Review Board for the Protection of Human Subjects

IRBPHS – University of San Francisco
Counseling Psychology Department
Education Building - 017
2130 Fulton Street
San Francisco, CA 94117-1080
(415) 422-6091 (Message)
(415) 422-5528 (Fax)
irbphs@usfca.edu

<http://www.usfca.edu/humansubjects/>

2/8/2005

APPENDIX J

ART 199 CONTEMPORARY ART HISTORY

Diablo Valley College

Fall 2005

Michael Leonard, Instructor

SLIDE COMPARISON ESSAY TEST

Directions: This is a test to see how well you can compare the following pair of slides in terms of their essential formal qualities (color, form, shape, technique, materials, etc.), their meaning or purpose, and their value as works of art as they pertain either to art history or your own subjective experiences. Use both your powers of observation and your knowledge of the art history (from readings and class lectures) to form your answers. Think about your answers before writing. Write clearly and simply in full sentences. Be specific! For example, in describing a particular object in a painting as “the round shape,” you might write more specifically “the purple, oval-shaped object in the upper left corner of the canvas.”

Comparison: Francis Bacon’s *Study After Velasquez’s Portrait of Innocent X (1953)* and Gerhard Richter’s *Athens (1985)*. = 30 Minutes

Questions:

4. Describe and compare only the most obvious and important differences and similarities between both works of art in terms of their subject matter and formal qualities (their shapes or forms, the techniques used, the materials used, the way they are composed, the colors used, the use of line if applicable, etc.) that give those works of art their visual power, energy, and meaning.
5. Compare the important differences or similarities of these two works of art in terms of their artistic purpose or meaning (socio-political, aesthetic, conceptual, etc.).
6. What is the art historical significance of these works of art? How do they relate to your own life experiences including your visual experiences (past and present), values, needs, or interests (use at least 2 but no more than 3 specific examples).

APPENDIX K

ARTH 199 CONTEMPORARY ART HISTORY

Diablo Valley College

Fall 2005

Instructor: Michael Leonard, MA

GALLERY REVIEW/RESEARCH PAPER GUIDELINES

1. Write a review of a recent exhibition of the work of a contemporary (living) artist at one of the many San Francisco **art galleries** located in the 49 Geary Street Building; 77 Geary Street Building; The Modernism Gallery located at 685 Market Street, 2nd Floor; The Paule Anglim Gallery at 10 Geary Street; or the John Berggruen Gallery located at 220 Grant Avenue. If you find an exhibition of an artist whose work you like at a gallery outside of San Francisco, you must first inform your instructor as to the name of the gallery and the exhibition before beginning to write your review. **DO NOT REVIEW AN EXHIBITION AT A MUSEUM.**
2. Pick out one (1) work to critique from that artist's exhibition which you feel most attracted to and which you think best sums up the body of that artist's work in general.
3. Carefully examine the overall body of the artist's work, then study the one work that you are going to write about. Take notes: **write down your observations**, important descriptive details, your own interpretations or associations (including those related to art and artists discussed in class), the strengths and weaknesses of the work.
4. **Gather as much outside information about the artist as you can** to help you make your own intelligent interpretation and evaluation of that artist's work. Ask the gallery if they have any biographical information about the artist or copies of critical newspaper and magazine reviews of the artist's work. If the artist is well known, there will probably be information about him or her in the library periodical or book sections. Check The Web for information.
5. Your review will include the following information: a) name of the artist, b) name of the work; c) date the work was completed, d) name of the gallery where you saw the work; e) a basic description of the work (media, scale, materials, technique, colors, shapes, etc.); f) an interpretation of the work (what it means); g)

APPENDIX K CONTINUED

6. an evaluation of the work (why you liked it, why you think it's a good work of art, what could be improved, etc.).
7. You may organize your review in any way you feel is best, but it must follow a basic structure of introduction, body, and conclusion. Write the review as though you were an art critic writing for a newspaper or magazine telling an audience that has never seen the work what it is about.
8. This review must be word-processed and double-spaced.
9. If you use a quote from the artist or some other source, you must use footnotes stating where the information came from. Use quotes sparingly **and only** to back up your own observations or opinions.
10. Write as much as you need to. Your review will not be evaluated on its length, but on the quality of your observations and your ability to express yourself clearly and intelligently.

