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STRATEGY PREFERENCES FOR TEACHING ART

by

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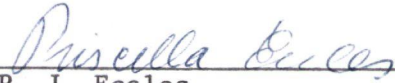
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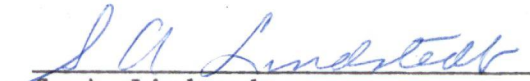
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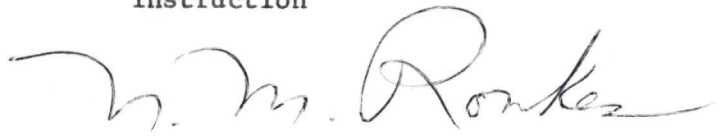
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ABSTRACT

The purpose of this thesis was to investigate problem setting strategies for art instruction. The four strategies investigated were the academic, divergent, spontaneous, and serendipitous. With the academic strategy a teacher sets the means of learning art as well as the goals. With the divergent strategy, means are set but not the goals. With the spontaneous, means are not established but the goals are set. With the serendipitous, neither the means of learning nor the goals are set. The objectives were to discover the over-all popularity of each strategy and to determine if preferences for strategies varied over the nine combinations of specified means and goals of art learning. The identified means of learning were materials, techniques, and themes. The goals were perception, production, and evaluation.

To meet the proposed objectives, high school teachers, employed by both the Calgary Public and Separate school systems, were surveyed in the fall of 1970.

The questionnaire was designed to collect information that would describe teacher preferences for four strategies in hypothetical teaching situations. Biographical information which described the subjects was also collected. The number of first, second, third, and fourth ranks assigned to the strategies, and the biographical data were tabulated, initially, in two tables. Data were extracted from these two tables and analyzed. To interpret the results, weighted scores (determined by how respondents ranked strategies) were compared with scores based upon

random distribution, by means of chi-square analyses. The purpose was to discover the order of strategy popularity for given teaching situations expressed as specific and over-all combinations of means of learning and goals of art instruction.

Finally, results were evaluated and discussed. Evaluation of the data over all combinations of means and goals indicated there was no significant ordering among the academic, divergent, and spontaneous strategies but the serendipitous was least preferred. For certain means and goals combinations, some preferences were indicated between certain pairs of strategies.

A problem setting model appears to be a useful device for describing art teaching strategies. The model used in this investigation figuratively displays the relationships among strategy concepts, means of art learning, and goals of art education.

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CHAPTER I

THE PROBLEM

I. INTRODUCTION TO THE PROBLEM

Art educators occasionally have expressed an interest in ways of structuring teaching situations to best facilitate productive learning. One method of focussing on teaching is by analyzing and devising instructions for classroom activities. In this thesis, instructions for productive learning in art will be surveyed. Here the instructional aspect of teaching is limited to problem setting. Problem setting takes place when the teacher presents a learning activity with reference to open or closed means and goals. The presentation usually takes the form of a set of verbal descriptions, limitations and possibilities, referred to as teaching strategies.

Strategies can be explicitly defined in a problem setting model. Such a model can display the characteristics of each conceivable type of problem (means of learning goals) and how it is taught (strategies). The major means of learning art are through materials, techniques, and themes. The major goals of art learning are the broadening of perceptual levels, the producing of artistic compositions, and the evaluating of visual phenomena.

Through various combinations of these selected means (materials, techniques, and themes) and goals (perceptions, production, and evaluation), nine types of hypothetical learning situations are formulated. Moreover, these learning situations can be set into problems with open

and closed relationships of means and goals. The four possible combinations of open and closed means and goals become the focus of this investigation into art teaching, namely: academic, divergent, spontaneous, and serendipitous strategies.

II. IMPORTANCE OF THE STUDY

The teaching strategies identified in this thesis contain degrees of support for creative behaviour with the objective of facilitating creative production. Creativity is bringing something new into existence. Morris Stein described a newly created object as,

. . . a novel work that is accepted as tenable or useful or satisfying by a group in some point in time. By 'novel' I mean that the creative product did not exist previously in precisely the same form. It arises from a reintegration of already existing material or knowledge; when it is completed it contains elements that are new. The extent to which a work is novel depends on the extent to which it deviates from the traditional or the status quo.¹

E. Paul Torrance defined creative behaviour as:

. . . becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them.²

Since learning problems can be relatively open or closed, some teaching strategies may elicit more creative behaviour and production than others.

In addition to the possible facilitation of more creative behaviour and production, a model for problem setting strategies can provide an efficient preparation tool in teaching art. A major problem among educational practitioners is lack of preparation time. Great difficulty is encountered in handling complex information and various methodologies. Teachers require an efficient method of choosing materials, techniques, themes, and goals. The use of a model of teaching strategies may provide

an efficient method of teaching art. As Kenneth Beittel said:

Because human memory and consciousness can manipulate only a few items at a time, and thus resorts to chunking of information, the energy of the organism or system is distributed between encoding 'chunked' input, . . . and selecting and applying 'transformation' on this output, and for this reason, simple and clear strategies or systems of operations are important. Too many techniques and ways to operate and too many beginning ideas of nearly equal importance would effectively forestall action,³

The results of the present study ought to indicate which strategies are deemed most desirable by the high school teachers of art in a comparatively large urban area. Also apparent should be the fact that teachers' preferences for strategies bear certain relationships to the means and goals of art education.

III. STATEMENT OF THE PROBLEM

The first task required of the investigation was to survey the teaching strategies preferred by art teachers. The purpose of the survey was two-fold: (1) to determine which of the four identified strategies teachers prefer most; and (2) to discover how strategy preference related to the identified means and goals of art learning.

Specifically the investigator sought answers to the following questions:

1. What is the indicated order of preference for problem setting strategies, considered over all combinations of means and goals for teaching art?
2. What is the order of preference for problem setting strategies indicated by teachers of art when they are emphasizing:
 - a. materials as the means of broadening levels of perception;

- b. materials as the means of producing art;
- c. materials as the means of evaluating art;
- d. techniques as the means of broadening levels of perception;
- e. techniques as the means of producing art;
- f. techniques as the means of evaluating art;
- g. themes as the means of broadening levels of perception;
- h. themes as the means of producing art; and
- i. themes as the means of evaluating art?

IV. DEFINITION OF TERMS

Strategy--a pattern representing a means to an end.

Academic Teaching Strategy--a problem-setting pattern whereby teachers identify specific means for reaching clearly-defined goals.

Divergent Teaching Strategy--a problem-setting pattern whereby teachers set specific means without disclosing goals to the students.

Spontaneous Teaching Strategy--a problem-setting pattern whereby teachers leave the means undetermined to reach a clearly-defined goal.

Serendipitous Teaching Strategy--a problem-setting pattern whereby teachers leave both the means and the goals open for students to determine.

Means--the route or method taken to reach a goal. (In this thesis, the means are embedded in art materials, techniques, or themes.)

Goals--the objective of the teaching situation. (Here the goals

refer to perceptions, products, or evaluations.)

Materials--often called media or supplies. (Here selections are limited to drawing papers, weaving fibres, and clays and glazes.)

Techniques--manipulative skills. (In this investigation, references are to furniture, jewellery, and mosaic construction.)

Themes--an ideational content. (Here themes refer to the expressiveness of ideas, the source of ideas, and the suitability of themes for media.)

Perception--sensory recognition.

Production--the process of creating art.

Evaluation--judgement or assessment of value.

Any--in the questionnaire, "any" is used to indicate that procedures or goals are not stated by the teacher nor specified in the setting of the problem. They are rather derived by the learner.

Designated--in the questionnaire, "designated" is used interchangeably with "selected," "explicit," "specific," or "established." These terms imply that the means or goal reference is established by the teacher or predetermined in the statement of the problem. They are not derived by the learner.

Junior High School--grades 7, 8, 9.

Senior High School--grades 10, 11, 12.

Art Teacher--instructor of commercial art, design, drawing, painting, printmaking, sculpture, environmental study, and crafts.

Separate School--a denominational Calgary school primarily for the enrolment of students adhering to the Roman Catholic religion.

Public School--a non-denominational Calgary school.

V. LIMITATIONS AND ASSUMPTIONS

The effectiveness of this study was limited by the methods used to formulate the survey instrument and evaluate the results.

The data for this study were obtained by means of a questionnaire. Several weaknesses were inherent in the instrument. Some basic assumptions concerning the curricular areas selected and generalizations deduced from them had to be made. It was assumed that:

1. Drawing papers, weaving fibres, and clay glazes were representative of art materials and that generalization about materials could be made from reference to these media.
2. Furniture building, plastic jewellery production, and mosaic construction adequately represented art techniques and that generalizations about techniques could be made from reference to them.
3. Ideas for sculpture, a print sequence, or a painting represented categories of themes in art and that generalizations about themes could be validly deduced from references to these uses of theme.
4. Recognition of papers, furniture construction techniques, and sculptural themes represented the category of perception.
5. Weaving, producing plastic jewellery, and developing themes

for a sequence of prints adequately represented the category of production.

6. Judging the suitability of glazes for clay bodies, construction methods for making mosaics, and media for themes in painting was representative of the category of evaluation in art and that generalizations about evaluation could be deduced from reference to this type of judgement.

The implications and conclusions, drawn from the results of the survey of strategies preferred, were based upon the assumption that the popularity of strategies could be determined by analyzing how teachers rank hypothetical teaching situations which include the varying relationships of open and closed means and goals of learning. A further assumption rested upon the teachers' full understanding of the statements in the questionnaire. The author assumed that teachers clearly understood the hypothetical situations described in the questionnaire and that they answered each question thoughtfully and honestly. Associated with this assumption was a further limitation of the study. The hypothetical situations were tersely and abstractly stated to accommodate individual interpretation of each situation by each teacher. The brief method of describing each hypothetical situation posed a serious limitation in the study, in that the mental logistics required to answer the questions were taxing and possibly frustrating for active teachers to consider.

The number of hypothetical situations was vastly limited in the questionnaire. Only one hypothetical situation was used to represent each combination of the three means and three goals. Although the

purpose of this limitation was to reduce the time required for answering to a reasonable half hour, in order to ensure high returns from busy teachers, the power of generalization was considerably reduced by the limited number of hypothetical situations.

FOOTNOTES TO CHAPTER I

¹Morris J. Stein, "Creativity and Culture," *Readings in Art Education*, eds. Elliot W. Eisner and David W. Ecker (Toronto: Blaisdell Publishing Co., 1966), pp. 340-348.

²E. Paul Torrance, "Scientific Views of Creativity and Factors Affecting its Growth," *Daedalus*, vol. 94, no. 3 (Summer, 1965), 663-664.

³Kenneth R. Beittel, "Sketches Toward a Psychology of Learning in Art," a Seminar in Art Education for Research and Curriculum Development, Cooperative Research Project No. V-002, Pennsylvania State University, 1966, p. 191.

CHAPTER II

REVIEW OF RELATED RESEARCH

The first objective in this chapter is to show how previous researchers defined strategies; the second objective is to examine the names assigned to strategies; and the third is to show whether or not research on teaching strategies is related to problem setting or if it encompasses the entire teaching spectrum (i.e., problem setting, reinforcement tactics, review techniques, testing, etc.). Finally, the fourth objective is to assess the number and extent of studies completed on problem setting strategies in art education. To meet the first objective, it was necessary to review briefly the available research on learning strategies, since the means and goals of learning were similar to those of teaching strategies. In the first section of the chapter, strategies are defined. In the second, the names, breadth of strategy involvement, and extent of strategy research in art education are examined.

I. DEFINITIONS OF TEACHING AND LEARNING STRATEGIES

In three related studies by (1) Kenneth Beittel and Robert Burkhart; (2) Jacob Getzels and Mihalyi Csikszentmihalyi; and (3) B. Othanel Smith, Milton Meux, Jerrold Coombs, Graham Nuthall, and Robert Precians, the researchers engaged in defining strategies.