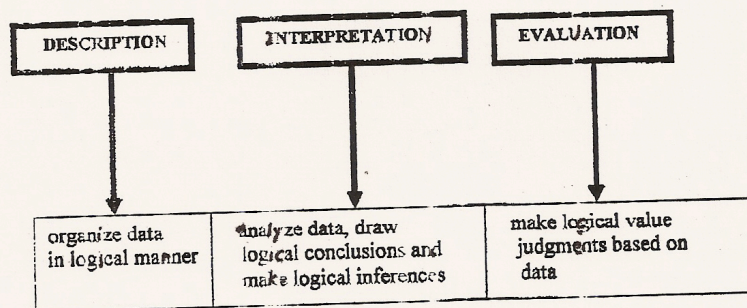
11. Gallery Review due Friday, December 1, 2005

- 12. Follow these directions carefully. If you ignore these written guidelines, you will be severely penalized. Contact your instructor if you have any questions.**

APPENDIX L

ART HISTORY
Diablo Valley College
Michael Leonard, Lecturer

REASONING ABOUT ART



APPENDIX M

This material is reproduced from the text *Criticizing Art* by Terry Barret (1994), McGraw Hill, with permission from McGraw-Hill Companies

provided some statement of explanation. If the artists themselves chose to show their work together, you can consider how the works relate to each other.

Include and comment on the written opinions of curators and artists when they are available. Consider interviewing artists and curators. Unless you are doing a news story, however, your writing should be more than just quotations of what the artists and curators think about the work. Use their thoughts to provide context, but keep in mind that it is your own point of view about what they say that is of interest and importance.

Describing

Remember from Chapter 2 that description is criticism, not merely a prelude to criticism. Your readers may never see the art you are writing about and your description may be their only access to it. You cannot count on having a photograph accompany your piece, but you always have your words. The main task in describing a work of art is to tell what it looks like. Describe accurately and with vivacity. Make the work come alive for your readers—give them a verbal image they can see. If you describe thoroughly and passionately, description may be all you need.

Chapter 2 discusses two major sources of descriptive data: internal and external. Internal information is based on what can be seen in the work itself and can be divided into three categories: subject matter, medium, and form. Subject matter refers to those recognizable people, places, or events in a work—the nouns of the work. The medium is the material of which the work is made. Form is how the artist shapes the subject with the medium. In nonobjective and nonrepresentational work, medium and form may be predominant with no identifiable subject matter. Chapter 2 includes good descriptive examples of writing from many critics on many different types of art forms from performance art to glass-making. You may want to refer to these.

External contextual information includes data about the time in which the piece was made—its social and intellectual milieu—other works by the same artist, and works by other artists of the same period. You can also place the work within a setting for your readers. Describe the gallery, the general tone of the exhibition, the dates during which the work was shown, and the number of pieces in the exhibition. Provide accurate information about titles, sizes, media. Provide information about who curated the exhibition, and if the work is for sale and at what price range. If biographical information about the artist would be helpful to your readers, or helpful in defending your thesis about the work, then provide it. The test of what to include in description and what to ignore is relevancy. Relevancy refers both to what your readers need to know and to what you need to tell your readers so your thesis makes sense.

If you are assigned a descriptive paper by a professor, know whether you are expected to be descriptive only, or if you are allowed to color your descriptions

with your preferences and values. If you are only to describe—not to make value judgments—then take care to avoid implied evaluations of positive or negative worth. If you are given free rein, let the reader know that you like (or dislike) the art. Also know if you can include external information.

Interpreting

Recall from Chapter 3 that interpretation of an artwork can be based on two types of information: internal evidence and external evidence. Internal evidence consists of what is in the work itself; it is drawn from a description of the work. External evidence consists of relevant information not within the work itself: the artist's other works; the artist's biography, including gender, race, age; and the social, political, and religious milieu of the time and place in which the work was made. If you are assigned an interpretive paper to write, ask whether your interpretation may go beyond what is in the work and include external sources.

The basic premise of interpretation is that works of art are about something. When you interpret, you present your understanding of the work in a way that is convincing, both by how you write and by the evidence you provide. You want to make the work as interesting to the reader as the work allows. Always present an artwork in its strongest rather than weakest light.

In a sense, all art is about other art—that is, influenced by and in dialogue with other art. At the same time, all art is affected by the culture in which the artist lives and, in turn, affects the culture in which it is shown. The interpretive goal is to make the art meaningful to your reader in terms of the art itself, the artist's other work, all art, and culture.

If you are writing about a new artist, you have advantages and disadvantages. One advantage is that any true thing you write is a contribution because you are one of the first to do so. A disadvantage is that you are starting the dialogue without benefit of an ongoing conversation about the artist. Much has already been written about an established artist, and your challenge in this case is to add something to the discussion.