Beittel and Burkhart were two of the primary early investigators of art learning strategies. These two researchers, in a paper published

in 1963, identified three coherent working (learning) strategies which were manifested in the way students approached a drawing (the drawings analyzed were those completed for an earlier study).¹ These strategies were named spontaneous, divergent, and academic.² The purpose of the Beittel and Burkhart research was to define strategies by describing the distinctions among the types of strategies represented in the working pattern (strategy) used by students engaged in drawing. These men also examined the interdisciplinary implications of strategy definitions for learning. Beittel and Burkhart clearly distinguished the spontaneous strategy from the divergent and distinguished both from the academic strategy. They said that:

In a dynamic strategy there is an open and a closed circuit to the system. The procedure and the objective can be either open or closed, but not both, as one must always be held constant as a means of control. With a Spontaneous student, the problem is held constant and the procedure is varied until an appropriate procedure emerges which leads to the solution of the problem. Thus, the innovation in Spontaneous work is procedural. This is a process orientation. The Divergent student varies the goal rather than the procedure. He controls the process in order to intellectually search for ideas which will lead to new discoveries. The former is more like a troubleshooter, the latter, the inventor. For the one, the problem is the challenge; for the other, the discovery. In contrast, the Academic student chooses a known technique by which to proceed to a known goal. He thus operates under a static strategy. In focusing only on control, both procedure and objective are held constant and there is no innovative quality to the system.³

After arriving at definitions for the three strategies, Beittel and Burkhart suggested some interdisciplinary implications, and predicted that different content areas may require students to use one strategy more than another.⁴ Although the two researchers conducted experiments and wrote papers where other working (learning) strategies were defined, the names and definitions of the three strategies in the 1963 paper remained

in the research vocabulary.

In their educational research, Getzels and Csikszentmihalyi also focussed on art working (learning) strategies. They apparently included other variables, besides procedures (means) and goals, within the strategy specifications. Their aim in 1965, therefore, was to explore some of the cognitive processes involved in students' drawing activity.

To conduct this exploration they posed three questions:

- (1) Could the manifest behavior observed in artistic composition be classified systematically?
- (2) Assuming this could be done, could differences among artists in this respect be described reliably?
- (3) Assuming this, would there be any relationships between these descriptions and (a) the quality of the aesthetic products, and (b) selected intellectual and personalistic characteristics of the artist?⁵

To deal with the three questions, Getzels and Csikszentmihalyi found that they needed a model relating various types of problem solving situations, from the most creative to the least creative. They used a model developed the previous year by Getzels.⁶ In the model they assumed that:

. . . . problematic situations can be classified along a continuum between two extremes: presented problem situations and discovered problem situations. In the former, the problem is already formulated, there is a known method of solution and a known (correct) solution exists. In the latter, the problem does not have a known formulation, and therefore there is neither a known method of solution nor a previously known solution. . . . Within the two extremes it is possible to distinguish several types of problematic situations varying in what is known and unknown.⁷

Getzels illustrated problematic situations by means of the figure shown below:⁸

<u>Type Case</u>	<u>Problem Formulation</u>		<u>Method of Solution</u>		<u>Solution</u>	
	O	P	O	P	O	P
1	+	+	+	+	+	-
2	-	+	+	-	+	-
3	-	-	-	-	-	-

Figure 1A. Typology of Problem Solving Situations

. . . let O in Fig. 1 stand for 'other' (i.e., teacher, experimenter, society), P for 'person' (i.e., subject, student, problem-solver), + for what is 'known', and - for what is 'unknown'.⁹

The two main strategies can be defined more concisely by stating that:

1. with presented problem situations (strategies) the problem is formulated, procedure is known, and goal is known;

2. with discovered problem situations (strategies) the problem is not formulated, procedure is not known, and goal is not known.

Three questions were answered during the course of their investigation.

For the first, Getzels and Csikszentmihalyi classified six types of behaviour which represented relevant stages in the formulation and solution of discovered programs in drawings. The three types of behaviour exhibited when problems were formulated were: number of objects manipulated, unusualness of objects chosen, and exploratory behaviour. The other three types of behaviour exhibited when problems were solved were: openness of problem structure, exploratory approach to drawing, and change in problem structure content.¹⁰ For the second question, Getzels and Csikszentmihalyi found that differences among artists with respect to the six types of behaviour manifested in the formulation and solution of problems could be described.

"It was found that the subjects varied widely in the extent to which

they engaged in such behavior."¹¹ For the third question, the two researchers also found that the differences among the artists, manifested in the six types of behaviour, were related to quality of aesthetic products and intellectual and personalistic characteristics of the artists.¹² The Getzels and Csikszentmihalyi problem solving situations (strategies) were broader in concept than those of Beittel and Burkhardt. Whereas the latter two men defined a strategy as a "total system of behavior which included both an individual's working procedures and his goals,"¹³ Getzels and Csikszentmihalyi defined a situation (strategy) as not only involving a procedure and goal, but also the envisagement of the problem. This variable was labelled the "problem formulation."

In the first two studies reviewed, working (learning) strategies were defined. For the third study reported in this section, that of Smith et al., a teaching strategy is analytically discussed. The work of these researchers in 1967 was designed to descriptively analyze classroom discourse used in the teaching of English, mathematics, science, and social studies. In the report, Smith et al. initially set forth the breakdown of classroom discourse into units of instruction called "ventures" and set out how these ventures were classified into categories according to objectives.¹⁴ They also showed how the "ventures" were analyzed into verbal moves. These moves, when combined into patterns, constituted what were referred to by Smith et al. as strategies of instruction.¹⁵ They indicated that units of instruction (ventures) were classified as causal, conceptual, evaluative, interpretative, procedural, based on reason, based on particulars, or based on rules.¹⁶

These units of instruction were analyzed into verbal moves (strategies) according to the interaction between teacher and students and according to the goals of teaching.

This discussion of a teaching strategy bears close resemblance to the definitions of learning strategies previously defined in this chapter. Smith et al. defined a "teaching strategy" by the types, patterns, and goals of instruction; Beittel and Burkhart appeared to define a "learning strategy" by the procedures and goals; and Getzels and Csikszentmihalyi by the method of problem formulation, method of solution, and the solution. In common with all three was the identification of "procedures" and "goals."

II. TEACHING STRATEGIES

Objectives two, three, and four, as stated at the beginning of the chapter, will be discussed in reference to five studies by: (1) Burton Grover; (2) Leon Frankston; (3) Floyd Urbach; (4) Lester Kleckner; and (5) Bernard Barrish. Since most of these studies are outside the field of art education, they will be mentioned only briefly.

In his research conducted in 1963, Burton Grover identified a convergent study question and a divergent study question used in the teaching of civic education. Although Grover did not use the word "strategy," his study questions appeared to be problem setting strategies. The investigation was designed to test the effectiveness of the convergent and divergent questions on: (1) encouragement of convergent and divergent thinking; (2) creative output; and (3) facility to memorize. With the convergent type study question, students were to write single

answers, after which they were informed of the correct answer. With the divergent type study question, students were to write as many answers as possible, after which they were not informed of the correct response. Grover's results showed that for quantity of convergent and divergent thinking and creative output, the type of study question was not an influential factor, but for memory skills, the group receiving convergent study questions made a slightly superior performance.¹⁷

Leon Frankston, in his investigation in 1965, referred to the spontaneous and divergent teaching strategies in art. His research study was designed to: (a) compare the effect of two art programs (self-developed and prescribed) on the quality of the students' art products; and (b) compare the effect of two methods of teaching (spontaneous and divergent) on the quality of the art products of the students.¹⁸ Frankston did not distinguish at great length between these two methods of teaching, since that was not his objective. However, his means of distinguishing between spontaneous and divergent teaching strategies was by the teachers' art products which were clearly identified according to a learning strategy's descriptive terms. Frankston's results indicated that "the strategies of the teachers do not influence or affect the strategies of their students,"¹⁹ and "that the two groups following a self-developed course of study gained more in Divergent art strategy, while the two groups following a prescribed course of study gained more in Spontaneous strategy."²⁰

Floyd Urbach, in 1966, surveyed patterns used in presenting biology to first-year students. His survey was designed to discover: (a) whether an instructor used a repeating pattern of verbal teaching

techniques; and (b) whether there were common kinds of teaching patterns among instructors. The Flanders ten-category interaction observation techniques were used. The findings suggested the existence of instructional patterns, but indicated that they were difficult to identify because of their diverse nature.²¹ While "instructional patterns" was the term used, it appears to mean "teaching strategies" as they are conceived in this study. No names were applied to any teaching patterns.

When Lester Kleckner reported his results on the teaching of mathematics in 1968, he referred to the discovery (indirect) teaching strategy as opposed to the conventional (direct) strategy. His objective was to see (a) if discovery type teaching strategies could result in greater gains in achievement, work-study skill, and positive learning attitude than could conventional strategy; and (b) if performance through discovery (indirect) strategies and conventional (direct) methods could be quantified and controlled reliably in a given direction. The discovery strategy referred to a very free situation. The conventional referred to a more rigid framework. The findings indicated that: (1) conventional methods produced better learning than did discovery methods, but only at a low level of significance; (2) strategy was not significantly related to development of work-study skills or attitude; and (3) performance of discovery teaching strategies and conventional strategies could be quantified and controlled reliably.²²

When Bernard Barrish completed his research in 1970, he referred to the inductive-guided discovery teaching strategy and the deductive-reception strategy in a project designed to see which of these influenced the achievement of high divergent students in mathematics.

The inductive-guided discovery strategy was characterized by a presentation of related facts, elicitation of discovery through discussion, restatement of discovered generalizations, and drill. The deductive-reception strategy was characterized by a presentation of a generalized principle, reinforcement of the principle, use of questioning, and drill. The findings stated that the deductive-reception strategy proved superior for learning of low cognitive material by high divergent students.²³ No other results were significant.

The preceding two studies explicitly named teaching strategies, but the strategies contained many dimensions other than pure problem setting.

From the five studies reviewed, strategies appeared to vary considerably. They varied not only in the names assigned, but also in their descriptive content. For instance, the words spontaneous, inductive-guided discovery, or convergent were all names for teaching patterns. Only in one study was strategy content limited to that of problem setting. In the others, generalized patterns (strategies) encompassed many more aspects of teaching. Although one investigator (Frankston), reviewed in this chapter, discussed teaching strategies in art education, no other researchers have defined, assessed, or in any other way studied problem setting for art education.

III. SUMMARY

The literature on educational methods of teaching, relevant to strategies, revealed the following:

1. Teaching strategies seemed closely related in content to

learning strategies. With both learning and teaching patterns, characteristics of the procedures and goals formed the definitions.

2. Names applied to strategies varied considerably. Strategies were called convergent, divergent, spontaneous, discovery (indirect), conventional (direct), inductive-guided discovery, or deductive reception.

3. Strategy research in teaching was largely descriptive, based on observations of teaching behaviours.

4. Although a relatively large amount of research has been conducted on art learning strategies, little has been completed on art teaching strategies. Teaching strategy research seemed to be largely outside the field of art education.

FOOTNOTES TO CHAPTER II

¹Kenneth R. Beittel and Robert C. Burkhardt, "Strategies of Spontaneous, Divergent and Academic Art Students," *Readings in Art Education*, eds. Elliot W. Eisner and David W. Ecker (Toronto: Blaisdell Publishing Co., 1966), pp. 292-310.

²Ibid.

³Ibid., pp. 292-293.

⁴Ibid., p. 307.

⁵Jacob Getzels and Mihaly Csekszentmihalyi, "Creative Thinking in Art Students, the Process of Discovery," Cooperative Research Project No. S-080, The University of Chicago, 1965, p. 7. (Microfilmed.)

⁶Ibid., p. 3, citing J. W. Getzels, "Creative Thinking, Problem Solving and Instruction" in *Theories of Learning and Instruction*, NSSE Yearbook, Chicago: The Nat. Soc. for the Study of Educ., 1964, p. 241.

⁷Getzels and Csekszentmihalyi, loc. cit. p. 3.

⁸Ibid., citing J. W. Getzels and M. Csekszentmihalyi, *Creative Thinking in Art Students: an exploratory study*, Cooperative Research Report No. E-008, Chicago, 1964, p. 118.

⁹Getzels and Csekszentmihalyi, loc. cit. p. 3.

¹⁰Ibid., p. 29.

¹¹Ibid., p. 97.

¹²Ibid., pp. 98-99.

¹³Beittel and Burkhardt, op. cit., p. 292.

¹⁴B. Othanel Smith, Milton Meux, Jerrold Coombs, Graham Nuthall, and Robert Preicans, "A Study of the Strategies of Teaching," Bureau of Educational Research, College of Education, University of Illinois, Urbana, Illinois, 1967, p. 21. (Microfilmed.)

¹⁵Ibid., p. 3.

¹⁶Ibid., p. 23.

¹⁷Burton Grover, "Some Effects and Correlates of Different Types of Practice Used in Studying a Topic in Ninth Grade Classrooms" (unpublished doctoral dissertation, Stanford University, 1963).

¹⁸Leon Frankston, "Effects of Two Programs and Two Methods of Teaching Upon the Quality of Art Products of Adolescents," Cooperative Research Project No. S-055, Pennsylvania State University, 1965, p. 2. (Microfilmed.)

¹⁹Ibid., p. 94.

²⁰Ibid., p. 94.

²¹Floyd Dale Urbach, "A Study of Recurring Patterns of Teaching" (unpublished doctoral dissertation, The University of Nebraska, 1966).

²²Lester Gerald Kleckner, "An Experimental Study of Discovery Type Teaching Strategies With Low Achievers in Basic Mathematics I" (unpublished doctoral dissertation, Pennsylvania State University, 1968).

²³Bernard Barrish, "Inductive Versus Deductive Teaching Strategies With High and Low Divergent Thinkers" (unpublished doctoral dissertation, Stanford University, 1970).

CHAPTER III

PROBLEM SETTING STRATEGIES USED IN THE QUESTIONNAIRE

Prior to constructing the questionnaire, it was necessary to establish the criteria to be used for problem setting strategies, in accordance with means, goals, and curricular areas. These criteria are grouped under four headings: (1) origin of problem setting strategies; (2) strategies in relation to means and goals; (3) strategies in relation to curricular areas; and (4) strategies in relation to hypothetical problems.

I. ORIGIN OF PROBLEM SETTING STRATEGIES

To the present time, stylistic instruction based on problem setting strategies has not been described in depth. For this reason, the art learning strategies (after Beittel and Burkhart, 1966)¹ were employed as the basis to formulate art problem setting strategies. Using learning strategies to construct problem setting strategies seemed logical. Since it is apparent that certain strategies (academic, divergent, and spontaneous) are natural working strategies, there seemed to be a reasonable basis for examining teaching strategies, especially related to the problem setting aspect of teaching.

The academic, divergent, and spontaneous problem setting strategies utilized in this research evolved from drawing strategies described by Beittel and Burkhart² who identified three distinct

learning strategies and defined them in terms of open and closed means and goals of learning. Their findings indicated that,

. . . [with the Spontaneous working strategy] the problem is held constant and the procedure is varied until an appropriate procedure emerges which leads to the solution of the problem. Thus, the innovation in Spontaneous work is procedural. This is a process orientation. The Divergent student varies the goal rather than the procedure. He controls the process in order to intellectually search for ideas which will lead to new discoveries.³

. . . the Academic student chooses a known technique by which to proceed to a known goal. He thus operates under a static strategy. In focusing only on control, both procedure and objective are held constant and there is no innovative quality to the system.⁴

These problem solving strategies may be described succinctly as follows:

1. Academic strategy is the use of a designated means to reach a designated goal.
2. Divergent strategy is the use of a designated means to reach an undesigned goal.
3. Spontaneous strategy is the use of an undesigned procedure to reach a designated goal.

These three operational definitions provoked the use of a fourth working strategy to complete the range of possibilities with both open and closed means and goals. The fourth strategy is the use of an undesigned procedure to reach an undesigned goal. Nothing in this problem setting strategy is stipulated except the mandate to work on a problem. A student using this strategy is at liberty to vary the procedure and goal for finding both problems and solutions.

In transferring learning strategies to problem setting strategies, the names are not changed. They remain the same as those identified by

Beittel and Burkhart. Thus, three of the problem setting strategies were called academic, divergent, and spontaneous. The fourth, completely open strategy, was named "serendipitous." "Serendipity" means the discovery of new ideas and phenomena, when not in search for them.⁵

The problem setting strategies used in this study are described succinctly as follows:

1. Academic strategy is the presentation of a situation using a designated means to reach a designated goal.

2. Divergent strategy is the presentation of a situation using a designated means to reach an undesigned goal.

3. Spontaneous strategy is the presentation of a situation using an undesigned means to reach a designated goal.

4. Serendipitous strategy is the presentation of a situation using an undesigned means to reach an undesigned goal.

II. STRATEGIES IN RELATION TO MEANS AND GOALS

After determining the type of problem setting strategies to be used in this survey, characterized by variations in the kind and amount of decision making permitted the learner, individual means and goals of art learning were selected for hypothetical art learning situations. The hypothetical learning situations were based on three major working approaches taken by artists and three major objectives of art education. The approaches taken by artists that were selected as the means of art learning were materials, techniques, and themes. These three "means" were defined in Chapter I. The three major objectives of art education used in formulating the hypothetical problem setting situations in this

study were those of raising perceptive levels, producing art, and evaluating visual compositions. These three "goals" of art education were also defined in Chapter I.

To devise a range of problem setting situations, the three means and three goals were combined to produce nine exclusive types of problems. Materials (a means) were combined with perception, production, and evaluation (goals). Techniques (a means) were combined with perception, production, and evaluation. Themes (a means) were also combined with the three goals.

III. STRATEGIES IN RELATION TO CURRICULAR AREAS

The nine hypothetical teaching situations were further developed to encompass selected areas in the high school art curricula. Major curricular areas in the high school program of studies include drawing, graphics, painting, sculpture, ceramics, and crafts. Therefore, these six areas were used in delineating the problem setting situations for the survey questionnaire.

IV. STRATEGIES IN RELATION TO HYPOTHETICAL PROBLEMS

In formulating the hypothetical problem setting situations for the questionnaire, the four strategies, three means, three goals, and the six curricular areas were combined. When each of the four strategies was integrated with the nine combinations of means with goals, 36 hypothetical problem setting situations emerged. All 36 were presented in the part of the survey instrument designed for the ranking of

B. Materials - Production

If your class were learning to weave, would you ask your students to:

- | [Means (Materials)] | | [Goal (Production)] |
|----------------------------------|---------------|--------------------------|
| ↑ | | ↑ |
| () use <u>any</u> <u>fibres</u> | and produce | <u>any</u> <u>fabric</u> |
| () use <u>selected</u> fibres | and produce a | <u>specific</u> fabric |
| () use <u>any</u> fibres | and produce a | <u>specific</u> fabric |
| () use <u>selected</u> fibres | and produce | <u>any</u> fabric |

The curricular area was crafts; the means of learning was use of the material, fibres; and the goal was producing fabric. The strategies were again implanted in the underlined terms, "any," "selected," and "specific." Situation 1 represented the serendipitous strategy; situation 2, the academic strategy; situation 3, the spontaneous strategy; and situation 4, the divergent strategy.

The framework, for all the problem setting situations as they were presented in the questionnaire, is shown in Table 1.

The questionnaire was based upon a model of problem setting variables. This model will be discussed more fully in Chapter VII.

Table 1

Hypothetical Problem Setting Situations

Situation	Means	Goals	Curricular Area	Strategy Order*
A	Materials (papers)	Perception (recognition of papers)	Drawing	Spontaneous Divergent Academic Serendipitous
B	Materials (fibres)	Production (fabric)	Crafts	Serendipitous Academic Spontaneous Divergent
C	Materials (glazes)	Evaluation (glaze suit- ability for clay bodies)	Ceramics	Academic Serendipitous Divergent Spontaneous
D	Techniques (furniture construc- tion)	Perception (recognition of construc- tion methods)	Crafts	Divergent Spontaneous Serendipitous Academic
E	Techniques (plastic con- struction)	Production (jewellery)	Crafts	Spontaneous Divergent Academic Serendipitous
F	Techniques (mosaic con- struction)	Evaluation (suitability of construc- tion methods)	Crafts	Serendipitous Academic Spontaneous Divergent

* The strategy order was purposely listed randomly to elicit thoughtful answers on behalf of the respondents.

Table 1 (continued)

Situation	Means	Goals	Curricular Area	Strategy Order
G	Themes (sculptural content)	Perception (recognition of expres- siveness in sculpture)	Sculpture	Academic Serendipitous Divergent Spontaneous
H	Themes (print content)	Production (themes for a series of prints)	Graphics	Divergent Spontaneous Serendipitous Academic
I	Themes (painting content)	Evaluation (suitability of media for themes)	Painting	Academic Divergent Spontaneous Serendipitous

FOOTNOTES TO CHAPTER III

¹Kenneth R. Beittel and Robert C. Burkhardt, "Strategies of Spontaneous, Divergent and Academic Art Students," *Readings in Art Education*, eds. Elliot W. Eisner and David W. Ecker (Toronto: Blaisdell Publishing Co., 1966), pp. 292-310.

²Ibid., pp. 292-293.

³Ibid., p. 292.

⁴Ibid., p. 293.

⁵Funk and Wagnalls, *Standard College Dictionary* (Toronto: Longmans Canada Limited, 1963), p. 1226.

CHAPTER IV

PREPARATION AND DISTRIBUTION OF THE QUESTIONNAIRE

As stated at the outset of the study, the problems were: (a) to determine which of the four identified strategies teachers preferred; and (b) to discover how strategy preference was related to particular means or goals or combinations of them. Then to meet the objectives of the research, a questionnaire was devised and distributed to junior and senior high school art teachers.

I. PREPARATION OF THE QUESTIONNAIRE

A trial version of the instrument was designed and subjected to a pilot investigation. This first version was sent to: (1) three graduate students in art at The University of Calgary; (2) two design-orientated instructors of first- through fourth-year art courses at Mount Royal College; (3) all instructors of art at the Southern Alberta Institute of Technology; and (4) some faculty members of the Department of Art at The University of Calgary. (All faculty members were not available as distribution was made in summer.) A high school teaching population was not used for the pilot investigation for two reasons. First, the pilot study was ready for testing during the last week in June, a period when high school teachers are known to be finalizing their year's work. Second, respondents with greater educational backgrounds and teaching experience presumably would be more accurate and

detailed in their criticisms of the instrument. The pilot subjects were requested to complete the trial version of the questionnaire and to make critical comments regarding format and ambiguities about the strategies as they were presented in the hypothetical teaching situations. The final version was redrafted to incorporate pertinent suggestions.

The revised survey instrument consisted of three parts: (1) an introductory letter and an explanatory page designed to outline the purpose of the investigation and to describe procedures for the instrument's completion; (2) some hypothetical problem setting situations constructed to gather strategy information; and (3) a biographical page designed to elicit the academic and artistic development of the respondent as well as age, sex, and teaching experience.

The introductory letter (reproduced in Appendix A) explained the purpose of the research, acknowledged the Calgary School Board's permission to conduct the study, and thanked the prospective respondents for their assistance. The explanatory page (Appendix B) outlined the relative open-endedness of the procedures and goals. This was accomplished by directing attention to the use of the words "any" and "designated" (selected, explicit, specific, or established). The pilot respondents had stated in almost every case that they could answer the questions more accurately if the procedures and goals were more clearly imprinted on their minds, and if the strategies were explained and identified. The strategy concept was explained but no strategy names were identified, since knowledge of the names by the respondents might short circuit the response judgements.

The biographical page solicited information which described the

respondents and is shown in Appendix D. Sixteen questions were formulated and presented in this third part of the instrument. Subjects were requested to make appropriate responses on a two-point dichotomy, or a four-point continuum.

II. DISTRIBUTION AND COLLECTION OF THE QUESTIONNAIRE

The questionnaires were personally addressed and mailed on October 16, 1970 to 119 teachers of an art or craft course, employed by both the junior and senior high schools located in the Separate and Public School systems of the city of Calgary, Alberta. Of the total, 22 (18.49 per cent) were mailed to Separate School teachers, and 97 (81.51 per cent) were mailed to Public School teachers.