If you are writing about the work of an artist who has already been written about, you can consult these other writings or develop your own interpretation. There are advantages and disadvantages to both approaches. Working on your own, without reading others' thoughts on the same topic, requires a certain amount of self-confidence and a willingness to take risks. If you trust yourself and trust that your insights are worthwhile, you will probably contribute to ongoing thought about the work. If you consult other writers, then you will need to go beyond what they have already written and contribute to the conversation. If you take the latter approach, you can add the points of view of these other critics to your own, thus giving your readers options among interpretations. And if you do take this course, be sure to fully credit all the others.

Throughout this book, we have examined several interpretive and ideological perspectives: psychoanalytical, semiotic, feminist, Neo-Marxist, Post-structuralist, Modernist, Postmodernist, and idiosyncratic worldviews. When you select art to write about, you might decipher the ideological basis of the artwork itself and adapt your criticism accordingly. If the art is clearly Postmodernist, for example, you can explain it in those terms and enlighten your reader about Postmodernist theory. If you disagree with the ideology of the art, first explain what it is and then resist the ideology with reasonable arguments.

Judging

Responsible judgments include a clear assessment of the worth of an art object, and reasons for the assessment based on reasonable criteria. Critics disagree about which exact criteria are appropriate for judging art. Types of criteria are Realism, Formalism, Expressionism, Instrumentalism, and combinations and variations thereof. As stated in Chapter 4, you need to decide which criteria or criterion you are going to use. You may let the art itself decide by which criteria it should be judged: If it is obviously a political work, for example, then Instrumentalist criteria would apply. If it is a Formalist work, then you might apply Formalist criteria to it. This is a generous and accepting approach that allows you a wide range of tolerance for many types of art.

You may, however, want to hold more narrowly to a particular set of criteria and judge all art, no matter what it strives to do, according to your chosen criteria. For example, because of the severe social problems in the world, you may want to measure all art by Instrumentalist criteria, favoring only that art which attempts to make the world a better place in which to live. Thus, you might reject Formalist work as socially irrelevant and a waste of human energy and natural resources.

These are difficult choices: You may err on the side of aimless and contradictory eclecticism, or narrow rigidity. Or perhaps you will be able to find some amicable middle ground.

When you judge art, you are not giving advice to artists but rather articulating to readers why you think something is good or not and on what basis. To judge is to risk the possibility of being demeaning to the artist by assuming a superior role or attitude. Such an approach will likely set you against artists, and them against you, in an antagonistic way. Antagonism is not in the spirit of good criticism. Criticism is meant to further rather than to end discourse about art; you want to further the discussion by inclusion rather than dismissive exclusions. Most often, critics' judgments are positive, informing readers why a work of art is meaningful and enjoyable. Resist finding minor faults in works of art—fault finding is petty—and argue for larger issues. Be generous to artists in your considerations of their art and enthusiastic for your readers. The spirit of this book



is curiosity and the project of criticism is arousing curiosity and sometimes satisfying it.

Considering Assumptions

Infer the ideological basis of the art you are considering, and know and identify your own. What constitutes good art for the artist you are considering? What constitutes good art for you? Can you list your ten commandments of good art? Are there contradictions in your set? Are your assumptions and beliefs in consort with the art you are considering, or in conflict with them? Can you make both clear to your reader?

If the brief consideration in Chapter 5 of theoretical topics interested you, you would do well to take courses in aesthetics within a department of philosophy. You might also look into courses on recent literary theory and criticism, film theory and criticism, and women's studies, all of which are affecting art theory. You may have a penchant for writing feature-length articles of theoretical criticism rather than reviews of particular exhibitions. You may want to write social theory based on artifacts. Some critics are concerned with larger issues, and use works of art as examples of their theories. Others are content to write art journalism, or news about artists, rather than criticism. There is room for many approaches. Try several, find what you are comfortable doing, and do it as well as you can.

TECHNICALITIES AND PROCEDURES OF WRITING

Selecting a Style Manual

You can find style guides in libraries and bookstores. Style guides tell you how to footnote, how to present a bibliography, how to break your paper into sections. All journals and magazines have editorial styles that they follow. Your professor may require you to follow a certain style. If not, choose one of your own and follow it. Your selection can be arbitrary but you might first find what style is generally preferred in your major area of study. If you are a psychology major, the American Psychological Association (APA) has a style manual that you may want to obtain and use. If you are an English major, your professors may prefer the University of Chicago style, or the style of the Modern Language Association. Do not make up your own style—several have already been invented. If you plan on eventually writing a major paper, such as a senior thesis, a Master's thesis, or a doctoral dissertation, find out which style your department or advisor expects and practice using it for your shorter papers so that you become familiar with it.