A stamped, self-addressed envelope accompanied the questionnaire to facilitate its return. During the third week following the mailing, many respondents who had not yet replied were contacted by telephone and requested to return the questionnaire. After November 15, 1970 no further replies were received. Since the influx of returns had slowed down at a constant rate, and the number of incomplete questionnaires had increased, no further contact was deemed productive. The actual percentage of returned questionnaires was at the level of 70.59 per cent. The percentage of "correctly completed" questionnaires was at the level of 54.62 per cent. Of the total mailed questionnaires, 15.97 per cent were either "incomplete" or "incorrect" and therefore not used. A questionnaire was judged to be "incomplete" if subjects failed to react to all of the nine situations. For example, some answered only eight. A

questionnaire was judged to be "incorrect" if instructions were misinterpreted. For example, some misinterpretations resulted when respondents failed to rank each of the completing statements. Others resulted when respondents used a tick mark (✓) instead of a ranking number for the task, and so on.

When all incomplete or incorrect questionnaires were discarded, a total of 65 remained, and these became the study population.

A statistical compilation of the questionnaire returns is shown in Table 2.

Table 2

Statistical Compilation* of
Questionnaire Returns

Category	Number Returned	Per Cent of Total Mailed
Correctly completed	65	54.62
Incomplete or incorrect	19	15.97
Total returned	84	70.59

*
of 119 mailed

CHAPTER V

DESCRIPTION OF THE STUDY POPULATION

The 65 respondents who had "correctly" and "completely" filled out the questionnaire made up the study population. As was discussed in the previous chapter, a biographical page was designed to elicit the academic and artistic development of the subjects as well as their age, sex, and teaching experience. The objective of this chapter is to describe the study population.

I. TABULATION OF RESPONDENTS' BIOGRAPHICAL INFORMATION

Data were extracted from the biographical page (Appendix D) of the survey instrument, and tabulated to describe each respondent. Respondents are described in order to: (a) provide a method by which generalizations about the study population could be drawn (the results seemed meaningful to the extent that the respondents were artistically and academically developed) and (b) facilitate a comparison of aspects of biographical data with separate strategy preferences. For example, correlations between artistic development and individuals with strong serendipitous preferences might be investigated; however, such an investigation was beyond the scope of the present study.

Table 29 (Appendix E) shows the artistic and academic background of each respondent as well as age, sex, and teaching experience. For instance, the first subject (1S) is a male between 19 and 29 years of

age, and so on. Generalizations from the data presented in Table 30 are drawn to describe the study population.

II. DESCRIPTION OF RESPONDENTS

Age and Sex

As is shown in Table 3, there was almost an equal distribution of male and female respondents (male: 46.2 per cent; female: 53.8 per cent). Over half of the subjects were in the 19-29 years of age bracket (55.4 per cent).

Teaching Experience

Over half of the study population had taught school from between one and five years (55.4 per cent) and had been teaching art during this period (67.7 per cent). Of this group, the majority were junior high school teachers (75.4 per cent).

Academic Development

Respondents holding at least one university degree made up 63.1 per cent of the total; moreover, a respectable 46.2 per cent had taken more than six art courses, and 56.9 per cent had taken an art course in the past five years. Over half had examined more than two professional art periodicals regularly (56.9 per cent) and most of the group owned six art books or more (64.6 per cent).

Personal Art Production and Interest in Artifacts

Those teachers who were personally involved with producing artifacts in more than one area formed a majority of the study population

Table 3
Statistical Description of Respondents*

Category	Number of Teachers	Per Cent of Respondents
Sex		
Male	30	46.2
Female	35	53.8
Age in years		
19 - 29	36	55.4
30 - 39	11	16.9
40 - 49	11	16.9
50 plus	7	10.8
Years of teaching experience		
1 - 5	36	55.4
6 - 10	17	26.1
11 - 20	8	12.3
21 plus	4	6.2
Years of experience teaching art		
1 - 5	44	67.7
6 - 10	13	20.0
11 - 20	5	7.7
21 plus	3	4.6
Teaching level at present		
junior high school	49	75.4
senior high school	16	24.6

*Total number of respondents: 65.

Table 3 (continued)

Category	Number of Teachers	Per Cent of Respondents
University degrees held		
none	15	23.1
one	41	63.1
two	8	12.3
master's	1	1.5
Number of art courses taken		
none	6	9.2
1 - 5	29	44.6
6 - 10	18	27.7
11 plus	12	18.5
Years since last art course was taken		
taking a course at present	14	21.5
1 - 5	37	56.9
6 - 10	6	9.3
11 plus	8	12.3
Breadth of art production		
none	9	13.8
one area	12	18.5
2 - 3 areas	21	32.3
4 or more areas	23	35.4
Time spent on art production per day		
no time spent	22	33.9
to 1 hour	37	56.9
2 hours	3	4.6
2 plus hours	3	4.6

Table 3 (continued)

Category	Number of Teachers	Per Cent of Respondents
Gallery affiliation, past or present		
yes, at some time	16	24.6
no, never	49	75.4
Number of professional periodicals examined regularly		
none	18	27.7
1	10	15.4
2 or 3	29	44.6
4 plus	8	12.3
Number of art books in personal possession		
none	8	12.3
1 - 5	15	23.1
6 - 10	11	16.9
11 plus	31	47.7
Pieces of original art owned		
none	26	40.0
1 - 5	12	18.5
6 - 10	11	16.9
11 plus	16	24.6
Number of art exhibits attended annually		
none	12	18.5
1 - 2	23	35.4
3 - 6	18	27.6
7 plus	12	18.5

(the crafts were often combined). Over half could find time to work on producing their own artifacts for up to one hour per day (56.9 per cent). Although the majority had never been affiliated with an art gallery (75.4 per cent), they did indicate that they attended more than one art exhibition annually (81.6 per cent). Most of the respondents owned at least one original artifact (60.0 per cent).

CHAPTER VI

METHOD OF ANALYSIS, PRESENTATION, AND EVALUATION OF DATA

In the preceding chapter, the population used in this study was described. The subjects appeared to be qualified both academically and artistically to respond meaningfully to questions relating to their preferences for strategies in teaching art. The objective of this chapter is to discuss: (1) the method of data analysis; (2) the data analysis; and (3) a summary and evaluation of the data. The discussion will be developed around the topics posed as questions in Chapter I. They are: (1) preferences for strategies, over all combinations of means and goals; and (2) preferences for strategies for specific combinations of means and goals.

I. METHOD OF DATA ANALYSIS

The first major specific question as stated in Chapter I was:

What is the indicated order of preference for the problem setting strategies, over all combinations of means and goals for teaching art?

To facilitate answering this question, the strategy preferences exhibited by individual respondents were analyzed in three phases. First, the preferences were tabulated in Table 29, Appendix E. Code numbers for individual respondents were the same as those used in the biographical table (Table 30, Appendix F). Then total numbers of

strategy preferences for first, second, third, and fourth choices, based on the ranks assigned to strategies by the respondents, were computed and tabulated in Table 4. Finally, to obtain the over-all order of preference, total numbers of choices for the four strategies were summarized (see Table 5). Weighted scores were calculated by giving four ranks (choices 1, 2, 3, 4) a value. Rank 1 was assigned a value of 4; rank 2, a value of 3; rank 3, a value of 2; and rank 4, a value of 1. The method used to calculate a weighted score is shown in Table 6. Weighted scores are presented for analysis in Table 7. (Also presented in Table 7 are numbers representing what one would expect if a completely random selection had been made.)

To find the order of preference a chi-square analysis was performed on data contained in Table 7. A calculated confidence level of 0.05 (5 per cent) then indicated whether or not there was some preferential ordering among the four strategies at this level of significance. If a preferential ordering were discovered, then pairs of strategies were analyzed similarly to determine all paired preferences. Preferences are summarized and presented in Table 8. Discussion of the data follows.

The second major question stated in Chapter I was to determine the order of preferences for problem setting strategies when emphasis was upon the nine specific combinations of means with goals.

To facilitate answering this question, the strategy preferences exhibited by respondents were analyzed in three phases. First, the preferences tabulated in Table 30 (Appendix F) and presented in Table 4

Table 4

Strategy Preferences for Combinations of Means with Goals*

Rank	Academic Number	Divergent Number	Spontaneous Number	Serendipitous Number
<i>Question A. Priorities of Strategies for Materials-Perception</i>				
1	38	6	16	5
2	15	16	31	3
3	2	42	17	4
4	10	1	1	53
<i>Question B. Priorities of Strategies for Materials-Production</i>				
1	28	21	6	10
2	11	35	13	6
3	8	8	40	9
4	18	1	6	40
<i>Question C. Priorities of Strategies for Materials-Evaluation</i>				
1	31	9	20	5
2	17	20	20	8
3	7	34	21	3
4	10	2	4	49

*65 total is possible (65 respondents)

Table 4 (continued)

Rank	Academic Number	Divergent Number	Spontaneous Number	Serendipitous Number
<i>Question D. Priorities of Strategies for Techniques-Perception</i>				
1	34	15	10	6
2	11	25	24	5
3	8	22	27	8
4	12	3	4	46
<i>Question E. Priorities of Strategies for Techniques-Production</i>				
1	18	39	2	6
2	25	20	9	11
3	10	5	37	13
4	12	1	17	35
<i>Question F. Priorities of Strategies for Techniques-Evaluation</i>				
1	29	6	23	7
2	19	20	22	4
3	8	32	14	11
4	9	7	6	43

* 65 total is possible (65 respondents)

Table 4 (continued)

Rank	Academic Number	Divergent Number	Spontaneous Number	Serendipitous Number
<i>Question G. Priorities of Strategies for Themes-Perception</i>				
1	23	15	14	13
2	15	23	22	5
3	8	22	27	8
4	19	5	2	39
<i>Question H. Priorities of Strategies for Themes-Production</i>				
1	15	25	6	19
2	9	16	26	14
3	5	23	28	9
4	36	1	5	23
<i>Question I. Priorities of Strategies for Themes-Evaluation</i>				
1	31	9	16	9
2	10	22	26	7
3	8	30	20	7
4	16	4	3	42

*65 total is possible (65 respondents)

Table 5
Strategy Preferences *

Rank	Academic Number	Divergent Number	Spontaneous Number	Serendipitous Number
1	247	145	113	80
2	133	196	193	63
3	63	219	231	72
4	142	25	48	370

*585 total is possible (65 respondents x 9 questions = 585)

Table 6

Means of Assigning a Value to Strategies
Over All Combinations of Means and Goals

Rank	Value		Academic Strategy		Divergent Strategy		Spontaneous Strategy		Serendipitous Strategy	
			Total Choices	Score	Total Choices	Score	Total Choices	Score	Total Choices	Score
1	4	x	247	= 988	145	580	113	452	80	320
2	3	x	133	= 399	196	588	193	579	63	189
3	2	x	63	= 126	219	438	231	462	72	144
4	1	x	142	= 142	25	25	48	48	370	370
Weighted Score			1655		1631		1541		1023	

Table 7

Chi-square Analysis on Weighted Scores
in Conjunction with Random Scores,
Over All Means and Goals

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Score	1655	1631	1541	1023
Random Score	1462.5	1462.5	1462.5	1462.5

$\chi^2 = 100.83$

dif. = 3

sig. level = 0.00000000025

Table 8

Summary of Strategy Preferences
for All Means and Goals

Column 1*	Column 2
Academic	Serendipitous
Divergent	Serendipitous
Spontaneous	Serendipitous

* Strategies in the first column are preferred over all those in the corresponding row of the second column at the 0.05 level of significance.

were studied. Second, the sums contained in Table 4 were used to compute a weighted score for each strategy in a particular means-goals combination, and these weighted scores are presented in Table 9. For example, the weighted score for the academic strategy in reference to the materials-perception combination was 211.

Finally, to determine the order of preference for the nine combinations of means with goals, thereby answering the second question posed, the weighted scores in Table 9 were transferred to Tables 11, 12, 13, 14, 15, 16, 17, 18, and 19, where they are accompanied by the figures of a hypothetical random selection.

To find the order of preference for each of the nine means with goals combinations, a chi-square analysis at the 0.05 level of significance was performed on data in Tables 11, 12, 13, 14, 15, 16, 17, 18, and 19. If significant preferences were indicated, then pairs of strategies were analyzed similarly to determine all paired preferences. Paired preferences are summarized and presented in Tables 20, 21, 22, 23, 24, 25, and 26. Discussion of these significant findings follows.

II. ANALYSIS OF DATA

Preferences for Strategies Over All Combinations of Means and Goals

Chi-square analysis was performed on the data in contingency Table 7, which lists weighted scores and a random score for the four strategies regardless of means and goals. The calculated value of $\chi^2 = 100.83$ with 3 degrees of freedom corresponded to a significance level of 0.00000000025. At the 0.05 level of significance, this figure

Table 9

Popularity of Strategies for Combinations of Means and Goals

Academic	Divergent	Spontaneous	Serendipitous
Weighted Scores	Weighted Scores	Weighted Scores	Weighted Scores
211	157	<i>Question A. Materials-Perception</i> 192	90
179	206	<i>Question B. Materials-Production</i> 149	116
199	166	<i>Question C. Materials-Evaluation</i> 186	99
197	182	<i>Question D. Techniques-Perception</i> 170	101
179	227	<i>Question E. Techniques-Production</i> 126	118
198	155	<i>Question F. Techniques-Evaluation</i> 192	105
172	178	<i>Question G. Themes-Perception</i> 178	122
133	195	<i>Question H. Themes-Production</i> 163	159
186	163	<i>Question I. Themes-Evaluation</i> 185	113

indicates preferential ordering. Chi-square analysis was then performed on selected pairs of strategies (Table 10). At the 0.05 level of significance there is no preference between the pairs of academic and spontaneous strategies (sig. level = 0.15). However, there is a significant order of preference expressed between the spontaneous and serendipitous strategies (sig. level = 0.0000000000003). The χ^2 figures, degrees of freedom, and significance levels for these two comparisons are presented in Table 10. The ordering among the pairs is summarized in Table 8.

The data summarized in Table 8 reveal that there are no preferential distinctions among the strategies. However, the academic, divergent, and spontaneous strategies are preferred over the serendipitous strategy.

Preferences for Strategies in Specific Combinations of Means and Goals

Chi-square analysis was performed on weighted scores for strategies in means and goals combinations. These scores, random scores and chi-square test results, are presented in Tables 11, 12, 13, 14, 15, 16, 17, 18, and 19. At the 0.05 level of significance there is a definite ordering of preferences for: materials-perception (sig. level = 0.0000014); materials-production (sig. level = 0.0025); materials-evaluation (sig. level = 0.00012); techniques-perception (sig. level = 0.00028); techniques-production (sig. level = 0.000037); techniques-evaluation (sig. level = 0.00035); and themes-evaluation (sig. level = 0.013). At the 0.05 level of significance, there was no significant level of preference for strategies in themes-perception

Table 10

Chi-square Analysis on Pairs of Strategies in
Conjunction with Random Scores, Over All
Means and Goals

Strategy Pair	χ^2	d.f.	Sig. Level
Academic, Spontaneous	2.03	1	0.15
Spontaneous, Serendipitous	52.86	1	0.00000000000003

Table 11

Chi-square Analysis on Weighted Scores for
Materials-Perception in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	211.0	157.0	192.0	90.0
Random Scores	162.5	162.5	162.5	162.5

$\chi^2 = 29.96$

d.f. = 3

sig. level = 0.0000014

Table 12

Chi-square Analysis on Weighted Scores for
Materials-Production in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	179.0	206.0	149.0	116.0
Random Scores	162.5	162.5	162.5	162.5

$\chi^2 = 14.28$

d.f. = 3

sig. level = 0.0025

Table 13

Chi-square Analysis on Weighted Scores for
Materials-Evaluation in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	199.0	166.0	186.0	99.0
Random Scores	162.5	162.5	162.5	162.5

$\chi^2 = 20.73$

d.f. = 3

sig. level = 0.00012

Table 14

Chi-square Analysis on Weighted Scores for
Techniques-Perception in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	197.0	182.0	170.0	101.0
Random Scores	162.5	162.5	162.5	162.5

$\chi^2 = 18.94$

d.f. = 3

sig. level = 0.00028

Table 15
 Chi-square Analysis on Weighted Scores for
Techniques-Production in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	179.0	227.0	126.0	118.0
Random Scores	162.5	162.5	162.5	162.5

$\chi^2 = 23.16$

d.f. = 3

sig. level = 0.000037

Table 16

Chi-square Analysis on Weighted Scores for
Techniques-Evaluation in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	198.0	155.0	192.0	105.0
Random Scores	162.5	162.5	162.5	162.5

$\chi^2 = 18.48$

d.f. = 3

sig. level = 0.00035

Table 17

Chi-square Analysis on Weighted Scores for
Themes-Perception in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	172.0	178.0	178.0	122.0
Random Scores	162.5	162.5	162.5	162.5

$$\chi^2 = 7.45$$

$$\text{d.f.} = 3$$

$$\text{sig. level} = 0.059$$

Table 18

Chi-square Analysis on Weighted Scores for
Themes-Production in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	133.0	195.0	163.0	159.0
Random Scores	162.5	162.5	162.5	162.5

$\chi^2 = 5.96$

d.f. = 3

sig. level = 0.11

Table 19

Chi-square Analysis on Weighted Scores for
Themes-Evaluation in Conjunction
 with Random Scores

	Academic Strategy	Divergent Strategy	Spontaneous Strategy	Serendipitous Strategy
Weighted Scores	186.0	163.0	185.0	116.0
Random Scores	162.5	162.5	162.5	162.5

$\chi^2 = 10.82$

d.f. = 3

sig. level = 0.013

(sig. level = 0.059); and themes-production (sig. level = 0.11).

Chi-square analysis was then performed on selected pairs when significant preferences among the four strategies for the means-goals combinations were indicated. Contingency Tables 20, 21, 22, 23, 24, 25, and 26 were constructed and chi-square analysis performed on the pairs of strategies in conjunction with random scores.

The preferential ordering among the strategies for the nine means and goals combination is summarized in Table 27. These data show there were no consistent first, second, third, and fourth place distinctions among the strategies and may be reviewed as follows:

1. For materials-evaluation, techniques-perception, techniques-evaluation, and themes-evaluation, the academic, spontaneous, and divergent strategies were significantly preferred over the serendipitous strategy. There was no significant preferential ordering indicated between the academic, spontaneous, and divergent strategies.
2. For techniques-production, the academic and divergent strategies were significantly preferred over the spontaneous and serendipitous strategies. There was no order of preference between the academic and divergent strategies or between the spontaneous and serendipitous strategies.
3. For materials-perception, the academic strategy was significantly preferred over the divergent and serendipitous but not over the spontaneous strategy. The spontaneous strategy was preferred over the serendipitous but not the divergent.

Table 20

Chi-square Analysis on Pairs of Strategies
for Materials-Perception in Conjunction
with Random Scores

Strategy Pair	χ^2	d.f.	Sig. Level
Academic, Spontaneous	0.448	1	0.500000
Spontaneous, Divergent	1.760	1	0.180000
Academic, Divergent	3.980	1	0.046000
Spontaneous, Serendipitous	19.070	1	0.000013

Table 21

Chi-square Analysis on Pairs of Strategies
for Materials-Production in Conjunction
with Random Scores

Strategy Pair	χ^2	d.f.	Sig. Level
Divergent, Academic	1.02	1	0.3100
Academic, Spontaneous	1.37	1	0.2400
Divergent, Spontaneous	4.61	1	0.0320
Academic, Serendipitous	6.80	1	0.0091
Spontaneous, Serendipitous	2.06	1	0.1500

Table 22

Chi-square Analysis on Pairs of Strategies for
Materials-Evaluation in Conjunction
with Random Scores

Strategy Pair	χ^2	d.f.	Sig. Level
Academic, Divergent	1.49	1	0.2200
Divergent, Serendipitous	8.61	1	0.0033

Table 23

Chi-square Analysis on Pairs of Strategies for
Techniques-Perception in Conjunction
with Random Scores

Strategy Pair	χ^2	d.f.	Sig. Level
Academic, Spontaneous	0.99	1	0.3200
Spontaneous, Serendipitous	8.93	1	0.0028

Table 24

Chi-square Analysis on Pairs of Strategies for
Techniques-Production in Conjunction
 with Random Scores

		d.f.	Sig. Level
Divergent, Academic	2.85	1	0.091
Academic, Spontaneous	4.64	1	0.031

Table 25

Chi-square Analysis on Pairs of Strategies for
Techniques-Evaluation in Conjunction
with Random Scores

Strategy Pair	χ^2	d.f.	Sig. Level
Academic, Divergent	2.63	1	0.100
Divergent, Serendipitous	4.85	1	0.027

Table 26

Chi-square Analysis on Pairs of Strategies for
Themes-Evaluation in Conjunction
with Random Scores

Strategy Pair	χ^2	d.f.	Sig. Level
Divergent, Serendipitous	3.99	1	0.046

Table 27
Summary of Strategy Preferences for
Means and Goals

Category	Column 1*	Column 2
Materials-Perception	Academic	Divergent, Serendipitous
	Spontaneous	Serendipitous
Materials-Production	Divergent	Spontaneous, Serendipitous
	Academic	Serendipitous
Materials-Evaluation	Academic	Serendipitous
	Spontaneous	Serendipitous
	Divergent	Serendipitous
Techniques-Perception	Academic	Serendipitous
	Spontaneous	Serendipitous
	Divergent	Serendipitous
Techniques-Production	Divergent	Spontaneous, Serendipitous
	Academic	Spontaneous, Serendipitous
Techniques-Evaluation	Academic	Serendipitous
	Spontaneous	Serendipitous
	Divergent	Serendipitous
Themes-Perception	No Preferences	No Preferences
Themes-Production	No Preferences	No Preferences
Themes-Evaluation	Academic	Serendipitous
	Spontaneous	Serendipitous
	Divergent	Serendipitous

* For each means-goals combination, the strategies in Column 1 are preferred over those in the corresponding row of Column 2 at the 0.05 level of significance.

4. For materials-production, the divergent was significantly preferred over the spontaneous and serendipitous strategies; and the academic strategy was preferred over the serendipitous strategy. The divergent was not preferred over the academic strategy.
5. For themes-perception and themes-production there was no significant preferential ordering among the four strategies.

III. FINDINGS AND DISCUSSION OF QUESTIONNAIRE RESULTS

The findings suggested that for all means and goals, there were no clear preferential distinctions among the strategies. The academic, divergent, and spontaneous strategies were preferred over the serendipitous one. There was no significant preferential ordering indicated between the academic, divergent, and spontaneous strategies.

This over-all order of popularity for the strategies was not altogether unexpected. It was expected that preferences would be shown for a strategy with at least a means or a goal pre-determined as the teachers seemed to feel most comfortable with something defined. Therefore, it was expected that the academic strategy would receive a clear first preference. The fact that preferences were distributed nearly equally among the academic, divergent, and spontaneous strategies, leaving the serendipitous one significantly last suggests that teachers preferred to leave some allowance for creativity (indicated by the popularity of the spontaneous and divergent strategies) although they did not extend their preferences to a completely open-ended strategy

(serendipitous).

How can the strategy preferences (Table 27) for varying combinations of means and goals in problem setting be interpreted? One can study the clustering of strategy preferences (see Table 28) and ask the following. Why were the academic, spontaneous, and divergent strategies preferred over the serendipitous for the means-goals combinations of techniques-evaluation, materials-evaluation, themes-evaluation, and techniques-perception? Why were the divergent and academic strategies preferred over the spontaneous and serendipitous in the techniques-production strategy? Why was there no order of preference indicated for themes-perception and themes-production?

Where teachers indicated a preference for the academic, spontaneous, and divergent strategies over the serendipitous one (Table 28), they were possibly suggesting that for these means-goals combinations (techniques-evaluation, materials-evaluation, themes-evaluation, and themes-perception) they made some allowance for creativity. Possibly when evaluation or perception is a goal, concepts are so elusive to art education and artists, that some allowance for student choice is essential.

The divergent and academic strategies were preferred over the spontaneous and serendipitous strategies when techniques were the means and production the goal in the problem setting situation. This finding means that, as a group, teachers preferred to establish the techniques when the learning objective was production of art. Thus, some allowance for creativity was provided by leaving the goal undetermined.