Determining Word Count

Find out before you begin your project what length of paper or article you are expected to write. Do not even begin before you know. *New Art Examiner* wants

APPENDIX N

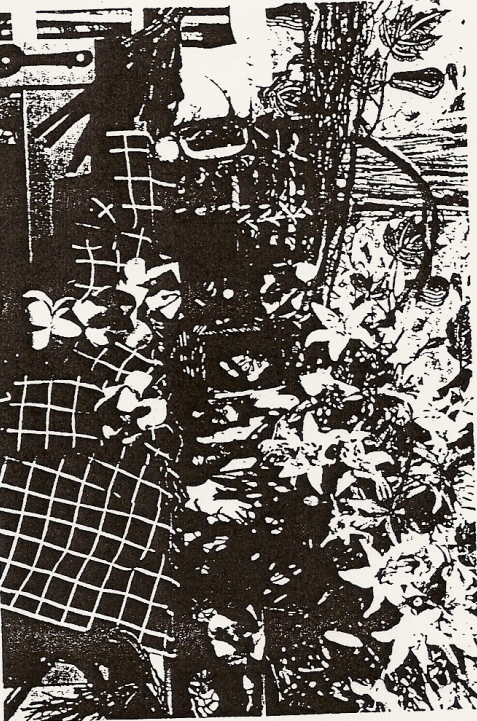
PLEASURES OF THE ORDINARY

San Francisco / Michael Leonard

A strong exhibit of paintings and drawings by Mary Snowden and Marie Schoeff is currently at Braunstein/Quay Gallery. Snowden's watercolors are the featured work; Schoeff's charcoal drawings make up a smaller, separate group shown as part of Access, the gallery's new emerging-artists program.

The twelve large watercolors by Snowden, who is a master technician, are somewhat monumental in nature. Her love of the medium is obvious and intimately connected to the overall content of the work itself. These are very much paintings about painting. Each self-contained, exactly placed brushstroke, the attractive colors and energizing light and dark tones reflect the artist's delight in her medium.

Snowden's paintings are about surface and physical form, rather than vague esoteric agendas. In paintings such as *Fruits of the Field*, she compares the different textures of metal, wood, ceramics and cloth. The form of a chair is juxtaposed with those of cups, jars, drapery and fruit. A napkin draped over a table is marked with a yellow chevron reminiscent of a Kenneth Noland painting. The geometric form of a hanging blue cloth sets off the organic shape of a string of garlic similarly hung from some overhead anchor (*Late in the Afternoon*). In an arrangement of pure simple everyday objects bathed in clear



Mary Snowden, *Pots and Pears*, 1988, watercolor, 35" x 52", at Braunstein/Quay Gallery, San Francisco. Photo: Sixth Street Studio.

light along a horizontal plane (*First Fruits*), Snowden evokes the image of a Giorgio Morandi still life.

Although a large variety of carefully rendered and easily recognizable objects throng Snowden's paintings, they do not exist in the same kind of splendid isolation that is common in some of Paul Wonner's recent still lifes. Rather, they are part of an

overall baroque pattern whose rhythmic movement is the result of Snowden's acute sense of color and decoration. The artist's interest in decoration is evident in *Potted Pears*, where the floral design of the wall paper is contrasted with that of an arrangement of flowers and the striking geometric design of a draped tablecloth. In *Fruits of the Field*, a royal blue chair, a

green cup and a napkin with bright yellow chevrons create a horizontal dance of color across the lower picture plane.

To compose her watercolors Snowden, like the photorealist painter Audrey Flack, employs the blown-up photographic image of a still life she has personally arranged. Unlike Flack who chooses objects easily identifiable with popular culture, Snowden focuses upon forms more readily associated with traditional still-life concepts. For example, the hanging branch of autumn leaves juxtaposed against a background of a wall with hanging hat in *First Fruits* is evocative of many late nineteenth-century still lifes.

Schoeff's drawings, like Snowden's works, are monumental in nature, large in scale and technically proficient in their rendering. The quiet, serene mood of Snowden's watercolors, however, is replaced with a powerful spiritual and sexual energy. Schoeff's imagery, both personal and universal, takes the form of organic semiastract landscapes relating to both the mind and the body (particularly the female body). By an expressive use of charcoal, Schoeff creates dark, palpating waves and ripples and luminous, flowing ribbons that are sensual and exciting. Her light, like Rembrandt's *chiaroscuro*, is inherent to the work and indicative of its spiritual concerns. □