Table 28
Clustering of Strategy Preferences*

GOALS	MEANS		
	Techniques	Materials	Themes
Evaluation	$\frac{A, Sp, D}{Ser}$	$\frac{A, Sp, D}{Ser}$	$\frac{A, Sp, D}{Ser}$
Perception	$\frac{A, Sp, D}{Ser}$	$\frac{A}{D}$ and $\frac{Sp}{Ser}$	No Preferences
Production	$\frac{D, A}{Sp, Ser}$	$\frac{D}{Sp, Ser}$ and $\frac{A}{Ser}$	No Preferences

* A = academic
Sp = spontaneous

D = divergent
Ser = serendipitous

Each strategy above the line is preferred over that below the line at the 0.05 level of significance.

When teachers considered materials as the means of broadening levels of perception and promoting production the results did not form a clear pattern and were not easily interpreted.

There were no significant preferences revealed among the strategies for the means-goals combinations of themes-perception and themes-production. In these combinations, the serendipitous strategy was not significantly last. This finding suggests that for themes-perception and themes-production teachers were considering the usefulness of the completely creative strategy.

CHAPTER VII

SUMMARY, FINDINGS, SIGNIFICANCE AND RECOMMENDATIONS

In this chapter a summary of the thesis is presented, including the findings. The significance of the findings is noted and recommendations for further research on problem setting strategies in art are made.

I. SUMMARY

The main purposes of the study were: (a) to determine which of the four identified problem setting strategies teachers of high school art preferred; and (b) to discover how strategy preferences were related to particular means or goals of art learning.

This research seemed to have importance because:

1. These problem setting strategies contain degrees of support for the development of creative behaviour.
2. The specific identification of teaching strategies may assist teachers in seeing structure in their directions for students and consequently in introducing efficiency in their work.
3. The survey pointed out the problem setting strategies deemed important by the Calgary art teaching force.

The limitations of the research were in the types of deductions that might be made from structured questions within quite specific areas and the limited number of hypothetical situations presented.

It was assumed that assessing the popularity of strategies could

be achieved through conducting a chi-square analysis for preferential ordering. A further assumption was that teachers understood the directions and items in the questionnaire and they responded honestly.

The review of previous research on teaching strategies focussed on: (1) how strategies were defined; (2) the labels attached to strategies; (3) the scope of the investigation on problem setting strategies in general; and (4) the extent to which problem setting research had been completed in art education. Judging from the relevant research examined, definitions of strategies were based upon objectives and methods of learning. The labelling of strategies and the breadth of strategy concept were varied. No problem setting strategies in previous research have specifically defined means and goals of art education. For these reasons, the present study seemed warranted.

Three of the problem setting strategies originated, in concept, from the learning strategies identified by Beittel and Burkhart. A fourth was added by the author. The four problem setting strategies, identified in terms of the amount of decision making permitted students, were described as follows:

academic strategy--designated means, designated goal;

divergent strategy--designated means, undesigned goal;

spontaneous strategy--undesigned procedure, designated goal;

serendipitous strategy--undesigned procedure, undesigned goal.

Materials, techniques, and themes were selected as primary general means of teaching art. Perceptions, products, and evaluations were selected as major art learning goals. Nine hypothetical problem setting situations for teaching were stated. They contained all possible combinations of

the three means and the three goals. Teachers were asked to indicate a rank order preference for the four strategies for each of the hypothetical problem setting situations.

The preparation, distribution, and collection of the survey instrument were pre-tested in a pilot survey. The final version of the questionnaire contained introductory pages, the problem setting situations, and a page for biographical data.

Biographical data were extracted from the survey instrument, tabulated, and generalizations drawn which described the academic and artistic development of the respondents. To assess the popularity of a problem setting strategy, weighted scores were calculated.

II. FINDINGS

Conclusions drawn from the results were:

1. Over all combinations of means and goals there was no ordering among the academic, divergent, and spontaneous strategies but these were preferred over the serendipitous.
2. For the nine combinations of means with goals, there was either partial ordering among the strategies or none at all.

It was found that:

(a) For materials-perception, the academic was preferred over the divergent and serendipitous strategies. There was no significant preference for the academic over the spontaneous strategy. The spontaneous was preferred over serendipitous strategy but not over the divergent one.

- (b) For materials-production, the divergent strategy was preferred over the spontaneous and serendipitous but not over academic. The academic strategy was preferred over the serendipitous, but not the spontaneous.
- (c) For materials-evaluation, techniques-perception, techniques-evaluation, and themes-evaluation, academic, spontaneous, and divergent were preferred over the serendipitous strategy.
- (d) For techniques-production, the academic and divergent strategies were both preferred over the spontaneous and serendipitous strategies, however, there was no significant preference between the academic and divergent strategies or the spontaneous and serendipitous strategies.
- (e) For themes-perception and themes-production, there were no significant preferences.

III. SIGNIFICANCE OF THE STUDY

The importance of this investigation centres in the effort to arrive at a consistency in the labelling of teaching strategies (which originated largely from learning strategy concepts as identified by Burkhart).

The investigation was an initial, and in some respects, unique attempt to examine problem setting strategies in art education.

One of the most significant results of the investigation was the design and use of a problem setting model, depicted in Figure I. The model is represented by a rectangular solid with three dimensions designating means, goals, and strategies. The intersections bring into

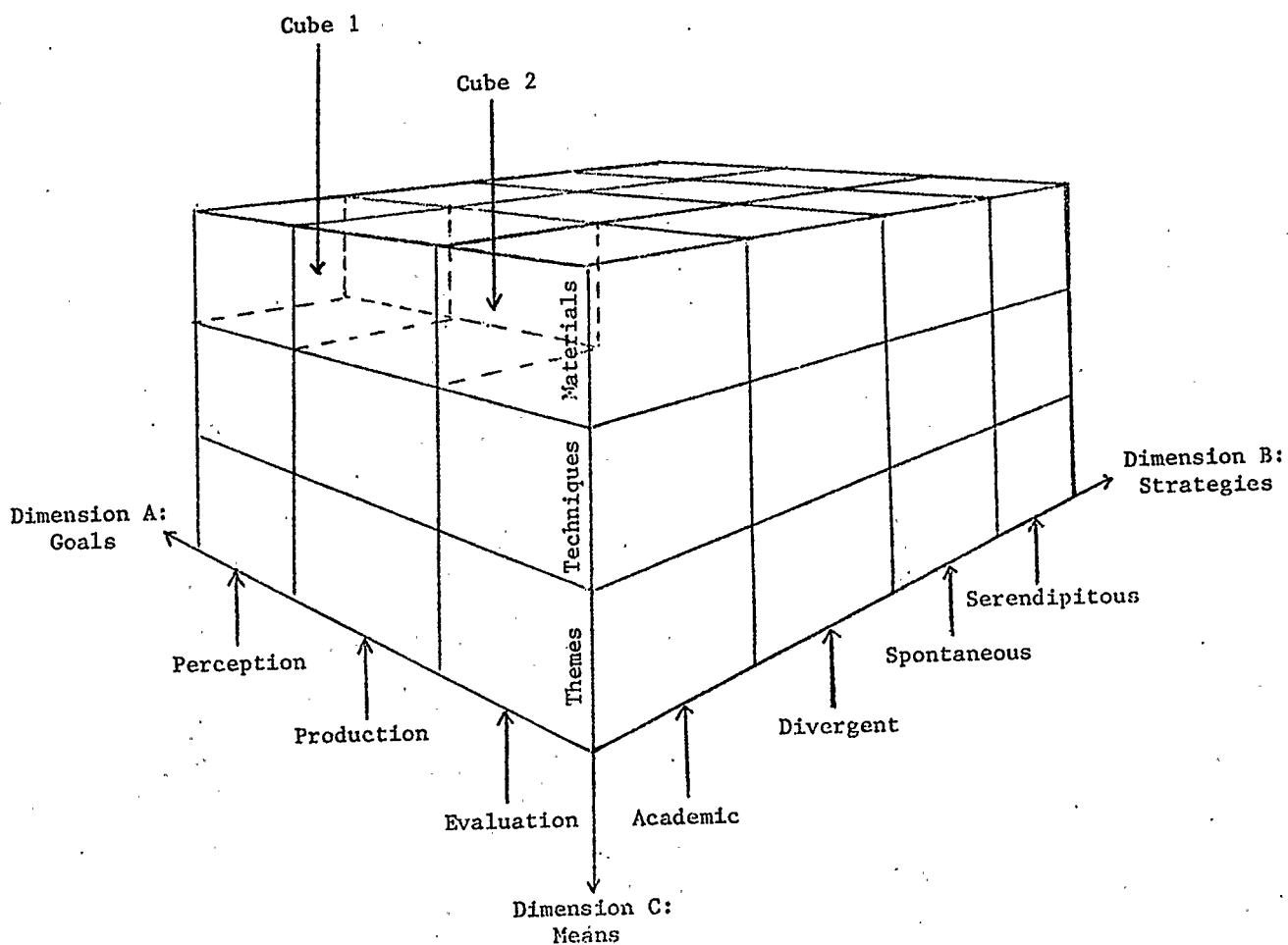


Figure 1

Problem Setting Strategies for Art Instruction

juxtaposition every possible combination of the three types of variables. Dimension C represents the means of learning art. It contains three sections, one for materials, one for techniques, and one for themes. Dimension A represents the goals of learning art, and consists of three sections, one for evaluation, one for production, and one for perception. Dimension B represents the teaching strategies and has four sections, one for the academic strategy, one for the divergent strategy, one for the spontaneous strategy, and one for the serendipitous strategy.

When three sections intersect, this intersection represents the concept of a teaching situation. For example, Cube 1 displays the academic strategy used to present a materials approach as the means of broadening perceptive levels. Cube 2 displays the academic strategy used to present a materials approach as the means of creating art products.

The 36 cubes of the model were embodied in the nine questions in the survey instrument and analyzed.

This model is a useful tool in establishing methods of instruction because of its clear portrayal of relationships of strategies to means and goals of art education. It is a guide for practitioners or for those training to be teachers of art.

The results of the study showed that in general teachers did not limit their preferences to a completely closed strategy (set means and set goal). With minor exceptions a totally open strategy was least preferred (unestablished means and goal). Their choices seemed to lie somewhere between the extremes, which suggests that teachers deem as desirable problem setting with some allowance for creativity.

IV. RECOMMENDATIONS

Arising from the experience with and results of this work, some areas for further investigation are suggested. It is therefore recommended that:

1. A replication of this study be conducted, utilizing
 - (a) a wider range of problem setting situations, and
 - (b) personal interviews with respondents rather than mailed questionnaires.
2. A fourth variable be employed, i.e. curricular areas, thus extending the investigation.
3. Actual classrooms taught by art teachers form the site of a replication of this study, in order to survey actual strategies used by teachers of art.
4. A similar study be conducted, with the analysis extended to include the relationship between strategies preferred (or used) and certain biographical features of the teachers, i.e. academic and experiential background.
5. Appropriate evaluation of classes of students be investigated to test the effectiveness of the strategies as designated by the model used in the present study.

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APPENDICES

APPENDIX A
Letter of Introduction
and Transmittal

Faculty of Fine Arts/Department of Art

October 1, 1971

Mrs. Maureen Enns, as a graduate student in art education at The University of Calgary, is identifying and studying strategies used in the instruction of visual art, as part of her thesis work. Permission has been kindly granted by school officials to seek your assistance in obtaining pertinent data.

Therefore, will you please respond to the two parts of the attached questionnaire and return it in the stamped, self-addressed envelope provided, at your earliest convenience or by October. While there is no compulsion to complete this questionnaire, your help will benefit a future teacher of art. By the same token, your signature is not required unless you wish to be advised the results of the study when it is completed.

Your cooperation is greatly appreciated and thank you for taking time to assist at this busy period of year.

Yours sincerely,

Helen M. Diemert, Professor
of Art Education

HMD:dl

Enclosures: 2

APPENDIX B

Explanatory Page

THE UNIVERSITY OF CALGARY

DEPARTMENT OF ART

IDENTIFICATION OF TEACHING STRATEGIES

Introduction to Part I

This questionnaire is based upon nine hypothetical teaching situations. Each situation is composed of four statements which require completion. For each statement, rank the alternative choices with 1, 2, 3, and 4, according to your preferences.

For example, you may choose to rank an evaluative situation with the following set of responses:

If your class were learning to judge the suitability of ring settings for a particular stone, would you ask the students to:

- (2) examine *any* settings using *designated* criteria
- (1) examine *selected* settings using *designated* criteria
- (3) examine *any* settings using *any* criteria
- (4) examine *selected* settings using *any* criteria

As you respond, assume that each situation is an introductory one and that the students have average capabilities with art learning.

In the above example, you will notice that *any*, *designated* and *selected* are in italics. In this case and throughout, *any* implies student choice whereas *designated*, *selected* (or *explicit*, *specific* or *established*) implies the teacher's selection.

As you read the questionnaire, you will notice that these hypothetical situations involve the major art areas of *materials*, *techniques*, and *themes*. Within each of these areas, I am examining the development of *perceptual abilities*, *production of objects or ideas* and *evaluation skills*.

APPENDIX C

Questionnaire

Ranking of Strategies

PART I

Rank each of the four completing statements with 1, 2, 3, or 4 to indicate your order of preferences. Each of the alternative statements should have a number.

A. Materials - Perception

If your class were learning to recognize drawing papers, would you ask your students to:

- () identify any papers using established guidelines
- () identify specific papers using any guidelines
- * () identify specific papers using established guidelines
- () identify any papers using any guidelines

B. Materials - Production

If your class were learning to weave, would you ask your students to:

- () use any fibres and produce any fabric
- () use selected fibres and produce a specific fabric
- () use any fibres and produce a specific fabric
- () use selected fibres and produce any fabric

C. Materials - Evaluation

If your class were learning to judge the suitability of glazes for clay bodies, would you ask your students to:

- () evaluate explicit glazes using designated criteria
- () evaluate any glazes using any criteria
- () evaluate explicit glazes using any criteria
- () evaluate any glazes using designated criteria

D. Techniques - Perception

If your class were learning to recognize methods of constructing furniture, would you ask your students to:

- () recognize specific building techniques using any models
- () recognize any building techniques using established models
- () recognize any building techniques using any models
- () recognize specific building techniques using established models

* Represented by cube I in Figure III.

E. Techniques - Production

If your class were learning to produce plastic jewelry, would you ask your students to:

- () follow any procedures and produce specific pieces of jewelry
- () follow selected procedures and produce any pieces of jewelry
- () follow selected procedures and produce specific pieces of jewelry
- () follow any procedures and produce any pieces of jewelry

F. Techniques - Evaluation

If your class were learning to evaluate the suitability of construction methods for making mosaics, would you ask your students to:

- () judge any technique using any criteria
- () judge explicit techniques using designated criteria
- () judge any techniques using designated criteria
- () judge explicit techniques using any criteria

G. Themes - Perception

If your class were learning to become aware of expressive themes, in sculpture, would you ask your students to:

- () examine specific content using established methods
- () examine any content using any methods
- () examine specific content using any method
- () examine any content using established methods

H. Themes - Production

If your class were learning to develop themes for a sequence of prints, would you ask your students to:

- () study selected phenomena and create any types of themes
- () study any phenomena and create specific types of themes
- () study any phenomena and create any types of themes
- () study selected phenomena and create specific types of themes

I. Themes - Evaluation

If your class were learning to judge the suitability of media to themes in paintings, would you ask your students to:

- () evaluate explicit themes and media applying designated criteria
- () evaluate explicit themes and media applying any criteria
- () evaluate any themes and media applying designated criteria
- () evaluate any themes and media applying any criteria

APPENDIX D

Questionnaire

Biographical Information

PART II

Please indicate with a check mark [✓] or make appropriate responses for each of the following questions concerning yourself:

1. Male _____ Female _____
2. Age bracket (19-29) _____ (30-39) _____ (40-49) _____ (50 or over) _____
3. Total number of years of all teaching experience _____
4. Number of years of experience teaching art _____
5. What level of art do you teach? Junior High _____ Senior High _____
6. List names of university degrees you hold _____
7. Number of art courses you have taken (university and others) _____
8. Number of years since your last art course was taken _____
9. Describe your major areas of art production

(painting)(drawing)(sculpture)(graphics)(ceramics)(others, please list)(none)
10. Daily average number of hours you spend on personal art production _____
11. Number of professional periodicals dealing with art and art education you examine regularly _____
12. Approximate number of original works of fine art in your possession _____
13. Approximate number of books on art in your personal library _____
14. Average number of art exhibitions you attend annually _____
15. Are you a member of an art gallery? Yes _____ No _____
16. Have you been a member of an art gallery? Yes _____ No _____

[I wish to be advised of the results of this study. Yes _____ No _____]

Signature (optional) _____

Name of school (optional) _____

ME: October 1970: Thank you very much for your help.

APPENDIX E

Table 29

Data Collected from the Survey Instrument for the Testing
of Four Hypothetical Strategies Used by Junior
and Senior High School Art Teachers

Table 29

Data Collected from the Survey Instrument for the Testing
of Four Hypothetical Strategies Used by Junior
and Senior High School Art Teachers†

(M E A N S - G O A L S - S T R A T E G I E S)																								
1. ACADEMIC				2. DIVERGENT				3. SPONTANEOUS								4. SERENDIPITOUS								Means Goals Strategy
Materials Perception		Materials Production		Materials Evaluation		Technique Perception		Technique Production		Technique Evaluation		Theme Perception		Theme Production		Theme Evaluation								
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4					
1	3	2	4	4	2	3	1	2	3	1	4	1	2	3	4	4	3	2	1	1				
4	2	3	1	4	3	2	1	4	2	3	1	4	2	3	1	4	3	2	1	2				
1	3	2	4	4	3	2	1	1	3	2	4	4	3	2	1	4	3	2	1	3				
2	3	1	4	4	2	3	1	2	3	1	4	3	2	4	1	1	3	2	4	4				
2	4	1	3	4	2	3	1	2	3	1	4	3	1	4	2	2	3	1	4	5				
3	2	4	1	1	2	3	4	3	2	4	1	4	2	3	1	2	4	3	1	6				
2	3	1	4	2	1	3	4	4	2	3	1	3	2	4	1	2	1	4	3	7				
1	3	2	4	4	2	3	1	4	2	3	1	4	3	2	1	4	2	3	1	8				
1	2	3	4	2	1	3	4	3	1	4	2	1	4	3	2	1	2	3	4	9				
1	3	2	4	4	1	3	2	2	3	1	4	1	2	3	4	2	1	4	3	10				
2	3	1	4	2	4	1	3	2	1	3	4	2	1	3	4	2	3	1	4	11				
1	3	2	4	4	1	2	3	3	1	2	4	2	1	3	4	2	3	1	4	12				
4	1	2	3	3	2	1	4	2	3	1	4	2	1	3	4	4	1	2	3	13				
4	1	3	2	4	1	3	2	4	3	1	2	4	1	3	2	4	1	3	2	14				
1	2	3	4	4	2	3	1	2	1	4	3	4	1	2	3	3	1	4	2	15				
1	3	2	4	3	1	2	4	3	2	1	4	3	1	2	4	4	1	2	3	16				
2	1	3	4	2	1	3	4	1	3	2	4	2	1	3	4	3	1	2	4	17				

†65 subjects; 36 variables

Table 29 (continued)

(M E A N S - G O A L S - S T R A T E G I E S)

1. ACADEMIC				2. DIVERGENT				3. SPONTANEOUS				4. SERENDIPITOUS				Means Goals Strategy				
Materials Perception		Materials Production		Materials Evaluation		Technique Perception		Technique Production		Technique Evaluation		Theme Perception		Theme Production			Theme Evaluation			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		1	2	3	4
3	2	1	4	3	1	2	4	3	1	2	4	4	1	2	3	4	1	2	3	18
4	3	2	1	3	2	1	4	4	1	3	2	3	1	2	4	2	1	3	4	19
2	3	1	4	2	1	3	4	2	1	3	4	4	3	2	1	4	3	2	1	20
1	3	2	4	3	1	2	4	1	3	2	4	4	1	2	3	1	2	3	4	21
1	3	2	4	2	1	4	3	4	3	1	2	4	3	2	1	4	3	2	1	22
4	1	2	3	4	2	1	3	3	1	2	4	3	2	1	4	4	3	2	1	23
4	2	1	3	4	1	2	3	4	3	2	1	4	2	3	1	4	3	1	2	24
1	3	2	4	2	1	4	3	2	1	3	4	2	4	1	3	4	2	3	1	25
4	1	3	2	4	1	3	2	2	4	1	3	4	3	2	1	4	2	3	1	26
1	3	2	4	3	2	1	4	4	1	2	3	4	2	1	3	4	3	1	2	27
2	3	1	4	2	1	3	4	2	3	1	4	2	3	1	4	3	2	1	4	28
2	3	1	4	1	3	2	4	2	1	3	4	2	3	1	4	4	1	3	2	29
1	3	2	4	2	1	3	4	2	3	1	4	3	2	1	4	4	1	3	2	30
2	3	1	4	2	1	3	4	1	3	2	4	2	1	3	4	2	1	3	4	31
1	3	2	4	4	2	3	1	1	3	2	4	3	1	4	2	4	3	2	1	32
4	3	1	2	1	2	4	3	3	1	4	2	1	4	2	3	4	3	1	2	33
1	3	2	4	1	2	3	4	4	3	2	1	1	2	3	4	4	1	3	2	34
1	3	2	4	3	1	2	4	2	3	1	4	4	2	1	3	1	3	2	4	35
1	2	3	4	1	2	3	4	1	3	2	4	2	1	3	4	1	4	2	3	36

Table 29 (continued)

(MEANS - GOALS - STRATEGIES)																				
1. ACADEMIC				2. DIVERGENT				3. SPONTANEOUS				4. SERENDIPITOUS				Means Goals Strategy				
Materials Perception		Materials Production		Materials Evaluation		Technique Perception		Technique Production		Technique Evaluation		Theme Perception		Theme Production			Theme Evaluation			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		1	2	3	4
4	2	3	1	1	3	2	4	1	2	3	4	2	4	1	3	1	3	4	2	37
1	3	2	4	1	2	3	4	2	3	1	4	4	3	2	1	1	2	3	4	38
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	39
1	3	2	4	1	2	4	3	1	3	2	4	3	2	1	4	1	2	3	4	40
1	3	2	4	1	2	3	4	1	3	2	4	1	2	3	4	2	3	1	4	41
1	3	2	4	1	2	3	4	1	3	2	4	4	1	3	2	1	2	3	4	42
1	3	2	4	1	2	3	4	1	3	2	4	2	3	1	4	1	3	2	4	43
1	3	2	4	1	2	3	4	1	3	2	4	2	3	1	4	1	3	2	4	44
1	3	2	4	1	2	3	4	1	3	2	4	3	2	1	4	1	3	2	4	45
2	3	1	4	4	2	3	1	2	1	3	4	1	3	2	4	1	3	2	4	46
1	3	2	4	1	2	3	4	4	2	3	1	3	2	4	1	3	1	4	2	47
1	3	2	4	1	3	4	2	1	2	4	3	1	2	3	4	1	2	3	4	48
1	3	2	4	1	2	3	4	1	3	2	4	1	3	2	4	1	2	3	4	49
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	4	2	1	3	50
1	3	2	4	1	2	3	4	2	1	3	4	2	3	1	4	1	2	3	4	51
1	3	2	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	52
1	3	2	4	3	1	4	2	1	3	2	1	1	2	3	4	1	3	2	4	53
4	2	3	1	1	3	2	4	3	1	4	2	1	2	3	4	4	3	2	1	54
2	3	1	4	4	1	3	2	1	4	2	3	1	3	2	4	4	2	3	1	

Table 29 (continued)

(M E A N S - G O A L S - S T R A T E G I E S)																				
1. ACADEMIC				2. DIVERGENT				3. SPONTANEOUS								4. SERENDIPITOUS				Means Goals Strategy
Materials Perception		Materials Production		Materials Evaluation		Technique Perception		Technique Production		Technique Evaluation		Theme Perception		Theme Production		Theme Evaluation				
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1	2	3	4	1	2	3	4	1	2	3	4	2	1	4	3	4	3	1	2	55
2	1	3	4	1	2	3	4	3	2	4	1	1	2	4	3	1	4	2	3	56
2	3	1	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	57
1	3	2	4	1	2	3	4	1	2	3	4	2	1	3	4	1	3	2	4	58
1	2	3	4	2	3	1	4	1	2	3	4	2	1	4	3	1	3	2	4	59
2	3	1	4	1	3	2	4	1	3	2	4	4	2	3	1	1	3	2	4	60
1	2	3	4	4	2	3	1	1	3	2	4	1	2	4	3	4	1	3	2	61
1	2	3	4	1	2	3	4	1	3	2	4	2	1	3	4	1	2	3	4	62
1	2	3	4	4	1	2	3	1	2	3	4	4	1	3	2	1	2	3	4	63
1	3	2	4	1	2	3	4	1	3	2	4	1	2	3	4	1	3	2	4	64
2	3	1	4	1	2	3	4	1	2	3	4	1	2	4	3	3	1	2	4	65

APPENDIX F

Table 30

Data Collected from the Survey Instrument for the Description
and Testing of Biographical Information

Table 30

Data Collected from the Survey Instrument for the Description
and Testing of Biographical Information†

Sub- ject	Sex	Age	Teaching	Art Teach- ing	Teach- ing Level	Degrees	Number of Art Courses	Time Since Last Course	Breadth of Produc- tion	Gallery Affili- ation	Amount of Produc- tion	Profes- sional Periodi- cals	Art Books	Ori- ginal Art Owned	Annual Exhibit Atten- dance
	1 M 2 F	1 (19-29) 2 (30-39) 3 (40-49) 4 (50+)	1 (1-5) 2 (6-10) 3 (11-20) 4 (21+)	1 (1-5) 2 (6-10) 3 (11-20) 4 (21+)	1 J 2 S	1 None 2 One 3 Two 4 Masters	1 None 2 (1-5) 3 (6-10) 4 (11+)	1 None 2 (1-5) 3 (6-10) 4 (11+)	1 None 2 One Area 3 Two or More 4 Other Areas	1 Yes 2 No	1 None 2 1 hr. 3 2 hrs. 4 More	1 None 2 One 3 Two or Three 4 More	1 None 2 (1-5) 3 (6-10) 4 (11+)	1 None 2 (1-5) 3 (6-10) 4 (11+)	1 None 2 (1-5) 3 (6-10) 4 (11+)
1	1	1	1	1	1	2	3	2	2	2	3	3	2	1	2
2	1	1	1	1	1	2	2	2	3	2	2	1	3	1	2
3	2	3	4	2	1	3	4	1	3	1	4	3	4	4	3
4	2	3	2	1	1	3	1	4	3	2	1	1	3	2	2
5	2	2	2	2	2	2	4	1	3	1	3	3	4	4	4
6	1	1	2	2	2	2	3	1	2	1	4	4	4	4	4
7	1	1	1	1	1	1	2	2	4	2	2	1	2	2	2
8	1	2	2	2	1	2	2	3	1	2	1	1	1	1	2
9	2	4	4	4	1	1	3	2	3	1	1	3	4	2	3
10	2	1	2	2	2	1	3	1	3	2	1	2	4	2	2
11	2	1	1	1	1	2	2	2	1	2	1	2	2	1	2
12	2	1	1	1	2	2	4	2	3	2	3	3	4	2	1

†65 subjects; 15 variables

Table 30 (continued)

Sub- ject	Sex	Age	Teaching	Art Teach- ing	Teach- ing Level	Degrees	Number of Art Courses	Time Since Last Course	Breadth of Produc- tion	Gallery Affili- ation	Amount of Produc- tion	Profes- sional Periodi- cals	Art Books	Ori- ginal Art Owned	Annual Exhibit Attende- ance
1 M	1	(19-29)	1 (1-5)	1 (1-5)	1 J	1 None	1 None	1 None	1 None	1 Yes	1 None	1 None	1 None	1 None	1 None
2 F	2	(30-39)	2 (6-10)	2 (6-10)	2 S	2 One	2 (1-5)	2 (1-5)	2 One	2 No	2 1 hr.	2 One	2 (1-5)	2 (1-5)	2 (1-5)
	3	(40-49)	3 (11-20)	3 (11-20)		3 Two	3 (6-10)	3 (6-10)	Area		3 2 hrs.	3 Two or	3 (6-10)	3 (6-10)	3 (6-10)
	4	(50+)	4 (21+)	4 (21+)		4 Masters	4 (11+)	4 (11+)	3 Two or More 4 Other Areas		4 More	3 Three 4 More	4 (11+)	4 (11+)	4 (11+)
13	2	1	1	1	1	3	4	1	3	2	1	1	4	1	2
14	2	4	4	4	1	4	2	4	3	2	1	1	4	1	3
15	1	3	3	3	2	3	4	2	3	1	2	3	4	4	4
16	2	1	1	1	1	3	2	2	2	2	2	2	2	3	2
17	2	1	1	1	1	2	2	2	3	2	2	2	3	1	2
18	1	2	3	2	1	3	1	4	2	2	1	1	1	1	1
19	1	3	2	1	1	2	2	3	2	2	1	1	1	1	1
20	1	1	1	1	1	2	2	1	3	2	1	3	3	3	1
21	2	1	1	1	1	2	1	4	3	2	2	3	3	3	2
22	2	4	3	3	1	2	3	2	3	2	2	3	4	4	3
23	1	3	1	1	2	1	4	3	3	2	2	4	4	4	4
24	1	1	2	1	2	2	3	2	3	1	2	4	4	3	4
25	1	1	1	1	1	2	2	2	3	2	1	2	3	1	2
26	2	1	1	1	1	2	3	2	2	1	2	3	4	4	4

Table 30 (continued)

Sub- ject	Sex	Age	Teaching	Art Teach- ing	Teach- ing Level	Degrees	Number of Art Courses	Time Since Last Course	Breadth of Produc- tion	Gallery Affili- ation	Amount of Produc- tion	Profes- sional Periodi- cals	Art Books	Ori- ginal Art Owned	Annual Exhibit Atten- dance
	1 M	1 (19-29)	1 (1-5)	1 (1-5)	1 J	1 None	1 None	1 None	1 None	1 Yes	1 None	1 None	1 None	1 None	1 None
	2 F	2 (30-39)	2 (6-10)	2 (6-10)	2 S	2 One	2 (1-5)	2 (1-5)	2 One	2 No	2 1 hr.	2 One	2 (1-5)	2 (1-5)	2 (1-5)
		3 (40-49)	3 (11-20)	3 (11-20)		3 Two	3 (6-10)	3 (6-10)	Area		3 2 hrs.	3 Two or	3 (6-10)	3 (6-10)	3 (6-10)
		4 (50+)	4 (21+)	4 (21+)		4 Masters	4 (11+)	4 (11+)	3 Two or More 4 Other Areas		4 More	Three 4 More	4 (11+)	4 (11+)	4 (11+)
27	1	3	2	1	1	2	2	1	3	2	2	1	1	2	3
28	2	1	1	1	1	2	2	2	3	2	2	1	2	1	1
29	2	4	1	1	1	2	2	1	3	2	1	4	3	4	2
30	1	3	1	1	2	2	4	3	3	2	2	3	4	3	3
31	2	1	1	1	1	1	3	2	2	2	2	3	4	4	2
32	1	2	2	2	2	2	3	2	3	2	2	3	4	1	4
33	1	2	2	2	2	2	3	2	3	2	2	3	4	1	4
34	1	1	2	2	1	2	3	2	2	2	2	3	3	1	3
35	2	1	1	1	1	2	2	2	2	2	2	3	3	2	1
36	2	1	2	2	1	1	3	1	3	1	2	4	4	1	2
37	1	3	3	3	1	2	3	1	3	2	2	2	2	2	3
38	1	1	1	1	2	3	3	2	3	2	2	1	4	4	4
39	2	2	2	2	1	1	2	2	3	1	2	4	4	3	3
40	1	1	2	1	2	2	2	2	3	2	1	3	1	1	3

Table 30 (continued)

Subject	Sex	Age	Teaching	Art Teaching	Teaching Level	Degrees	Number of Art Courses	Time Since Last Course	Breadth of Production	Gallery Affiliation	Amount of Production	Professional Periodicals	Art Books	Original Art Owned	Annual Exhibit Attendance
	1 M	1 (19-29)	1 (1-5)	1 (1-5)	1 J	1 None	1 None	1 None	1 None	1 Yes	1 None	1 None	1 None	1 None	1 None
	2 F	2 (30-39)	2 (6-10)	2 (6-10)	2 S	2 One	2 (1-5)	2 (1-5)	2 One	2 No	2 1 hr.	2 One	2 (1-5)	2 (1-5)	2 (1-5)
		3 (40-49)	3 (11-20)	3 (11-20)		3 Two	3 (6-10)	3 (6-10)	Area		3 2 hrs.	3 Two or Three	3 (6-10)	3 (6-10)	3 (6-10)
		4 (50+)	4 (21+)	4 (21+)		4 Masters	4 (11+)	4 (11+)	3 Two or More 4 Other Areas		4 More	4 More	4 (11+)	4 (11+)	4 (11+)
41	2	1	1	1	1	2	3	3	3	2	2	3	2	1	2
42	1	2	1	1	1	2	2	2	2	2	2	1	1	1	2
43	1	3	3	1	1	1	2	2	3	2	1	2	4	4	2
44	1	1	1	1	1	2	2	2	2	1	2	3	4	3	2
45	1	1	1	1	1	2	2	1	3	2	2	2	2	4	1
46	1	2	1	1	1	2	2	2	1	2	1	1	1	1	1
47	2	1	1	1	1	3	1	4	1	1	1	3	4	1	1
48	2	2	3	1	1	2	3	2	3	2	2	3	3	1	2
49	2	1	1	1	1	2	1	4	1	2	1	1	1	1	1
50	1	1	2	2	2	1	4	2	3	1	2	3	4	3	4
51	2	3	1	1	1	2	2	2	3	2	1	2	2	2	3
52	2	2	2	2	1	2	4	2	3	1	2	4	4	1	4
53	2	1	1	1	1	2	3	1	2	1	2	3	2	2	1
54	1	1	1	1	1	2	4	1	3	2	2	2	4	4	3

Table 30 (continued)

Sub- ject	Sex	Age	Teaching	Art Teach- ing	Teach- ing Level	Degrees	Number of Art Courses	Time Since Last Course	Breadth of Produc- tion	Gallery Affili- ation	Amount of Produc- tion	Profes- sional Periodi- cals	Art Books	Ori- ginal Art Owned	Annual Exhibit Attен- dance
	1 M	1 (19-29)	1 (1-5)	1 (1-5)	1 J	1 None	1 None	1 None	1 None	1 Yes	1 None	1 None	1 None	1 None	1 None
	2 F	2 (30-39)	2 (6-10)	2 (6-10)	2 S	2 One	2 (1-5)	2 (1-5)	2 One	2 No	2 1 hr.	2 One	2 (1-5)	2 (1-5)	2 (1-5)
		3 (40-49)	3 (11-20)	3 (11-20)		3 Two	3 (6-10)	3 (6-10)	Area		3 2 hrs.	3 Two or	3 (6-10)	3 (6-10)	3 (6-10)
		4 (50+)	4 (21+)	4 (21+)		4 Masters	4 (11+)	4 (11+)	3 Two or More 4 Other Areas		4 More	4 More	4 (11+)	4 (11+)	4 (11+)
55	2	4	3	3	1	1	3	2	3	2	2	1	2	3	2
56	2	1	1	1	1	1	2	1	3	2	1	3	4	1	3
57	1	1	1	1	1	1	2	2	3	2	1	1	2	1	2
58	2	3	1	1	2	2	4	2	3	1	2	3	4	4	3
59	1	1	1	1	2	2	2	2	3	2	2	3	4	1	4
60	2	4	4	4	1	1	2	3	3	2	1	4	4	4	3
61	2	1	1	1	2	2	4	2	2	1	2	3	4	3	4
62	1	2	3	3	1	2	2	2	2	2	1	3	4	4	3
63	1	2	2	2	1	1	1	4	4	2	2	1	2	1	1
64	1	1	1	1	2	1	2	2	3	2	4	3	2	3	3
65	2	1	1	1	1	2	3	2	3	2	2	3	3	2	3